

**FARMERS, AUTONOMY AND
SUSTAINABLE RURAL LIVELIHOODS:
BIODIESEL PRODUCTION IN
BRAZIL AND TIMOR-LESTE**

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CERTIFICATE OF ORIGINAL AUTHORSHIP

I certify that the work in this thesis has not previously been submitted for a degree nor has it been submitted as part of requirements for a degree except as part of the collaborative doctoral degree and/or fully acknowledged within the text.

I also certify that the thesis has been written by me. Any help that I have received in my research work and the preparation of the thesis itself has been acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

This research was supported by an Australian Government Research Training Program Scholarship.

Signature of Student:

Date: 24 July 2017

Dedication

This thesis is dedicated to my Grandmothers (in memoriam):

Hilda Vera Gibbons (née Johnston)

Joan Gwendoline Kilham (née Tapfield)

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Abstract

Biodiesel schemes in the Global South have been espoused as able to address the complex intersection of alternative energy sources, rural development, sustainable agriculture and social welfare. Smallholder farmers are recognised as being central to the success or failures of these schemes yet the ways in which smallholder farmers negotiate their participation in biodiesel schemes as part of a wider livelihood strategy is currently under-theorised and based on limited empirical research. Understanding this process of negotiation and the reasons that smallholder farmers may choose to participate or not participate in biodiesel schemes is critical to developing a nuanced theory about the role of biodiesel schemes for rural development.

The purpose of this thesis was to consider smallholder farmers' participation in biodiesel schemes and the ways that biodiesel schemes have been incorporated into rural livelihoods. This study provides a way to bring smallholder farmers' experiences to the fore in the biodiesel debate.

To address this problem space, I interviewed smallholder farmers participating in government led biodiesel schemes in Brazil and Timor-Leste. These two biodiesel schemes were chosen due to similarities between the rural development and social inclusion goals of each scheme. I used a transdisciplinary research approach that was problem-centred, collaborative and methodologically flexible. Through the application of Grounded Theory Method to the farmer informants' narratives, I developed a novel conceptual framework titled the *Autonomous Livelihood Framework*.

The findings from this study indicate smallholder farmer narratives can re-interpret and challenge current biodiesel policy analysis. Farmers do not

simply respond and react to biodiesel schemes as external economic and agricultural policies: they actively manage their participation (or non-participation) in such schemes. The farmer informants' narratives about livelihoods and participation in biodiesel schemes — which are at times contradictory and difficult to justify under externally determined notions of success — make sense when interpreted through the notion of negotiating for autonomy. Autonomy is a useful theoretical concept and the Autonomous Livelihood Framework offers a unique way of interpreting livelihoods. A shift in perspective to consider smallholder farmer's as actors with agency that are negotiating their autonomy are more likely to result in solutions for the social questions of biodiesel schemes that are acceptable, adoptable and durable. This thesis is part of an emerging body of scholarship that is applying the concept of autonomy to rural livelihoods and moving forward not only via actor-centred approaches but with research grounded in farmer's own narratives.

Transcription and Translation

The farmer informants narratives used in thesis appear italicised and with double quotations marks to indicate informants spoken words as distinct from the author's commentary.

To enhance readability, specific punctuation, regional dialects and speech patterns have been removed. In addition, all audio spoken recordings were transcribed and then translated into Australian English. As such, the quotations here should be read as paraphrases rather than verbatim quotations from farmer informants.

Original audio-recording material will be available via a Data Archive (see Annex 4: Data Sharing and Archiving via Databank).

Transcription and translation work was as follows:

Brazil

Interviews in Brazil were conducted in Portuguese. Drielle Bezerra, Eliza Ferreira de Oliveira and Sarina Kilham provided transcription. Sarina Kilham undertook translation.

Timor-Leste

Interviews in Timor-Leste were conducted in Tetum. Olga Villanova and Sarina Kilham provided transcription. Sarina Kilham undertook translation.

Chapter 1: Introduction

1.1 How the study originated

This doctoral research project was born out of a long-standing interest in Timor-Leste and the choices its people, government and the international community made about appropriate sustainable development options in the early years of becoming a sovereign nation. At the time of writing this, more than a decade and a half has passed since the referendum in which a majority of Timorese people voted for independence from Indonesia, and in the intervening years both the Timorese people and the world have been watching the process of the ‘birth of a nation’. Timor-Leste has experienced the push and pull of competing development agendas (Anderson, 2012) and faced the *wicked problem* of addressing resource management for current and future generations (Drysdale, 2012).

I spent my formative years as a young adult working in Timor-Leste and the time I spent in living in the mountains and working in local communities deeply affected my ideas about development, agriculture, sustainability and the future of family farming. In 2007 I became aware of various memoranda of understanding (MOU) signed by the Government of Timor-Leste (GoTL) with private agri-businesses, proposing large-scale and widespread biofuel projects throughout the country (Centre on Housing Rights and Evictions, 2008; GT Leste Biotech & Ministério da Agricultura e Pescas, 2008; República Democrática de Timor-Leste & Enviroenergy Development

Australia Pty. Limited, 2008). I had serious concerns about the proposals and was sceptical of the social benefits espoused in press releases and public meetings (Lao Hamutuk, 2008). I believed a serious piece of doctoral research may have been able to influence a ‘more’ sustainable policy outcome and I began to search to biofuel research and models that focused on family farmers in other countries. I uncovered two facts. Firstly, in terms of experience, longevity and socially focused biofuel models, Brazil was a global trailblazer. Secondly, there existed very little primary academic research with family farmers on their experiences and perceptions of biofuel production as a model for rural development.

In my mind, Timor-Leste and Brazil became the perfect pair for a research project focusing on countries that are pursuing biofuel production as part of a wider objective of ‘sustainable rural development’, including in particular, social inclusion and poverty reduction for family farmers¹. Brazil has been producing biofuel since the 1970s and has developed significant policies, technologies and cross-sectoral subsidies and until 2006 was the international lead producer and consumer of biofuels (Pousa, Santos & Suarez, 2007). Further, in 2005 Brazil specifically launched the National Biodiesel Production and Use Policy (Portuguese: *Programa Nacional de Produção e uso do Biodiesel*; PNPB) that had the explicit aim of increasing social inclusion for family farmers and was structured to support rural development (Rathmann, Szklo & Schaeffer, 2012). I refer to this as the PNPB model.

¹ Timor-Leste and Brazil share aspects of their colonial heritage as Portuguese colonies. Portuguese language is spoken in both countries.

In stark contrast, at the commencement of my doctoral research in January 2009, Timor-Leste had experimented with only one small-scale pilot project and none of the MOUs signed in 2007 and 2008 had materialised into on-the-ground projects. Timor-Leste had no official national policy on biofuels and this remains the case at the time of publication (2017). By 2010, the GoTL had commenced an official biofuel pilot project — The Agro-Energy Program (Tetum: *Programa Agro-Enerjia*) — that borrowed aspects of the Brazilian PNPB model.

My research project began to take more shape: here was an instance of one nation being influenced by the PNPB model. I wondered: What evidence exists that the Brazilian model is working for family farmers? And how might I examine the issues that truly interest me — lying somewhere at the intersection of sustainable agriculture and social sustainability, specifically with a farmer centred approach?

As with a plethora of doctoral research projects, the focus of this thesis has shifted from my original conceptualisation, through the influences of fieldwork, exposure to different theories, serendipitous conversations in the lunch room and perhaps most importantly, farmer informants own explanations of their experiences, which forced a re-thinking and re-imagining during this process of thesis creation.

This thesis does not, and cannot, capture all the possible connections and interpretations that could emerge from the fieldwork in Brazil and Timor-Leste. However, it does attempt to explain some of the shifting conceptualisations, draw on elements of social sustainability and social inclusion, and ground the empirical work in the emerging discourse of

‘autonomy of smallholder farmers. In this sense, I embrace the notion put forward by van der Ploeg (2008) that considers smallholder farmers as being in an ongoing *struggle for autonomy* in contexts characterised by the push and pull of marginalisation and integration, in forging new identities and maintaining social reproduction, and in negotiating what it means to be a smallholder farmer in an increasingly globalised world.

1.2 Biodiesel Schemes, Smallholder Farmers and Rural Livelihoods

Biofuel schemes — particularly in the Global South — have been espoused as able to address the complex intersection of alternative energy sources, rural development, sustainable agriculture and social welfare (Florin, van Ittersum & van de Ven, 2012b). Smallholder farmers are increasingly recognised as being central to the success or failures of these programs (Florin, van de Ven & van Ittersum, 2014) yet the ways in which smallholder farmers negotiate their participation in biofuel schemes as part of a wider livelihood strategy is currently under-theorised and based on limited empirical research (Hodbod & Tomei, 2013).

Understanding this process of negotiation and the reasons that smallholder farmers may choose to participate or not participate in biofuel schemes is critical to developing a nuanced theory about the role of biofuel schemes for rural development. Heightened concern about the direct and indirect effects of biofuel production on issues such as food security, land use change and social impacts on rural households has largely polarised the debate about whether biofuels compound the existing challenges of the food-society-

energy nexus or offer a panacea. These highly contested biofuel production issues intersect with broader theoretical concerns about how agrarian and rural development occurs, and within that, how smallholder farmers negotiate their livelihoods within systems of flux and an era of globalisation.

In Brazil — despite rural development outcomes and benefits for smallholder farmers being the centre piece of the biodiesel production policy — the experiences of smallholder farmers themselves remains under-researched. Whilst there is an increasing body of substantive research investigating the relationships between biodiesel and rural development (César & Batalha, 2013; Florin, van Ittersum & van de Ven, 2013; Stattman & Mol, 2014) — there is a limited body of research that adequately examines this from a transdisciplinary perspective centred on smallholder farmers own experiences, explanations and perceptions of biodiesel schemes within broader rural livelihoods.

This thesis responds to this research gap by developing a conceptual framework for interpreting smallholder farmer's livelihoods and the emerging rural development outcomes from biodiesel schemes. This thesis promotes the idea of smallholder farmers as active agents in agricultural and rural development and highlights the importance of smallholder farmer knowledge to biodiesel schemes. The conceptual framework developed in this thesis — the Autonomous Livelihood Framework — is a result of the use of Grounded Theory Method combined with aspects drawn from the Sustainable Livelihood Framework (Scoones, 1998, 2009) and theorisation on the autonomy of peasants (Schneider & Niederle, 2010; Stock, Forney, Emery & Wittman, 2014; van der Ploeg, 2008).

Specifically, I look at smallholder farmers participating in Government-Led-Biodiesel-for-Rural-Development schemes (referred to as *biodiesel schemes* from here on) in the Northeast State of Bahia, Brazil and in six districts of Timor-Leste. Brazil and Timor-Leste both implemented biodiesel schemes that were centred on the social inclusion of smallholder farmers and explicitly espoused rural development outcomes. In practice, the PNPB model has been criticised for the continued marginalisation of smallholder farmers and the reproduction of the large scale market-oriented agro-industrial agricultural model (Selfa et al., 2015). The Timorese Agro-Energy Program struggled to function effectively due to logistical challenges and the lead government agency was dissolved three years after the pilot began. Yet, these two biodiesel schemes did attract and retain the participation of smallholder farmers. These cases invoke the core question of this research:

How can we explain smallholder farmer' participation in Government-Led-Biodiesel-for-Rural-Development schemes as part of a rural livelihood in Brazil and Timor-Leste?

Brazil and Timor-Leste provide suitable contexts in which to explore this question because:

- (a) The biodiesel schemes in both locations centred on rural development outcomes and changes to smallholder farmers livelihoods, and
- (b) Smallholder farmers make significant contributions to the national economy in both locations.

In Timor-Leste, 85% of the population are engaged in smallholder subsistence farming (Lundahl & Sjöholm, 2013) and in Brazil there are around

4.3 million smallholder farms that are responsible for the production of the majority of basic consumer food items for the entire population of 200 million people (Lindoso et al., 2011). As such, changes to rural livelihoods and the farming activities of smallholder farmers have significant national implications.

This thesis represents one of the first attempts to integrate the burgeoning literature on the social implications of biofuels (specifically biodiesel) with the broader rural development and agrarian literature on the autonomy of smallholder farmers. As far as I am aware, it is the first study in Timor-Leste to investigate the experiences of smallholder farmers producing feedstock for biodiesel and to comprehensively document the Timorese Agro-Energy Program. In Brazil, this study is one of the earliest qualitative studies undertaken on the PNPB in Bahia and one of the few studies that is smallholder farmer-centred.

1.3 Research Aim and Questions

At the broadest level, the problem space of this study was identified as:

What are the social sustainability issues and rural livelihood outcomes for smallholder farmers participating in Government-Led-Biodiesel-for-Rural-Development schemes in Brazil and Timor-Leste?

In particular, this study sought to take a farmer-centric view and use the research process as a way to bring the farmer's voice to the fore in the debate about biofuels. Through the research process, I critically interrogated the dominant discourse surrounding the biodiesel schemes in Brazil and Timor-Leste and the notion of social inclusion. I offer an alternative theoretical

concept of *negotiating for autonomy* as a preferred way of interpreting smallholder farmers' participation (or non-participation)² in biodiesel schemes and addressing the problem-space.

In refining the research study to address this problem space, the following Research Questions were developed and form the basis of focus for this thesis:

- (a) How can we explain smallholder farmers' participation in biodiesel schemes as part of a rural livelihood in Brazil and Timor-Leste?
- (b) How do smallholder farmer's perspectives help explain and interpret the rural development outcomes from biodiesel schemes in Brazil and Timor-Leste?
- (c) In what ways does smallholder farmers' participation (or non-participation) in biodiesel schemes reflect their negotiating for autonomy?

1.4 Significant Contribution

This study offers several significant contributions in different outcomes spaces. I have framed my contributions based on the quality criteria for transdisciplinary doctoral research developed by Mitchell, Cordell and Fam (2015) — focusing on the three outcomes spaces of:

2. From this point on I will largely use only the term *participation* although I am also referring to farmer informants' *non-participation* in biodiesel schemes.

- (a) Resolution of the problem space (societal issue, sector, practice domain)
- (b) Academic knowledge space, and
- (c) Transformational learning for the researcher and/or collaborators.

(a) Resolution of the Problem Space

This study provides a medium to bring smallholder farmers voice³ to the fore in the biodiesel debate. This research has intentionally taken a farmer-centric approach to exploring biodiesel schemes. This study makes an important and focused contribution to the current stock of knowledge on this topic through documentation and analysis of smallholder farmer's knowledge and explanations.

By bringing smallholder farmer's voices to the foreground, this study provides challenges to the dominant discourse that frames smallholder farmers as passive recipients and offers an alternative interpretation of the social and livelihood implications of biodiesel schemes in Brazil and Timor-Leste.

Through the research process, I have engaged in public talks and personal communication with a range of academics, non-government

3. I would like to acknowledge these 'voices' are necessarily filtered and interpreted through my own experience. This is in line with the research methodology which acknowledges that 'research interaction' is a social site that is constructed and negotiated — that all truths are in fact just partial truths (seeDenzin & Lincoln, 2009) As the sole author of this work I have attempted to offer interpretations that would 'ring true' for the farmer informants, but ultimately, they are my interpretations.

organisations, public servants and politicians. Beyond the thesis, the initial research findings have been made widely and freely available via a report on an Open Access Repository (Kilham, Camargo & Willetts, 2010) and via edited mini-documentaries of the interviews (Kilham & Ribeiro Santos, 2011a, 2011b). Further, after an embargo period, the original interview transcripts, audio and video, will be available on an Open Access Data Repository.

These combined actions of bringing smallholder farmer's voices to the fore, engaging with the broader non-academic community and ensuring that the research is available in open access form can be considered to contribute incrementally to a resolution of the problem space.

(b) Academic Knowledge Space

This thesis represents the primary contribution to academic knowledge, supported by conference presentations (Kilham, 2013, 2014a; Kilham & Willetts, 2009) and peer-reviewed journal publication (Palmer, Fam, Smith & Kilham, 2014).

This study contributes towards the call put out by authors such as Arce (2003), Long (2015) and Turner (2012) on the necessity of incorporating "...inclusive, actor-oriented approaches..." (Turner, 2012, p.404) and moving toward "...Acquiring a new way of talking about conflicting interests and common dilemmas..." (Long, 2015, p.39).

Through the development of the Autonomous Livelihood Framework I have built upon the theoretical concept of the autonomy of peasants and have provided significant empirical data as illustration for how the concept of autonomy can be applied in different contexts, specifically in relation to

smallholder farmers in biodiesel schemes. I have also contributed to ongoing academic discussion about the utility of livelihood frameworks (Amekawa, 2011; Chambers, 1990) and how the Sustainable Rural Livelihood Framework could be extended and adopted. In this way, the thesis attempts not just to speak *to* scholars from the cross-cutting field of agrarian and rural studies, but to provide a new academic language (or discursive formation) *for* scholars interested in the social and livelihood implications of biodiesel schemes.

(c) Transformational Learning for the Researcher and/or Collaborators

As a doctoral researcher, my ideas, conceptualisations of the problem space and my self-identity have shifted considerably throughout this doctoral research project. Part of this learning has been captured through the formative processes of the Institute for Sustainable Futures Doctoral Program (University of Technology Sydney) — primarily ongoing engagements with my supervisors and the documentation of reflexive practice — and part through the summative processes of semester-based progress reports and formal ‘Candidature Stage Assessments’⁴.

Beyond these formal requirements, my transformational learning throughout the research project allowed for the development of increasingly nuanced interpretation. I questioned both my own preconceptions and world-views and considered how they came to influence my analysis and

4. See <http://www.uts.edu.au/current-students/health/higher-degree-research/requirements>

interpretation of the empirical material. I discuss part of this transformation later in Section 6.8 The Author as Researcher.

1.5 Scope of the Research

As a transdisciplinary research study, this project drew upon and contributes toward several major conceptual areas in a novel way — including the autonomy of peasants, rural livelihood approaches and social inclusion — all grounded in biodiesel schemes in two different countries. The forging of alignment and the articulation of a coherent narrative across this breadth of material involved seeking new ways and indeed, new language, to discuss these topics. As a transdisciplinary study, there were no predefined formulae, standards or disciplinary boundaries to adhere to — requiring a level of ongoing responsiveness and creativity to create a robust scaffold around which to structure the thesis. At a theoretical level, a degree of depth was necessarily lost in accommodating the breadth of a transdisciplinary research approach. As such it is to be expected that the nuances of some academic arguments simply cannot be elaborated on, nor even necessarily known, within this thesis.

There are always limitations inherent in cross-cultural, multi-lingual, multi-country research (Palmer et al., 2014). As an outsider — even though I am fluent in both Tetum and Portuguese — there will always be a loss of meaning. Whether literal or cultural or shared-experience meaning, my outsider status limits my ability to know as an insider would. An outsider status also influences how the farmer informants and the researcher play different

roles in the interview interaction and introduces, or possibly increases, the chances of farmer informants responding in order to please.⁵

1.6 A Word on Terminology

Many of the terms used throughout this thesis could be easily interchangeable with cognate terms, each representing slightly differing worldviews. Acknowledging that normative definitions can be controversial and that there exist grey zones in the definitions of many terms, especially across differing languages, I have attempted to adopt the best fit in terminology for this thesis.

Firstly, I have opted to use the terms *biofuel* and *biodiesel* to refer to liquid fuel derived from oleaginous plants. There is a strong argument that the term *agrofuel* better reflects that liquid biofuels are primarily derived from agricultural sources and the use of ‘bio’ invokes notions of ‘clean’, ‘green’, and ‘renewable’ — in effect masking that biofuels often involve high-inputs, non-renewable mono-agricultural production (Levidow & Oreszczyn, 2012; McMichael, 2010). Whilst I align with the agrofuel proponents, I have opted pragmatically to use the term biofuel and biodiesel as I situate this thesis largely within an academic community using these terms.

5. There was at least one interview where the farmer informant mistakenly believed that the research team (myself, videographer and driver) were representatives of a biodiesel company and wanted to encourage farmers into the biodiesel scheme. Despite many explanations to the contrary, the farmer informant had already pre-formulated this notion of us in his mind and throughout the interview slipped into references alluding to our desire to ‘get him into biodiesel’.

Secondly, the terms *smallholder farmer*, *family farmer* and *peasant* could be easily interchanged within this thesis. Family farmers are those that rely predominantly on family labour and resources for their productivity. In Brazil, the term family farmer has a legal definition with specific criteria that limit the size of land and type of labour used on a family farm. This legal definition in part controls family farmers access to eligibility for government approved loans and resources (Secretaria Especial de Agricultura Familiar e do Desenvolvimento Agrário, 2017).

The term peasant been used fairly consistently in the fields of anthropology, sociology and interdisciplinary fields of peasant and agrarian studies (Edelman, 2013). Van der Ploeg (2008) argues that the term *peasant* refers to people involved in agricultural production “centred on the construction and reproduction of *short and decentralised circuits* that link the production and consumption of food...farming and regional society” (p.3)(italics in original).

The United Nations Food and Agriculture Organisations (FAO) defines a smallholder farmer as “... [farmers with] limited resource endowments relative to other farmers in the sector...” (Dixon, Tanyeri-Abur & Wattenbach, 2004, para.5). In this thesis, I have opted to use the term *smallholder farmer* in part to avoid confusion, as not all the farmer informants would necessarily fit the official Brazilian definition of family farmers.

I have not used the term *peasant* as I specifically aimed to interview farmer informants who were actively involved in agricultural activities for their livelihood rather than with more broad activities associated with being a peasant. However, I emphasise that the adoption of these terms are primarily as

heuristic devices rather than representing some inherent qualities of the farmer informants.

Thirdly, throughout the thesis I refer to *biodiesel schemes* for ease of use but I am specifically referring to the Brazilian and Timorese Government-Led-Biodiesel-for-Rural-Development schemes — namely the Brazilian National Production and Use Policy and the Timor-Leste Agro-Energy Program. In this way, I am differentiating from other biodiesel schemes that may be present in Brazil or Timor-Leste but that are initiated by non-government organisations, civil society organisations or private companies.

Finally, I use the term *negotiating for autonomy* to describe the underlying process that I consider as a critical driver for how smallholder farmers construct their livelihoods. Although conceptually I draw primarily on van der Ploeg's (2008) *peasant principle* and his use of *striving for autonomy* — I purposefully adopted *negotiating* rather *striving* to reflect my definition of a process in flux, that involves compromise, imperfectness and is not necessarily part of smallholder farmers self-awareness. In the text *negotiating for autonomy* refers to my concept, whereas *striving for autonomy* refers to that of van der Ploeg (2008).

Specific terms are italicised in the first instance only, with subsequent use in normal text, except in cases of potential confusion. Terms are defined in the Glossary.

1.7 How the Thesis is Structured

This thesis is organised into 10 Chapters.

Chapters 1 – 3 position the study within the broader literature. Firstly locating the study within Brazil and Timor-Leste and their respective biodiesel schemes. Then turning to the global emergence of biodiesel schemes and the ways that the rural development aspects of the schemes have been examined in academic literature. Finally explaining the differing ways that social sustainability and social inclusion is articulated within the schemes.

Chapter 4 provides the theoretical and conceptual underpinnings for the Autonomous Livelihood Framework.

Chapter 5 provides a definition of an Autonomous Livelihood, explains the concept of negotiating for autonomy and defines the individual components of the Autonomous Livelihood Framework.

Chapter 6 provides a thorough documentation of the research design. This is a lengthy chapter, in part as it incorporates significant detail on each country location, as well as a reflective section on the author as researcher.

Chapters 7 –8 are the empirical chapters from Brazil and Timor-Leste. These chapters present the empirical data in a structured fashion following the format of the Autonomous Livelihood Framework.

Chapter 9 is the primary discussion chapter, interpreting the key findings from the empirical chapters and bringing together disparate experiences from the farmer informants in Brazil and Timor-Leste to a centralised interpretation. In this chapter, I illustrate how several of the findings challenge existing scholarship on rural development for smallholder farmers in biodiesel schemes.

Chapter 10 is the conclusion chapter. I review the research questions, key findings and their significance. I include a reflective section on the use of

the Autonomous Livelihood Framework and make suggestions on how the framework could be improved or adapted in the future.

Chapter 2: Locating the Study: Brazil and Timor-Leste

2.1 Introduction

The fieldwork⁶ for this thesis took in place in Bahia, Brazil and in six out of the 13 Administrative Districts of Timor-Leste. These two countries were chosen for a number of reasons including:

- (a) Presence of a Government-Led-Biodiesel-for-Rural-Development scheme specifically aimed at smallholder farmers with social welfare or rural development outcomes
- (b) Anecdotal information supplied that the Timor-Leste biodiesel model was influenced by the Brazilian biodiesel model, and
- (c) Practical access to research sites and local collaborators.

The decision to conduct research in two countries reflects a desire to move beyond a country-specific analysis of biodiesel schemes and to seek to understand whether it is possible or useful to globally begin to theorise about smallholder farmers perceptions and experiences in such schemes.

6. I am reluctant to use the term *fieldwork* for the social interview based qualitative data created in this research. The term fieldwork creates an illusion of the distant and objective researcher observing the ‘real world’ that is somehow out there, separate from the researcher herself. I do not align with this epistemological view, but have chosen to continue to use the term fieldwork as it well recognised as part of research process that involves the researcher and the researched creating data — in this case, through interviews.

Globally, Brazil arguably has the most comprehensive policy in terms of Government-Led-Biodiesel-for-Rural-Development schemes. The PNPB was specifically designed with sustainable rural development and social inclusion goals and the legal infrastructure involves multiple government ministries with financial incentives and tax concessions for feedstock and refinery companies. A peak of 100,000 smallholder farmers participated in 2011, although more recent data suggest that as of 2015 less than half of this number (45,000) smallholder farms remain part of the PNPB⁷ (Secretaria da Agricultura Familiar, 2015).

In contrast, Timor-Leste has no formal policy or program about biofuel development in general, and none specifically focused on biodiesel-for-rural-development. However, from 2009–2012, the Timor-Leste Secretary of State for Energy Policy (Portuguese: *Secretário de Estado da Política Energética*; SEPE) did initiate and fund a biodiesel pilot project (the Agro-Energy Program) that mirrored many of the aspects of the PNPB — in particular rural revitalisation and increased social inclusion for smallholder farmers. As of 2010 (the time this fieldwork was conducted) the number of smallholder farmers participating in the Agro-Energy Program was not formally

7. The data from the Ministry of Agrarian Development is not clear concerning whether 45,000 refers to farming units (families) or individuals.

documented but is estimated to be no more than 20 smallholder farmer families (100–150 individuals)⁸.

Despite these many differences between the biodiesel policies and experiences in Brazil and Timor-Leste, there are similarities between the two nations. One is the centrality of smallholder farmers to national questions of a tangible nature — such as agricultural and rural development — and of an intangible nature such as national identity. In both locations, smallholder farmers have a central role in internal food production, yet poverty and food insecurity in the rural populations remain high (Brazilian Institute for Geography and Statistics (IBGE), 2015; Gledhill & Hita, 2009; Kammen, 2012; Molyneux, da Cruz, Williams, Andersen & Turner, 2012)

Overall, it is primarily the framing of biodiesel schemes for rural development outcomes and social inclusion that makes Brazil and Timor-Leste an interesting pair in which to complete this study. I did not aim in the research design to structure this as a comparative study — the differences in the locations and the biodiesel schemes did not lend themselves to outright comparison. Rather, by examining two locations I aimed to:

- (a) Contribute toward a more nuanced understanding of smallholder farmers perceptions and experiences in biodiesel schemes

8. The Secretary of State for Energy Policy noted that there was a Biodiesel Cooperative functioning in each of the 13 districts of Timor-Leste. Of the Biodiesel Cooperatives visited in this research — each had from 3–10 family members. I visited 6 of the 13 Districts and the majority only had one Biodiesel Cooperative.

- (b) Contribute empirical data toward the idea of rural development as context and place specific
- (c) Counter the idea of biodiesel as a ‘one-size-fits-all’ rural development project (Hunsberger & Ponte, 2014).

This chapter focuses primarily on Brazil rather than Timor-Leste — principally as there was a dearth of any social science or rigorous academic research conducted in Timor-Leste during the years of resistance (1975 – 1999) due to Indonesian limitations on outsiders visiting the region (Gunn, 2007). Since 2000, there has been a “... new wave of social science researchers...” (McWilliam & Traube, 2011, p.1) in Timor-Leste — not least Timorese academics themselves. However, the research community focused on Timor-Leste remains small and an extensive search on several databases for articles pertaining to biofuel development provided limited results.

This Chapter is structured as follows:

Section 2.2 provides a detailed explanation of Brazilian National Biodiesel Production and Use Policy. This section is primarily developed through secondary sources and places the PNPB within broader biofuel development in Brazil, followed by details of the PNPB and then specific ways that the PNPB has been implemented in Bahia.

Section 2.3 provides a detailed overview of the Agro-Energy Program in Timor-Leste. An extensive literature search revealed no published academic

research on the Agro-Energy Program⁹ and a few limited academic publications on the proposed bioethanol development in Timor-Leste (circa 2009). As such, the information in this section is drawn from the scoping visits and onsite research in Timor-Leste undertaken as part of this study. Normally it could be expected that such findings are reported in the empirical section; however, these are unique circumstances given the lack of alternative academic sources on which to base this section, and as such, it is appropriate to report in this section of the thesis.

2.2 Brazil: The National Biodiesel Production and Use Policy

Globally, Brazil is a pioneer country in terms of development and transition toward biofuels as a non-petroleum energy source (Johnson & Silveira, 2014). The Brazilian biofuel development experience — of both bioethanol and biodiesel — has been promoted as a suitable model for other nations in the global south “... a number of developing countries could successfully adopt the Brazilian system, reducing their dear dependence on petroleum.” (Hira & de Oliveira, 2009, p.2450). Indeed, the government-led nature of the Brazilian biofuel model has been identified as key to supporting their fledging biofuel market whilst simultaneously investing in research, development and infrastructure (Hira & de Oliveira, 2009).

9. Databases searched include Google Scholar, Elsevier Scopus, Elsevier Science Direct Sage Journals Online and the National University of Timor Lorosa'e Institutional Repository using a combination of keyword searches based on biofuels, biodiesel and agro-energy.

The Brazilian Biofuel Development Model¹⁰ has been actively promoted by Brazil — in part through attempting to position itself as a knowledge broker in the international discourse on biofuels and through direct development cooperation based on “...novel patterns of investment and trade in the biofuel sector itself ... consistent with the prediction that these new South–South relationships will be significant drivers of biofuel production.” (Dauvergne & Neville, 2009, p.1094).

Brazil holds a triple advantage as:

- (a) Globally a major biofuel producer with significant experience in policy formulation and large-scale production
- (b) An emerging global economy with resources to invest locally and globally in biofuels
- (c) Significant South-South and North-South influence through political networks.

In this way, the importance of the PNPB cannot be understated.

This section will outline the development of the PNPB and provide specific context for the policy in Bahia (location of site interviews).

Brazil has been producing bioethanol since the late 1970s through the National Fuel Alcohol Program (Portuguese: *Programa Nacional do Álcool* — referred to as *Proálcool*), widely considered to be successful in terms of stimulating the Brazilian sugarcane industry and reducing Brazil’s dependency on oil exports (Manzi, 2013; Pousa et al., 2007). *Proálcool* was the first large-

10. By this term I refer generically to both the bioethanol and biodiesel policies and programs that have been developed over the past 40 years. These are elaborated on later in this chapter.

scale biofuel program in Brazil that involved legislation that mandated the use of bioethanol and provided subsidies for growing feedstock (Lehtonen, 2009).

Whilst Brazil experimented with developing a biodiesel industry in the 1980s¹¹ it was not until the late 1990s that further research collaborations occurred with Brazilian universities to explore the feasibility of production and use of biodiesel at a national level (Pousa et al., 2007). In 2003, a commission composed of 14 government ministries was established to explore the viability of biodiesel as part of the Brazilian National Energy Matrix and in late 2004 the PNPB legislation was introduced and passed (Garcez & Vianna, 2009; Pousa et al., 2007). The Brazilian Government designed the PNPB along a similar framework to *Proálcool* with chain of production, credit, finance and technology essentially led by the government and delivered to industry as a package (Colares, 2008).

Yet the PNPB was promoted as essentially different to *Proálcool* with specific measures designed to mitigate the negative policy outcomes and public perceptions of the *Proálcool* bioethanol program (Lehtonen, 2009). It was acknowledged that *Proálcool* had benefited mainly agro-industry in the Southern Brazilian states (Granco, Caldas, Bergtold & Sant'Anna, 2015) and possibly contributed to the further marginalisation of smallholder farmers and ongoing poverty of regions in the North, Northeast and Central Brazil.

11. This was through a program called the National Program of Vegetable Oil Production for Energetic Aims (Portuguese: *Programa Nacional de Producao de Oleos Vegetais para Fins Energeticas* ; referred to as *Prooleo*)

The government attempted to differentiate the PNPB through a focus on social inclusion benefits for family farmers, positive environmental outcomes through the promotion of small-scale local crops and an emphasis on regional development (Marcossi & Moreno-Pérez, 2017; Secretaria da Agricultura Familiar / Ministério do Desenvolvimento Agrário, 2010). The original report that underlies the conception of the PNPB noted three primary advantages to pursuing biodiesel production being:

1. Environmental: decrease on vehicles emissions
2. Economic: reduction of petroleum diesel imports
3. Social benefits: jobs creation in the poorest regions of Brazil.

(Ministério do Desenvolvimento Indústria e Comércio Exterior, 2006)

The PNPB can be considered a *structured market demand*¹² that connects smallholder farmers to large, predictable corporate procurement. The government essentially facilitates trade relations, ensures demand via legislation and provides incentives for both smallholder and corporate participation. This model of mediated market supporters is considered to be a socially efficient way to support rural development and has been relatively successful in other Brazilian National Programs such as the National School Feeding Program (Portuguese: *Programa Nacional de Alimentação Escolar*; PNAE) and Food Procurement Program (Portuguese: *Programa de Aquisição de Alimentos*; PAA) (Rocha, 2009; Wittman & Blesh 2015)

Nevertheless, despite its surface-level focus on social and environmental sustainability, PNPB continued to adhere to a specific discourse

12. Also referred to as *mediated market support*.

about rural modernisation and industrial agriculture. As a largely paternalistic state-driven model, rural development is seen as linked to social policy in so far as rural development policies are equated with social welfare policies for the rural poor (van der Ploeg, Jingzhong & Schneider, 2012). In this approach, rural development is primarily about the provision of public goods as ‘externalities’ that result from agricultural production and thus is a state responsibility (ibid.). As with the central tenet of rural modernisation theories, smallholder farmers were conceptualised as being in need of government intervention to support their livelihoods and in a process of moving away from ‘peasantry’ toward a the role of the ‘proletariat’, prioritising income generating activities and increasingly linked into the global agri-food network (Woods, 2014).

Social inclusion for family farmers is both a central ideological tenet to the policy and is legislated through the Social Fuel Stamp (Portuguese: *Selo Combustível Social*). To gain the Social Fuel Stamp, refineries must purchase a set percentage of their feedstock from family farmers (as legally defined and registered) in underdeveloped regions and provide technical assistance and capacity building (Kilham, 2014b; Manzi, 2013). In return, the Social Fuel Stamp allows industry to access tax benefits, finance and subsidies (Silva, Fernandes, Teixeira, Torres & Rocha, 2014a). The PNPB originally required that 80% of all biodiesel feedstock to come from refineries have the Social Fuel Stamp (Ministério de Minas e Energia, 2014) and indeed, the Social Fuel Stamp certification was necessary for companies to participate in the government run biodiesel auctions. The auctions are the only channel in Brazil for biodiesel producers to sell to distributors, although in recent years,

companies without Social Fuel Stamp certification have been able to participate through special allowances (ibid).

As of 2016, a number of Ministries have delegated responsibilities for various activities in the PNPB. For instance, The National Agency for Petroleum, Natural Gas and Biofuels (Portuguese: *Agência Nacional do Petróleo, Gás Natural e Biocombustíveis*; ANP) is responsible for organising the national biodiesel auctions, price regulation and determining quality standards (Azevedo & Müller Pereira, 2013) whereas the Ministry for Agrarian Development (Portuguese: *Ministério do Desenvolvimento Agrário*; MDA) supplies and monitors the Social Fuel Stamp (da Silva Júnior, Leite, Clemente & Perez, 2012). A characteristic of this cross-ministerial policy is that it attempts to fulfil multiple objectives of the different Ministries and other stakeholders *at the same time*.

There have been competing interests between the agricultural and energy sectors and the agricultural sector has come to be dominated by soy agribusiness (Stattman, Hospes & Mol, 2013). Beyond the challenge of meeting the multiple objectives of different Ministries, the PNPB also attempts to bring together transnational corporations (i.e. Biodiesel refinery companies) and social agrarian movements (e.g. The Landless Peasants Movement—Portuguese: *Movimento Sem Terra*; MST) — actors who have traditionally been antagonistic and whose philosophies and aims for rural development would seem at odds (Manzi, 2013).

The interests of the powerful lobbyists quickly superseded the basic environmental, economic and social benefits of the PNPB. Notably the agro-industries successfully advocated for the introduction of mandatory minimum

blends (Azevedo & Müller Pereira, 2013). The PNPB legislates for minimum mixes in the National Energy Matrix — originally envisaged as incremental moves from 2% biodiesel to diesel mix (B2) by 2008 to 5% (B5) in 2013 (Ministrio da Agricultura Pecuaria e Abasemento, 2006). The use of minimum blends effectively demounted many of the other mechanisms, notably the social inclusion goals. This was because large, commercial volumes of feedstock were required to meet the minimum quotas and realistically this could only be provided by agribusiness, rather than scattered small scale local producers (Azevedo & Müller Pereira, 2013; Stattman et al., 2013).

As such, the inherent structure of the PNPB reflects continuation of an industrial agricultural model as the mandated quotas could realistically only be met intensive agricultural production to produce the feedstock required under law. Family farmers have effectively been squeezed out of the policy arena (Stattman et al., 2013) and working with family farmers in the PNPB is generally considered to have high transaction costs for biofuel processing companies (Mourad & Zylbersztajn, 2012).

Several studies have found that the PNPB has effectively managed to work against its own goals, that is, the more developed regions and agro-industrial firms have benefited the most (Silva et al., 2014a). Indeed, for some scholars this comes as no surprise as the PNPB structural design and model has significant conceptual internal contradictions. As Selbmann and Ide (2015) note, part of the problem with the PNPB was the idea of a government agricultural value chain program to overcome social exclusion, which could be

argued was primarily caused by the government pursuing international markets and market dependent value chains in the first place.

Indeed, the challenges to meeting the social inclusion and regional development goals of the PNPB in Bahia have been widely acknowledged:

“In these 10 years of the program there has been an agreeable partnership between governments, businesses and workers. At this time, the country has matured enough, however we still have some bottlenecks and we still need to pay attention to issues such as land reform, access to land, secure tenure, technical assistance as an element that ensures productivity, increase production, relationship with the environment ”

Quote from Rural Development Secretary of Bahia Jerônimo Rodrigues in a local news source (Luiz, 2015, para 2)

Several studies have now asserted that the PNPB has failed to materialise as it was initially envisaged (Silva, Teixeira, Torres & Rocha, 2014b; Távora, 2012). The obligation for blending percentages (e.g. 5% biodiesel with 95% diesel) means in order to remain economically viable the majority of refineries across the country use soy as their primary feedstock (Rico & Sauer, 2015). This is reflected in analysis of data from the National Agency for Petroleum, Gas and Biofuels that indicates that feedstock from family farmers comprises a nearly negligible component of National Biodiesel production in recent years (Agência Nacional do Petróleo Gás Natural e

Biocombustíveis, 2014; Agência Nacional Do Petróleo Gás Natural E Biocombustíveis, 2012). Soy, cotton and beef fat heavily dominate the feedstock matrix, generally sourced from non-family farm agro-enterprises.

The next section will specifically discuss the PNPB in the Northeastern State of Bahia, as it is the location for this study.

PNPB in Bahia

In Bahia, the PNPB officially launched in 2006, although at the time that this research was conducted in 2010 it was still only in the inception phase. There are several public policies with the focus of developing the biofuel sector in Bahia including The Bahia Bioenergy Program (Portuguese: *Programa de Bioenergia da Bahia*; BahiaBio), the State Program for Family Agroenergy (Portuguese: *Programa Estadual de Agroenergia Familiar*; BioSustentavel) and The Bahia State Program for Biodiesel Production (Portuguese: *Programa Estadual de Produção do Biodiesel*; PROBIODIESEL BAHIA) administered by the Secretary of Science, Technology and Innovation. Bahia is one of the states classified as attracting subsidies and tax concession for companies with the Social Fuel Stamp certification under the PNPB (Hall, Matos, Severino & Beltrão, 2009). Biodiesel refinery companies are eligible for 100% tax exemption for purchasing feedstock from family farmers in the semi-arid regions of Bahia (Manzi, 2013).

Bahia initially had three biodiesel refineries approved under the PNPB but as of 2010, one of the largest refineries, BrasilEcoDiesel, lost its Social Fuel Stamp certification and closed its operations in Bahia. BrasilEcodiesel had previously been operating in the nearby State of Piauí and had been granted

cheap land by the State government (Santos & Rathmann, 2009). However, BrasilEcoDiesel shut down its Piauí operations to widespread local outrage — in particular on behalf of the ~700 smallholder farming families who had been growing feedstock and were left without a market or purchaser (“Após matéria da revista *Época*”, 2009). At the time that this research was conducted between March–August 2010, the main biodiesel refinery company in Bahia was Petrobras: a semi-state owned corporation. However, in the 2010 there were other companies exploring expanding into this space including Comanche (located in Simões Filhos) and BioBrax, located in the coastal region. Further, many agricultural cooperatives across the state were keen to start participating in the PNPB value chain.

As Bahia produces the majority of Brazil’s castor bean and castor is grown on farm holdings of less than 5 hectares by smallholder farmers (Queiroga, dos Santos & Queiroga, 2011; Severino et al., 2012) — castor proved a popular early choice for biodiesel refineries. Sourcing castor feedstock met many of the requirements for the Social Fuel Stamp certification and there was an established production market for processing companies to tap into (Manzi, 2013).

In particular, Petrobras was primarily meeting their Social Fuel Stamp certification requirement by sub-contracting cooperatives as the engagement point with smallholder farmers. The cooperatives received contracts to

- (a) provide technical assistance
- (b) distribute seed and

(c) collect, store and deliver feedstock to the refinery (G. Gomes Alves, Irecê Region Family Agriculture Cooperative, Personal Communication, 2010).

By 2010, warning signs of trouble in PNPB implementation were starting to show. The closure of BrasilEcoDiesel led to acknowledgement that the transaction costs of engaging with small and dispersed family farmers were high for companies not accustomed to sourcing feedstock material in this manner. Further, there were anecdotal reports of farmers breaking their contractual arrangements and companies being unable to obtain consistent reliable and sufficient quantities of feedstock as required. By 2014, the two remaining refineries in Bahia were purchasing their feedstock from smallholder farmers via contracts with cooperatives located in outside the state. That is, whilst still purchasing some feedstock locally, the biodiesel refineries were primarily importing the feedstock from southern states — legally acceptable under the PNPB but in direct contradiction to the social inclusion and regional development goals (Silva et al., 2014a).

Whilst castor oil was promoted as suitable oil under the PNPB (Ferreira, Daniel & Lima, 2015) in part due its primary production by family farmers in semi-arid regions, castor oil itself proved difficult to process into biodiesel. A highly valuable oil to the pharmaceutical industry, castor oil requires significant processing and mixing with other oils to make it suitable for biodiesel use and ultimately, if the energy of the bi-products is discounted, biodiesel production from castor results in a negative energy balance (Severino et al., 2012). The biodiesel refineries continued to purchase castor oil from family farmers in Bahia nonetheless, but it was never processed into biodiesel:

These plants also buy castor and palm from cooperatives and northeastern farmers in order to keep the SCS [Social Fuel Stamp]. Because they are not required to produce biodiesel oil with these, they are resold and the value obtained is directed to the purchase of soybeans. It can be stated that, from an economic standpoint, the northeastern mills are correct, for the production of biodiesel from castor oil and palm oil could derail the deal, since these oil prices in the international market are more attractive. (Silva et al., 2014a, p.217).

In this way, the PNPB has been market distorting to the castor oil industry — effectively introducing Petrobras as new buyer who expressly had the intention of displacing local brokers and the established castor bean value chain in Bahia — stimulated by the Social Fuel Stamp certification conditions.

This in turn has influenced the ways that smallholder farmers have interacted with the PNPB, depending in part on whether the PNPB has intervened as a new market player (such as in the case of castor oil) or whether farmers have been required to access loans and grow unfamiliar crops with no established markets or buyers (such as in the case with sunflower).

2.3 Timor-Leste: The Agro-Energy Program

Unlike Brazil, Timor-Leste has limited experience in biodiesel production and use and no mechanisms for integration with global biodiesel networks. Most of the attention directed to Timor-Leste over biofuels has been

due to controversy surrounding the notion of biofuel development in a country with significant food security and child malnutrition — largely drawing on the argument of *Food vs. Fuel*. Nevertheless, the case of Timor-Leste is highly relevant to review, principally because despite the massive resource gap for biodiesel production and use in comparison to Brazil — it nevertheless did develop and pilot and sustain participation of smallholder farmers. As such, it forms an important case to consider of why a relatively resource-poor and internationally isolated small half island was drawn to biodiesel production.

In Timor-Leste biofuels were first piloted in 2005 through a joint agreement between an Australian and a Timorese company. For a variety of reasons, this pilot project did not proceed beyond the small scale planting of *Jatropha* (Latin: *Jatropha Curcas*) feedstock, and no liquid biofuel was produced (Lao Hamutuk, 2008).

In 2008 the GoTL signed agreements with multilateral companies for biofuel production but actual production had not yet commenced on any of these projects by late 2010. The GoTL and the companies claimed that the biofuel projects, once functioning, would provide upwards of 10,000 jobs, increased incomes, social benefits and a ‘multiplier effect’ for the local economy (Daba-Loqui Energy Limited & Enviroenergy Developments Australia Pty Ltd; GT Leste Biotech & Ministério da Agricultura e Pescas, 2008; Jacobsen Elektro AS & Secretary of State for Energy Policy IV Constitutional Government of Timor-Leste, 2008; Komor Enterprise Ltd & República Democrática de Timor Leste; Lao Hamutuk, 2008; MPI, 2005; República Democrática de Timor-Leste & Enviroenergy Development Australia Pty. Limited, 2008).

These were controversial claims — primarily due to the issue of land appropriation and leases to international companies — and opposed by local non-government organisations and civil society (Anderson, 2012; de Carvalho & Palmer, 2012). Indeed, civil society and ex-senior government officials saw the issue of the biofuel MOUs as controversial:

“...While I was in the government we consistently refused to have any deal to cultivate in East Timor crops for biofuels. For example, I was asked several times by some foreign investors for us to give land for ... to cultivate *Jatropha* for biofuel — I refused...

What happened at the moment is that in Timor-Leste is that the current Minister for Agriculture he is (sic) signed a contract with an Indonesia company to produce, (er) to give up to one hundred thousand hectares for sugar-cane, I don't know where he is going to get it and how they are going to do it because we having (sic) less than four hundred thousand hectares of land available for food production”

Quote from Estanislau da Silva, ex-Minister of Agriculture (GoTL) (“*Timor Leste - Fretilin's comeback*” (2008) minute: 9:54) (original audio transcribed by the author)

In 2008 although Brazil and Timor-Leste had no explicit development cooperation focused on biofuels a Timorese Parliamentary Commission was sponsored by the Government of Brazil to see a range of development programs and government policies ‘in action’ (F. de Mello Barreto, Brazilian Embassy in Timor-Leste, Personal Communication, March 2009). Part of this visit to Brazil included touring and sightseeing of the Brazilian PNPB. Whilst at the time there was no official south-south cooperation between the Brazil and Timor-Leste in the area of biofuel development (F. de Mello Barreto, Brazilian Embassy in Timor-Leste, Personal Communication, March 2009), the underlying framework and mechanism of the Agro-Energy Program shares elements of the Brazilian PNPB model. This includes a focus on family (smallholder) farmers, the use of cooperatives as a conduit of engagement, social inclusion as a rural development goal and market-oriented agricultural modernisation through a government led biofuel scheme.

In 2009, SEPE commenced a biofuel pilot project named Agro-Energy Program (Portuguese: *Programa Agro-energia*) working through rural cooperatives (Secretaria de Estado da Política Energética Timor-Leste, 2009). At the time the GoTL had no official policy on biofuel production, the Agro-Energy Program was to be focused on biofuels as a means to decrease rural poverty through increased supply of energy and income generating activities (A. Coelho da Silva, with Secretariat of State for Energy Policy Personal Communication, 23 July 2009). The framework and language of the Agro-Energy Program mirrors the Brazilian PNPB, with a focus on social inclusion and implementation via cooperatives (Secretaria de Estado da Política Energética Timor-Leste, 2009).

A government press release dated November 30, 2009 states that there were 43 cooperative groups participating with 1,125 community family beneficiaries (Pereira, 2009). Despite the lack of official policy on biofuel production, there was strong moral support for the development of alternative energy from within the highest level of government:

...Secretary of State Ágio Pereira noted “The biggest fallacy has been that the Xanana Gusmão Government is not committed to alternative energies because we have commenced with the power plants to serve the immediate needs of the country. We have always been committed to alternative energies as a long-term prospect, but it is costly and the people of Timor-Leste need solutions now; however, doubling the funding for renewable energy in the 2010 budget demonstrates our continued commitment to exploring and supplying renewable energy resources, especially in remote rural areas.”

(p.1)

The Agro-Energy Program was relatively small and primarily involved supporting farmers’ cooperatives in each district to establish biodiesel feedstock greenhouses. Eligible Cooperatives received funds and material goods including polybags for seedlings, seeds, greenhouse materials, low-tech farming equipment such as watering cans or hand tools. The exact amount of funds received by each cooperative is unknown.

A larger component of the Agro-Energy Program was the establishment of a Biodiesel Distillery on the outskirts of Dili. The Biodiesel Distillery required a significant financial investment and included high capacity power generators, water pumps, processing plant machinery and the construction of the actual building to house the processing machines. In addition, Indonesian trainers were brought to teach Timorese how to process *Jatropha* bean into liquid biodiesel. The distillery was officially opened in May 2010 but by November 2010 was not operating due to a number of logistical and structural challenges.

Main Challenges to the Agro-Energy Program

The main challenges to the Agro-Energy Program can be broadly grouped into two themes: firstly, political, policy and community support for building a viable supply chain and market, and secondly, direct logistical and structural issues associated with implementation. These two themes are discussed briefly here to give a reader an orientation necessary for understanding the empirical chapters.

Firstly, at a policy level despite SEPE's focus on biodiesel development, biofuels are mentioned only very briefly within the Timor-Leste Strategic Development Plan 2011–2030 (Government of Timor-Leste, 2011)¹³ and biodiesel specifically is not mentioned at all. "Crops such as corn and sugarcane can produce ethanol, which can be used to fuel vehicles."(p.90). In fact, this reference to bioethanol appears to be idealistic. Timor-Leste currently produces no significant quantities of sugar cane, has no bioethanol processing

13. The Strategic Development Plan is the main mechanism meant to drive Ministerial priorities and budget allocations in Timor-Leste.

plants and does not have 'flex' vehicles that are able to utilise ethanol as fuel. Whilst Timor-Leste does produce maize, it is a primary staple food crop in a country that has high food insecurity (ibid). Diverting maize production towards bioethanol processing under these circumstances is likely to be met with widespread resistance and poor support both at community, civil society and government level. Hypothetically, even if bioethanol was able to gain political and social traction in Timor-Leste, the obstacles to producing sufficient excess maize make bioethanol production seem unfeasible. The challenges to surplus production of any crops in Timor-Leste are well-known and documented: "Low- fertility soils, seasonal droughts, crop failures, and pest damage in the broader context of storage problems and cash-poor households are still likely to work against the best intentions of development agents and farmers themselves." (Shepherd & McWilliam, 2011, p.196).

Further, bioethanol is discussed within the Strategic Development Plan under the sub-section of "*Renewable Energies and Rural Electrification*" (Government of Timor-Leste, 2011, p.87). This section is focused on the electrification of the rural and urban populations rather than alternative liquid fuel sources (i.e. biofuels) for powering machinery or motor vehicles (ibid.).

The Agro-Energy Program was focused on the supply side without having robustly developed the market demand side. A lack of structured policies that mandate the use of biofuels in vehicles or other machinery was completely absent, meaning that there was no market demand for biodiesel in Timor-Leste. Further, the Agro-Energy Program was implemented in isolation from the programs and policies of other Ministries, notably the Ministry of Agriculture and Fisheries. This is significant because SEPE lacked adequate

human resources to provide a rural extension service. Disease, infestation and poor growing conditions were commonly observed in the *Jatropha* greenhouses and plots, and frequently reported as a challenge by the farmer informants.

Secondly, the Agro-Energy Program appeared to be plagued by logistical issues that SEPE neither had the resources or finances to overcome. These logistical issues included lack of transport from isolated scattered farms to the processing plant, unclear lines of financial incentives and responsibilities, no established market for the biodiesel, high operating costs of the processing factory due to limited access to electricity and water and lack of local expertise in both feedstock production and biodiesel processing.

Overall, it was possible to ascertain that the Agro-Energy Program was essentially unviable in its current form. It seemed unlikely that the significant changes required to ensure the viability of the Agro-Energy Program were going to occur and at the time of the research SEPE staff were unsure about the next stages of the project (S. Mulyani, Staff SEPE, Personal Communication, 2010).

The Agro-Energy Program was short-lived. The SEPE was abolished in 2012 after the general election and the renewable energy projects of SEPE absorbed by the Ministry of Public Work and the Secretary of State for Electricity (Government of Timor-Leste, 2014). No further information has been able to be gathered to ascertain its status as of 2017.

2.4 Chapter Summary

In summary, this chapter introduce the PNPB of Brazil and the Agro-Energy Program of Timor-Leste.

I firstly outlined how the PNPB is a part of an ongoing sequence of biofuel policies and programs in Brazil well-established since the 1970s. I highlighted how the PNPB includes specific social sustainability goals that are articulated as social inclusion and formalised through the mechanisms of the Social Fuel Stamp. I assert that the PNPB reflects a state-driven model that adheres to particular discourse about rural modernisation and industrial agriculture — that is, that these are necessary and inevitable. I concluded this section by providing detail about the implementation of the PNPB in Bahia.

I then discussed the Timor-Leste Agro-Energy Program. I highlighted the controversial nature of proposed biofuel development schemes from 2005–2010 and the strong opposition to such schemes from civil society and the GoTL at the time. I then provided detail on the Agro-Energy Program and the challenges to implementation at a policy and practical level. I concluded by stating that the Agro-Energy Program was unviable and that its parent government department (SEPE) was dissolved in 2012.

The next chapter turns to discuss how social sustainability issues and rural development outcomes from biodiesel development have been addressed in the literature.

Chapter 3: Government-Led-Biodiesel-Policies-for-Rural-Development

3.1 Introduction

This literature review will examine how two of the common characteristics of the biodiesel policies of Brazil and Timor-Leste — being the goals of *social sustainability* (articulated as *sustainable rural development*) and *social inclusion* for smallholder farmers — have been addressed in the literature. This chapter represents an exploration of the broader *problem-space* defined earlier and commences by discussing the emergence of biofuels in general as a wicked problem before turning to a focused discussion on social sustainability in biodiesel production and the different ways that it is articulated and examined.

This Chapter is structured into three sections.

Section 3.2 addresses broadly the global emergence of biofuels schemes as a wicked problem.

Section 3.3 illustrates how smallholder farmers are examined under the notion of ‘social’ in biodiesel sustainability studies. As this thesis is focused on smallholder farmers, I have limited this review to biofuel sustainability debates centred on agricultural systems and rural development and specifically to social sustainability issues that affect smallholder farmers. This means that whilst I acknowledge the breadth of material about sustainability of biofuels, including but not limited to concerns with emissions, processing, international trade agreements and overall dependency on fuel based transport, I do not explore these debates as I consider that they fall outside the scope of this thesis.

Also, this thesis does not include biofuels from waste cooking oil or second and third generation biofuels, as the sustainability concerns with these products are inherently different from agro-fuels.

Section 3.4 introduces social inclusion as a theoretical concept and then discusses the centrality of social inclusion to the Brazilian PNPB. I critique how social inclusion approaches have been overemphasised in the literature on smallholder farmers in biodiesel schemes with limited exploration on how social inclusion as concept is problematic.

I have predominantly limited the review to discussions of biodiesel rather than bioethanol. The sustainability issues between biodiesel and bioethanol are markedly different, in part due of the organisation of feedstock production systems and more importantly — the role of smallholder farmers within these systems make bioethanol policy outcomes largely non-applicable to the studies of biodiesel.

3.2 Global Emergence of Biofuels as a Wicked Problem

Liquid biofuels were initially seen as a renewable and sustainable energy source that could reduce dependency on petroleum products, mitigate climate change, provide environmental benefits and support rural development within the global south whilst meeting the fuel needs of the global north (Dauvergne & Neville, 2009). In the early 2000s, the European Union (EU) mandated staggered increased usage of liquid biofuels for transport, essentially creating structured market demand in the global north that could only be met by sourcing biofuels from the global south (Amezaga, Boyes & Harrison, 2010). Biodiesel as a liquid biofuel was mandated into fuel mixes in the USA,

EU and Brazil by 2006 — usually accompanied by policies that provided tax incentives, direct subsidies and special conditions for those producing biofuel feedstock¹⁴. The accumulation of these policies, targets and subsidies meant that global biofuel production, in particular biodiesel production, increased three-fold between 2000 and 2005 (Zhou & Thomson, 2009).

Indeed, in the global south Government-Led-Biodiesel-for-Rural-Development schemes — those in which a national government promotes, regulates and funds biodiesel production specifically as a part of a rural development strategy — became increasingly popular with demand from the global north. As biodiesel is produced from oily seed crops, such as palm, canola, castor or *Jatropha*, governments have considered it as a more viable option for smallholder farmers in comparison to bioethanol. Nations such as Brazil considered biofuel production as decreasing their own dependency on foreign petroleum imports whilst simultaneously supporting the maintenance and expansion of the local agro-industrial sector as both an internal and export market for biofuel feedstock. In countries such as Indonesia and Malaysia, which together dominate the global production of palm oil (a primary feedstock for biodiesel), expansion into biofuels has been considered a dual economic and social strategy able to engage rural smallholder farmers, utilise

14. For example, prior to 2010 in the EU under the Common Agricultural Policy (CAP), the ‘Energy Crop Scheme’ provided direct subsidies to farmers for biofuel feedstock crops and were able to grow non-food crops on land that would have otherwise been part of compulsory ‘set-aside’ land.

so-called marginal land¹⁵ and support internal transition to renewable energy sources (Lima, 2012).

Bioethanol production is dependent on agro-industrial production (Granco et al., 2015) and monocultures (Maroun & La Rovere, 2014), and targeted to benefit the large-scale agro-industrial sectors that had established production units but required new markets for their products (Khanna, Nuñez & Zilberman, 2016; Stattman et al., 2013). In Brazil, bioethanol is largely produced in the south of the country on land owned by corporations or elite landowners, generally using itinerant seasonal labourers subject to arduous working conditions (Schaffel, Herrera, Obermaier & Lèbre La Rovere, 2012). Bioethanol production locations tend to have good infrastructure and production regimes that have been functioning for decades (Texeira de Sousa Jr et al., 2008). In contrast, biodiesel policy targets the production of feedstock by smallholder farmers on their own land, scattered across the North and Central regions of Brazil, areas renowned for poor infrastructure and with limited established markets or value chains for the feedstock (Florin et al., 2013; Stattman et al., 2013).

Yet by 2008 there was widespread criticism of the promotion and production of both bioethanol and biodiesel as a panacea for the integrated problems of energy and rural development. Global food shortages in part were blamed on the production of biofuels as it was believed that the combined effects of (a) edible grains being diverted from the food chain and (b) land use competition for biofuel feedstock crops, were driving low commodity stocks

15. Note that the term *marginal land* is controversial. See (Gomiero, Paoletti & Pimentel, 2010; McMichael, 2010)

and high prices (Rathmann & Padula, 2011). This saw the emergence of the ‘*Food vs. Fuel*’ debate (Millison, 2008; Monsalve et al., 2008) and biofuels being labelled as a “...*crime against humanity*...” (Ziegler, 2013, p.1) by United Nations Special Rapporteur on the Right to Food, Jean Ziegler. The 2007–2008 food riots that occurred across much of the global south between and the 2011–2012 Arab Spring have also been attributed to in part to biofuel production’s contribution to spiking food costs¹⁶ (Altieri & Toledo, 2011).

Indeed, in this sense biofuels can be considered a prime example of a twenty-first century wicked problem — biofuels are *ambiguous* in that production and policies are largely politically defined and subject to rapid changes in public opinion (Cacciatore, Binder, Scheufele & Shaw, 2012), biofuel policies are resistant to technical or formulaic solutions as resistance to global governance initiatives of biofuels has illustrated (Hospes, 2014) and biofuel production crosses multiple disciplinary boundaries including energy security, agriculture and rural development¹⁷. Indeed, embracing the idea of biofuels as a wicked problem has important epistemological implications because it dismisses the idea that a centralised policy approach can fix the

16. Analysis on the spiking food costs showed that it was a complex accumulation of factors including crude oil price increases, drought in some major producing countries and increased dependency on global food trade networks (meaning individual nations were not able to independently regulate the cost of food within their nation); there was nevertheless a persistent public view that biofuels were in a large part to blame (United Nations Economic and Social Council, 2003).

17. Rittel and Weber (1973) identified 10 characteristics of a wicked problem in their original description; however, I have drawn on just 3 key points to illustrate this argument.

sustainability concerns associated with biofuel production and use. Rather, by framing biofuels as a wicked problem it allows the exploration of a variety of concepts as potential channels for enhancing theory-building about the sustainability of biofuels, that is, a theory building that is ad infinitum enhanced and adapted.

3.3 Conceptualising Social Sustainability in Biodiesel

Production

This section will discuss approaches to social sustainability in biodiesel production and highlight how discourses about the nature of social sustainability are important for how smallholder farmers are conceptualised and framed within biodiesel production.

There are now vast literatures on the sustainability of biofuels that conceptualises the sustainability question from many angles and conceptual bases (Selbmann & Ide, 2015). The sustainability concerns centred on biofuels as an agricultural product are not ‘new’ concerns as such — issues around land access, agrarian reform, direct and indirect land use change, mono-cropping, cash crops, subsistence farming, food security, technical assistance and knowledge management have been long present in the sustainability debates about agricultural systems, rural development and smallholder farmer livelihoods (Altieri & Nicholls, 2005; Binder, Feola & Steinberger, 2010; Pretty, 1995b; Wittman, 2010). Yet acknowledging the agricultural origins of biofuels is important as “sustainable biofuel production is inextricably linked with sustainable farming systems.”(Florin et al., 2012b, p.108) and can support

the framing of social sustainability in relation to smallholder farmers participating in biodiesel schemes.

McMichael (2010) has strongly argued that sustainability criteria in general — even when debated or controversial — in and of themselves *legitimise* biofuels and provide an ontological framework for integrating a capitalist development paradigm as the norm “...biofuelling poverty...means deepening forms of rural dispossession in the name of the market...” (p.615). McMichael’s point is pertinent in relation to smallholder farmers in biodiesel schemes because the development paradigm that he refers to renders alternative pathways for smallholder farms as *unthinkable* (ibid.). That is, it is portrayed as *inevitable* that smallholder farmers will be incorporated into biodiesel schemes and that concerns with social implications can be overcome through the application of sustainability criteria. This is in contrast to theories on *re-peasantisation* that question the underlying power and social structure discourses that shape the livelihoods of smallholder farmers (Narotzky, 2016; van der Ploeg, 2008). Theories of re-peasantisation are returned to later in developing the Autonomous Livelihood Framework (Chapter 5).

The elusiveness of a social sustainability definition means that the ‘social questions’ of biodiesel production have been addressed from a multitude of conceptual approaches — each reflecting different values and criteria. Indeed, social sustainability could be considered the poor cousin of economic and ecological sustainability, which have captured academic and public attention with easy-to-understand definitions and quantifiable outcomes (Littig & Griessler, 2005; Patridge, 2005; Vallance, Perkins & Dixon, 2011).

Values and worldview are important in discussing smallholder farmers and social sustainability in biodiesel production as they both define the ‘borders’ of the biodiesel problem and how different actors and actions are perceived within any proposed solutions. Hodbod and Tomei (2013) argue that conceptualising social sustainability in biodiesel production is both theoretically underdeveloped and empirically under investigated (see their Systematic Review from Hodbod & Tomei, 2013). This is made more complicated by the ways that governments and policies also articulate social sustainability goals through different terms and languages — often using disparate terms that in academic circles are not commensurate — for instance, equating social sustainability with both sustainable rural development and social inclusion.

Early research (pre–2010) focused on social sustainability in biodiesel production tended to draw on the idea of smallholder farmers as poor or living in poverty (Hall et al., 2009), uneducated (ibid.), lacking accountability (Rodrigues, Rodrigues, de Almeida Buschinelli, Ligo & Pires, 2009), having a lack of commitment to biodiesel production and companies (Santos & Rathmann, 2009), in need of external intervention (i.e. government policies) to improve their livelihoods (Finco & Doppler, 2009), and unable to fully understand ‘what’s best for them’ in terms of issues such as value chain participation, cooperative membership (César & Batalha, 2010; César & Batalha, 2013). Smallholder farmers have been framed as incorrectly managing their farms and in need of discipline to achieve a sustainable livelihood:

The family agriculture is strongly influenced by cultural factors and heritage. This results in path

dependence and contributes to the inappropriate care of this crop. Some of these techniques are: higher or lower cultivation density than suggested; soil exposition; vegetal surface burning, and; consortiums with other crops in less space than that recommended.... The practice of using low quality seeds produced by the farmers themselves needs to be banned.” (César & Batalha, 2010, p.4036).

This dominant discourse is based on the ideas of the “... capitalist modernity ...” (McMichael, 2008, p.205) that essentially conceptualises agriculture as an industry and smallholder farmers as labourers within that industry (Lehtonen, 2012). This discourse is not limited to research but also occurs as part of the way that smallholder farmers are perceived by the wider society in Brazil. Newberry (2014) noted how outside actors, such as refinery administrators or state representatives may be *misinterpreting* smallholder farmer actions based on their own worldview and the prevailing discourse about smallholder farmers in Brazil. For instance, outsider administrators *perceive* smallholder farmers as disobeying environmental regulations due to ignorance — rather than as a calculated livelihood strategy — because the mainstream discourse holds that smallholder farmers are backward and steeped in traditionalism:

... environmental violations are a product of risk and accountability issues that are misrecognized by usina [biodiesel refinery] administrators as cultural issues of environmental consciousness... what

administrators and technicians are pointing to is a perceived ignorance – a lack of awareness on their [the smallholder farmer] part of the importance of protecting the environment and producing in a sustainable manner ... this perceived lack of awareness of sustainability issues [is located] in a wider symbolic nexus of cultural traditionalism and backwardness that are imputed to the farmers of rural Goiás by the largely non-native usina [biodiesel refinery] administrators. (p.307)¹⁸

The framing of smallholder farmers as backward and tradition-bound is by no means unique to biodiesel research nor Brazil. More than two decades ago Pretty (1995a) argued that positivist techno-bureaucratic approaches to agricultural research resulted in policies that were applied irrespective of context and ignorant of local knowledge largely because the dominant discourse held that outside experts knew best in comparison to local farmers.

In a systematic literature review, Hodbod and Tomei (2013) identified just 17 papers on the social impacts of biofuels that were based on empirical research conducted at the local household or community level. Exploration of this literature found little attention has been focused on smallholder farmer's

18. Newberry's research was conducted with smallholder farmers in a region of Goiás with bioethanol rather than biodiesel. Goiás shares a state border with Bahia. Newberry's discussion of smallholder farmers is relevant to the biodiesel case.

experiences and perceptions of their participation biodiesel production programs. Greater emphasis was placed on ‘objective’ data, e.g. agronomic and quantifiable household data, rather than ‘subjective’ data such as interviews with farmers.

Hodbod and Tomei’s (2013) review found that biodiesel scheme participation costs and benefits for smallholder farmers are unevenly distributed both within households and between household and community level. Despite this evidence there has been minimal attention given to the gender impacts of biodiesel schemes (*ibid.*) and this omission would align with those authors who emphasise a significant blind spot in regards to unequal power relations and social structures within research on biodiesel schemes (Lehtonen, 2009, 2012; Selfa et al., 2015).

Hodbod and Tomei (2013) identified just two English language articles that provided evidence of local level social impacts of biofuels in Brazil being Lima, Skutsch & Costa (2011) and Finco & Doppler (2010a) — although several papers have been published since (see Dal Belo Leite, Justino, Silva, Florin & van Ittersum, 2015; Drouvot, Drouvot & Perluss, 2014; Florin, van de Ven & van Ittersum, 2012a; Florin et al., 2012b, 2013; Maroun & La Rovere, 2014; Newberry, 2014; Ribeiro & Dias, 2016; Silva et al., 2014a; Silva et al., 2014b; Stattman & Mol, 2014).

However, despite the growing body of research on the social implications of the PNPB there is a marked absence of smallholder farmers’ perspective — both in defining the social implications of biodiesel schemes and in analysis of what such implications signify within their broader livelihood (see Florin et al., 2012a; Florin et al., 2012b).

In line with the larger body of literature reviewed by Hodbod and Tomei (2013), smallholder farmer's knowledge, agency and negotiation of livelihood assets is often overlooked in the empirical Brazilian based literature in favour of objective approaches such as modelling data based on crop area, yields, labour and input use (see Dal Belo Leite et al., 2015). Exceptions to this include Manzi (2013) and Stattman & Mol (2014).

In Brazil, there is no clear base for the limited empirical studies with smallholders farmers — speculatively it could be in part due to the incipient nature of the program and/or the rapid decline of smallholder farmers' participation since 2010 (Marcossi & Moreno-Pérez, 2017).

The peer-reviewed literature on smallholder farmers participating in biofuel schemes in Timor-Leste was extremely limited. De Carvalho and Palmer (2012) briefly discuss the biodiesel schemes in their discussion on engaging communities in resource management but their work is not empirically based. Indeed, an extensive literature review found no empirical work in Timor-Leste on biofuels at the time of this thesis publication (April 2017).

As Hodbod and Tomei (2013) note, this is an exceptionally low level of primary data¹⁹ — made more significant as smallholder farmers are the intended beneficiaries in the Brazilian and Timor-Leste biodiesel schemes, and as such, it could be considered that these biodiesel schemes are being implemented in a ‘data vacuum’ with limited resources to understand and interpret the actual experiences and outcomes for smallholder farmers.

3.4 Social Inclusion

The terms social inclusion and social exclusion emerged in Europe in the latter part of the 20th century in social policy debates about that defined poverty as multi-faceted and social disadvantage linked to the denial of citizen rights — particularly participation in social, political and economic aspects of society (Shortall, 2008; Wilson, 2006). Social exclusion referred to poverty in relative rather than absolute terms, with intricately linked poverty and inequality, and emphasised power and participation: “Social exclusion... refers not only to the distribution of income and assets (as does poverty analysis) but also to social deprivation and lack of voice and power in society...”(Buvinic, 2004, p.5).

19. Hodbod and Tomei (ibid.) recognise that they may have overlooked some research and their review primarily represents English language publications. There is a wider range of empirical data available in individual Brazilian university repositories in Portuguese language. However, this scholarship is largely inaccessible to English speaking only academics. There is recent trend in Brazil to encourage scholars to publish in English language high impact factor journals (Ketefian & Mendes, 2010), meaning that this scholarship is slowly becoming more widely available.

However, the term *social inclusion* was co-opted and used in a way that Veit-Wilson (1998) identifies as *weak* social inclusion —centred on the notion of the excluded as requiring integration into the dominant society. Weak social inclusion obscures inequalities and conflict and fails to consider the historical and social context in which actors are embedded (ibid.). In comparison, *strong* social inclusion addresses issues such as who has the power to decide who is excluded and how the excluded are imagined (Levitas, 1996; Silver, 1994; Veit-Wilson, 1998). For instance, Veit-Wilson’s emphasis the centrality of access to power as part of social inclusion:

The question of power to choose one method of combating poverty and deprivation as against others must be faced openly. Whose definition of the problem is it? ... Are the costs and benefits to them consistent with their own social value system and respectful towards their modes of life and conception of human dignity? (p.172)

These theoretical arguments provide an important background to understanding the ways that the terminology of social inclusion has been used within the biodiesel schemes — particularly the Brazilian PNPB and partly the Timor-Leste Agro-Energy Program. PNPB has specific social sustainability goals for smallholder farmers and rural development that are framed through the language of social inclusion. The two terms of social sustainability and social inclusion are not commensurate — however, the PNPB treats them as equal and as such, social inclusion forms part of the way that social sustainability is conceptualised in biodiesel schemes in Brazil.

In this section I will focus on how social inclusion has been conceptualised within the PNPB, the practical limitations of achieving social inclusion via the PNPB and the broader challenging discourse around social inclusion as an (in)appropriate framework through which to address rural development issues. I do not address social inclusion within the Timor-Leste Agro-Energy Program as there is no peer-reviewed literature specific to the Timor-Leste case.

Social Inclusion in the PNPB

At a basic level the PNPB was designed on the idea of achieving social inclusion through the mediated inclusion of smallholder farmers in biodiesel production value chains. The PNPB works from the premise that a change in farming conditions, such as a link to external markets and access to technological extension services, will result in increased income, employment and *ipso facto* result in social inclusion of smallholder farmers and social sustainability for under-developed rural communities (Schaffel et al., 2012).

Early critique (pre-2009) of the PNPB social inclusion goals focused on the implementation limitations rather than questioning whether social inclusion was an appropriate way to conceptualise rural development and social sustainability for smallholder farms. The social inclusion goals of the PNPB are now widely acknowledged as unsuccessful and superseded by emphasis on other aspects of the policy such as obligatory blending quotas which has increased use of soy, cotton and animal fat from the commercial agricultural industry and driven government support to agribusiness (Azevedo & Müller Pereira, 2013; Stattman et al., 2013). Indeed, there has been a

significant policy shift away from attempting to achieve the initial social inclusion goals with original targets largely downgraded. Nevertheless, social inclusion still forms an important part of the analysis of the PNPB as it has not yet been abandoned entirely.

In the Northeast of Brazil, the implementation limitations to achieving social inclusion in the PNPB can largely be grouped into two main themes. The first is locational and logistical barriers such as dispersed locations of smallholder farms, poor infrastructure for transporting feedstock and difficulty in achieving production at scale (César & Batalha, 2013; Dal Belo Leite, Bijman, van Ittersum & Slingerland, 2014).

The second theme is that of framing smallholder farmers as a moral and cultural underclass that is either unwilling, uneducated or unable to meet their obligations and defined role in the PNPB — e.g. by dishonouring multi-year production contracts or ignoring agricultural extension advice (Santos & Rathmann, 2009; Stattman & Mol, 2014; Xavier & Vianna, 2009).

However, this focus on the implementation limitations reinforces the rhetoric that smallholder farmers are materially poor due to lack of integration in markets rather than due to structural power imbalances between rural communities and urban elites. This is a *weak* social inclusion approach that ignores the social and historical structural power imbalances in Brazil vis-a-vis rural communities and urban elite. Smallholder farmers are defined as socially excluded to their detriment and in need of external expert assistance to support their livelihood. This approach positions the state as powerful, knowledgeable and in a patriarchal association with smallholder farmers who are framed as weak and ignorant of their own needs.

Viewed through a sociological approach to social inclusion (Allman, 2013), the power of the state and the agro-industrial elite is reinforced through the PNPB as it relegates smallholder farmers to a weak, powerless position with the biodiesel production chain. The assumption that integration into the biodiesel value chains will support social inclusion of smallholder farmers equates with ‘stepping away’ from challenging the social norms associated with power, class and land ownership in Brazil²⁰. It defines social exclusion and its remedy on terms that are compatible with maintaining the status quo for those in power. Indeed, it has been proposed that real commitment to social inclusion for Brazilian smallholder farmers would be better achieved via substantial agrarian and policy reform (Holanda, Wichmann & Pontes, 2011).

By labelling smallholder farmers as social excluded, the PNPB de-values the existing local markets, production chains, structures and communities that form part of smallholder farmers existing livelihoods. The PNPB fails to recognise that smallholder farmers may be happily socially included in communities and structures that fall outside the state policy and control.

This de-valuing is exacerbated when the implementation limitations are presented as failings on behalf of the smallholder farmers. As highlighted

20. The Northeastern State of Brazil has a higher percentage of subsistence smallholder farmers and higher rates of poverty (Rathmann & Padula, 2011) due to complex intertwined social, economic and political dimensions of the North East which has a significant history of slavery, *fazendeiros* (large landed estates), social discord, class divisions and violent conflict between smallholder farmers and landowners (Lehtonen, 2012; Wittman, 2009; Wolford, 2005).

earlier, smallholder farmers are presented as passive and failing to fully understand the benefits of the PNPB when their choices and actions are not in accordance with the policy design (for instance, breaking multi-year production contracts): “According to Abreu et al. (2009), poor family farmers are not aware of the importance of these actions and therefore fail to understand the idea of the spirit of cooperation.”(César & Batalha, 2013, p.166).

This framing of smallholder farmers draws on the idea of *false consciousness* in the choices that smallholder farmers are making and buys into the falsehood of “...restricted context of choice...”(Cornwall, 2003, p.1329). By citing farmers low level of education, it suggests that better educated farmers would make other choices and delegitimises the agency of smallholder farmers as valid in their own right.

This idea of false consciousness is further illustrated when we consider how smallholder farmers risk aversion is framed as a negative obstacle to improved livelihoods or full participation in the PNPB (Finco & Doppler, 2009). This overlooks the benefits of smallholder farmers being risk adverse, especially in nations that have limited or no social security. Risk averse farmers are protecting their livelihoods and risk reducing innovation has long been considered a necessary characteristic by sustainable agriculture scholars (Altieri, 2002). This framing of smallholder farmers is part of being able to label them as socially excluded and dismiss the autonomous nature of smallholder farmers choices.

The false consciousness approach breaks down further when we examine how choice and agency are exercised in other settings. In particular,

those who are excluded from decision-making can choose to exercise their agency elsewhere by “... resisting, rebelling and breaking the rules ... (Sarin, 1998)” (in Cornwall, 2003, p.1326) — an idea that is aligned with the everyday resistance of peasants (Scott, 1986). Non-participation, non-fulfilment of contractual arrangements and non-adherence of prescribed technical advice can be framed as resistance to dominant structures rather than antipathy. This transforms the idea from failures on behalf of the smallholder farmer in the PNPB to ways that smallholder farmers negotiate and pursue their own interests without being in direct, open conflict with the state. I align strongly with this view and resistance forms part of my Autonomous Livelihood Framework (Chapter 5).

Whilst authors such as Rathmann and Padula (2011) have argued that smallholder farmers and cooperative managers are participating in the PNPB due to their ignorance about the limited economic viability of the program, recent research conducted in agrarian reform settlements (Portuguese: *assentamentos*) noted that there is a level of state coercion to participation (Ribeiro & Dias, 2016).

State control of physical and economic productive space²¹ in these settings results in an unspoken but strong obligation on behalf of smallholder farmers to participate in the PNPB. The PNPB acts as more than just an economic activity, and this is considered a key factor the success⁷ of the State’s agrarian reform settlements and the fulfilment of the State policy goals. Indeed, in Ribeiro and Dias’s (2016) work on an agrarian reform settlement where the

21. The State has strict protocols about productive land use and land conservation areas on agrarian reform settlements

state had mandated the growing of transgenic soybean for biodiesel feedstock they found that:

... In the case that a family has favorable conditions for soybean cultivation and they do not [cultivate it], they are looked upon negatively, for not having adhered to the program. It disregards, therefore, the freedom of choice to participate or not in that particular program... (p.18)

The debate on social inclusion for smallholder farmers in the PNPB is in the process of becoming more nuanced. The PNPB has been subjected to a number of critiques focused on the conceptual limitations of social inclusion, with scholars drawing on challenging discourses rather than laying the blame at the feet of smallholder farmers (Hospes & Clancy, 2011; Stattman & Mol, 2014).

Research on the conceptual limitations of the PNPB has called into question the notion that smallholder farmers can be socially included through a government-led export oriented market mechanism — indeed, the counter argument is that a focus on export markets has led to economic exclusion for rural communities (Hospes & Clancy, 2011).

The focus on conceptual limitations has emphasised the ways that the PNPB reduces farmers autonomy for managing their farms and livelihoods.

... Amongst the problems that the transgenic seed has, one principal [problem]...is the lack of autonomy of the family that uses it, as they cannot control their entire production process and become

dependent on the seeds and inputs market. (Ribeiro & Dias, 2016, p. 19)

Further, the PNPB has contributed toward social exclusion by failing to acknowledge the heterogeneity of smallholder farmers and that inclusion can occur on adverse terms (Hospes & Clancy, 2011). Indeed, it is important to consider how different social capital ²² and demographics, particularly gender, affects individual farmers in the PNPB

... marginal subsistence farmers have been sidelined in this rural development model because they are neither members of cooperatives nor profit from the social inclusion policies of the PNPB. In that sense, social inclusion works for only a portion of small family farmers. (Stattman & Mol, 2014, p.292)

As a Rural Development Model, the combination of practical implementation issues, conceptual limitations and the shift toward support for agribusiness in order to meet obligatory blending quotas has meant that the PNPB has been largely unsuccessful in meeting social inclusion outcomes and is widely considered unviable (Marcossi & Moreno-Pérez, 2017; Rico & Sauer, 2015; Selfa et al., 2015).

Nevertheless, as pointed out by Manzi (2013) — the PNPB functions as a way to incorporate agrarian and civil social movements into a state controlled apparatus and to depoliticise smallholder farmers. Further, Manzi argues that the PNPB reinforces gendered and racialised approaches to rural development

22. Social networks, relationships, association or cooperatives

effectively reproducing structural power relations that locate smallholder farmers as socially excluded through limited access to power.

This section has primarily discussed the social inclusion goals of biodiesel schemes in the Brazilian context²³. The centrality and emphasis placed on social inclusion within the PNPB, especially at the time that this research was conducted in Brazil 2009–2010, dominated the discussion on social sustainability and wider social questions of smallholder farmer participation in the PNPB. I have illustrated that the limitations of a social inclusion approach are more than simple implementation challenges and that there are deeper conceptual issues with such an approach.

Significantly, I reject the dominant framing of smallholder farmers as passive, in need of intervention, unable to know what's best for them and socially excluded to their detriment. As noted earlier, in Chapter 1, I argue that a farmer-centred approach and valuing smallholder farmers knowledge, choices and negotiation of livelihood assets are key components to answering: *How can we explain smallholder farmer' participation in biodiesel schemes as part of a rural livelihood in Brazil and Timor-Leste?*

23. The Timor-Leste Biodiesel Pilot Project, the Agro-Energy Program, modelled on the Brazilian approach also lists social inclusion as a goal. However, there is a lack of detailed policy and academic literature on social inclusion as part of the Agro-Energy Program.

3.5 Chapter Summary

In summary, the preceding discussion forms the theoretical justification for this study. It has been developed by way of review of three bodies of literature.

Firstly, the global emergence of biodiesel schemes was outlined in order to provide context for this study. I canvassed the ways that biodiesel schemes could be considered a wicked problem and the epistemological implication of this approach that dismisses the idea of technological fix to social sustainability issues.

Secondly, I reviewed the conceptualisation of social sustainability in biodiesel production. I highlighted that low levels of empirical data have resulted in a data vacuum for interpreting the actual experiences and outcomes for smallholder farmers in biodiesel schemes.

Thirdly, I critiqued the social inclusion approach. I argued that there are ideological issues with a social inclusion approach due to power imbalances between those defined as ‘socially excluded’ and those with power to ‘do the defining’. I concluded that despite the rhetoric of social inclusion with the Brazilian PNPB, in fact, social exclusion was enhanced and power imbalances reinforced via the current configuration of the biodiesel scheme.

The next chapter turns to the conceptual underpinnings of the Autonomous Livelihood Framework.

Chapter 4: Conceptual Underpinnings of the Autonomous Livelihood Framework

4.1 Introduction

In the previous chapter I discussed the dominant ways that the social implications of biodiesel schemes for smallholder farmers have been addressed — that is, primarily through a social sustainability and social inclusion lens. I highlighted the research gap in terms of the small pool of empirical studies with smallholder farmers themselves and that this study aims to contribute toward bringing smallholder voices to the fore. However, current analytical tools for interpreting smallholder livelihoods in general are based on a fractured and disparate set of theories and methods. This review therefore combines theoretical insights from the Sustainable Rural Livelihoods Framework (Scoones, 1998) with the *autonomy of peasants* drawn from van der Ploeg's (2008) peasant principle to develop a novel framework — the Autonomous Livelihood Framework — that I have used to analyse and interpret the farmer informant narratives in this thesis.

One way to put social sustainability concepts into practice has been to focus on livelihoods. The Sustainable Rural Livelihoods Framework (Scoones, 1998) has been used by development agencies and scholars as both an analytical tool and conceptual framework to promote strategies for poverty alleviation and rural development in the global south (Knutsson & Ostwald, 2006; Robinson & Fuller, 2010; Scoones, 2009). Whilst the Sustainable Rural

Livelihoods Framework offers useful insights, limitations to the framework are well-recognised and it has rarely been used to assess the social implications of biodiesel production (Vargas, 2010).

The Sustainable Rural Livelihoods Framework informed the initial design of this research project and two key aspects — notably *Livelihood Resources* and *Livelihood Strategies* were used to structure the interview tool and the first phase of data analysis (see Section 6.6). However, several limitations of the Sustainable Rural Livelihoods Framework were identified in this process, including the lack of an adequate way to interpret smallholder farmer agency.

The smallholder farmer narratives from Brazil and Timor-Leste emphasised issues of independence and freedom — themes that corresponded with the concept of striving for autonomy present in the peasant principle developed by van der Ploeg (2008). This section therefore explores the conceptual base of the Sustainable Rural Livelihood Framework and *striving for autonomy* with the goal of developing an integrated framework for interpreting the social implications of biodiesel schemes for smallholder farmers' livelihoods.

This Chapter is structured as follows:

Section 4.2 provides a brief introduction to livelihood approaches in general and then focuses on the Sustainable Rural Livelihood Framework (Scoones, 1998) — in particular the aspects of capitals, social differentiation and actor-led approaches. These components are relevant to the development of the Autonomous Livelihood Framework. Finally, I turn to critiques of the

Sustainable Rural Livelihood Framework and some of its theoretical limitations.

Section 4.3 introduces autonomy as an emerging concept in rural and agrarian studies. I primarily focus on van der Ploeg's (2008) peasant principle and his use of autonomy as this is a seminal text and forms the basis for broader literature on autonomy of peasants published in the last seven years. In this section, I draw on philosophical conceptualisations about autonomy in order to augment van der Ploeg's (2008) peasant principle — in particular the work of Christman (2015) due to the accessible nature of his philosophical discussions for non-philosophers.

4.2 Sustainable Rural Livelihoods Framework

Livelihood approaches were first articulated in the 1980s as "... integrated rural development ..." (Ellis & Biggs, 2001, p.437) and developed further through the ideas of Sustainable Rural Livelihoods (Chambers & Conway, 1991) and the Sustainable Rural Livelihood Framework (Scoones, 1998). The Sustainable Rural Livelihoods Framework in particular was widely adopted by the United Nations, non-government organisations and bilateral donors, attracted by the shift toward development thinking based on people and

their capacity for leading and sustaining change and recognising ‘poor communities’ as complex and dynamic (Brocklesby & Fisher, 2003)²⁴.

The most commonly accepted definition of *sustainable livelihood* comes from Chambers and Conway (1991) who identified key aspects of a sustainable livelihood being capabilities, resilience and the ability to contribute to net benefits for other livelihoods in different spatial and temporal locations:

A livelihood comprises the capabilities, assets (stores, resources, claims, access) and activities required for means of living: a livelihood is sustainable which can cope with and recover from stress and shocks, maintain or enhance its capabilities and assets, and provide sustainable livelihood opportunities for the next generation; and which contributes net benefits to other livelihoods at

24. Ellis and Biggs (2001) remind us that the Sustainable Rural Livelihood Framework does not necessarily conceptualise ‘poor communities’ or the ‘rural individual / family’ as being farmers per se. The Sustainable Rural Livelihood Framework, emphasising a variety of assets and strategies to enhance resilience and resist vulnerability, embrace the notion that livelihood from farming is just one possible ‘asset’ and that non-farm activities contribute to the package of ‘rural livelihoods’. Whilst this research is essential family farmer focused, many farmer informants did not derive their primary income from their farming activities. In this sense, it could be argued that the central ‘actors’ are in-fact better labelled as ‘peasants’ or ‘rural based individuals’ — however, I have chosen *smallholder farmers* as the preferred terminology.

the local and global levels and in the short and long-term. (p.6).

Scoones (1998) expanded on the definition offered by Chambers and Conway (1991) to conceptualise a Sustainable Rural Livelihood Framework that includes five key aspects, being:

- (a) Context Conditions and Trends
- (b) Livelihood Resources
- (c) Institutional process and organisational structures
- (d) Livelihood Strategies, and
- (e) Sustainable Livelihood Outcomes.

The Sustainable Rural Livelihoods Framework is particularly relevant to interpreting the social implications for smallholders in biodiesel schemes because it provides a structured framework for analysing both the key components that constitute smallholder farmer livelihoods and the contextual factors that influence them. The five key aspects are both broad and complex enough to allow for diversity amongst feedstock, national policies, land use, social conditions, agro-ecological practices whilst maintaining a common framework for analysis.

The Sustainable Rural Livelihood Framework was considered novel when it was first articulated in the last 1990s, in part because it contributed towards an improved understanding of the holistic ways that livelihoods were comprised and embraced flexible, multi-faceted ways of combining capitals and strategies (Haan & Zoomers, 2005). Scoones (2009) notes the Sustainable Rural Livelihood Framework is appealing due to its attempts to understand realities from a local perspective “...look at the real world, and try and

understand things from local perspectives. Responses that follow should articulate with such realities and not try and impose artificial categories and divides on complex realities...” (p.172).

Further, Scoones (2009) argues that the Sustainable Rural Livelihoods Framework is at least multidisciplinary if not transdisciplinary and there is similarity with the concept of transformational learning in transdisciplinary research: “Belonging to no discipline in particular, livelihoods approaches can allow a bridging of divides, allowing different people to work together – particularly across the natural and social sciences.”(p.172).

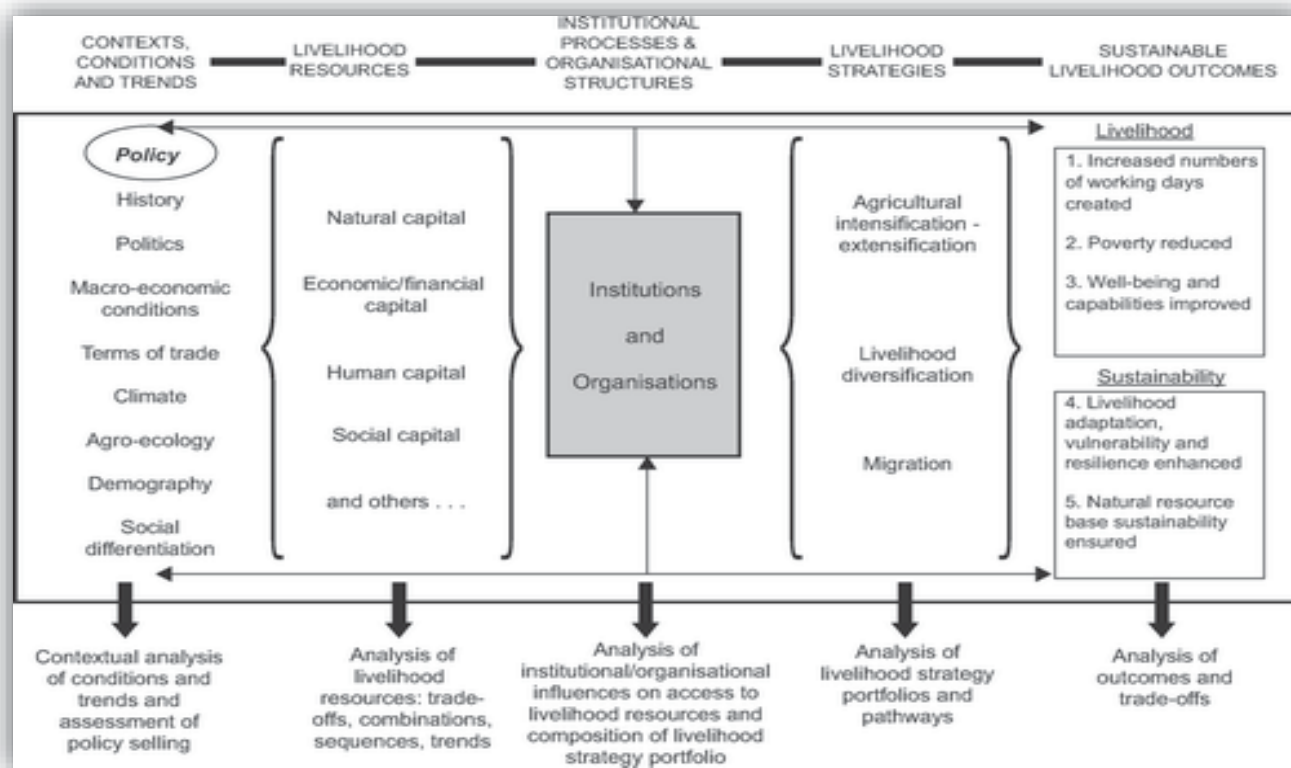


Figure 1: Sustainable Rural Livelihood Framework

(Scoones 1998 p.4)

Whilst Scoones (2009) asserts that the appeal of the Sustainable Rural Livelihood Framework is simple, the framework itself is complex (see Figure 1 Sustainable Livelihood Framework), attempts to cover a wide range of factors that are not necessarily comparable and in parts is theoretically weak (Haan & Zoomers, 2005; Turner, 2012).

In this section, I will primarily concentrate on the two components of the Sustainable Rural Livelihood Framework being:

- (a) Capitals, and
- (b) Social differentiation

that are not explored later in discussion of van der Ploeg's (2008) peasant principle. Whilst *Livelihood Strategies* are a core component of the Sustainable Rural Livelihood Framework — they are also a core feature of van der Ploeg's peasant principle. As such, to avoid repetition, Livelihood Strategies will be discussed in the following Section 4.3 on Autonomy.

Capitals

Capitals are the core resources or assets that can be drawn upon via different strategies for a livelihood. The five major capitals frequently used in livelihood approaches are:

- (a) Social Capital
- (b) Human Capital
- (c) Financial Capital
- (d) Physical Capital

(e) Ecological Capital

(Haan & Zoomers, 2005; Scoones, 2015)

I have not defined the five capitals in this section — rather, I return to formal definitions in the articulation of the Autonomous Livelihood Framework (Chapter 5) in order to avoid repetition.

In the Sustainable Rural Livelihood Framework, capitals are often represented through an ‘asset pentagon’ that can alter in shape depending on the relative strength or weakness of a certain capital when used in livelihood analysis of an individual, household or community. Both the use of the term *capitals* and the asset pentagon have been controversial and problematic on a number of points. The asset pentagon has been seen as reducing complexity and creating an illusion of comparable, measurable units where none existed (Scoones, 2015).

The asset pentagon excludes key capitals such as political and cultural capital, which rural sociologists have argued is essential to understanding context specific livelihood (Haan & Zoomers, 2005). Arce (2003) is highly critical of the term *capitals* — linking the terminology to economists evaluating highly institutionalised context where productive assets are privately owned and asserting that the terminology of *capitals* offers little toward interpreting complex rural livelihoods. Arce insists on differentiating between the terms *capitals*, *assets* and *resources* — however, for the purpose of this thesis and consistency, I have opted to use the term *capitals* as per the original Sustainable Rural Livelihood Framework, but also encompassing the notion of assets and resources.

A broader view of capitals has been developed by Bebbington (1999), that focuses on capitals as instrumental, hermeneutic and emancipatory. This approach purports that capitals can fulfil multiple functions: "... for instrumental action (making a living), hermeneutic action (making living meaningful) and emancipatory action (challenging the structures under which one makes a living)" (p.2022). Bebbington's interpretation of these three functions of capitals is pioneering and represents an important shift in direction in the theoretical application of capitals. This is because there has been a tendency to reduce capitals to 'things' (tangible or intangible) without adequate analysis on how power and social differentiation affect access to and utilisation of such capitals (Haan & Zoomers, 2005). I return to discuss Bebbington's three functions of capitals in the following section on autonomy (Section 4.3).

Social Differentiation

An important, although often underemphasised, aspect of the Sustainable Rural Livelihood Framework is that of social differentiation. Social differentiation is included in the Sustainable Rural Livelihood Framework diagram under the heading of "Context, Conditions and Trends" (Scoones, 1998, p.4) and is referred to as an essential tool for interpreting the different ways individuals have access to and control over resources as part of their livelihoods. Social differentiation can be considered "...property relations or certain social or physical characteristics such as race, gender, language, ethnicity, origin or religion..." (Haan & Zoomers, 2005, p.33). In particular social differentiation refers to those characteristics that are linked to social structures of power and access to resources. Scoones (1998) claims that social

differentiation is *critical* to understanding how social power structures can determine access to livelihood resources but that application of livelihood approaches has often ignore this component in favour of “... a fairly instrumental poverty reduction agenda, framed by economics.” (p.180). Indeed, Scoones’ criticism is echoed by scholars researching the sustainability of livelihoods in the biofuels sector who note that social sustainability assessment of biofuels have conventionally focused in income, without adequate consideration of the factors that mediate access and control of resources (Selfa et al., 2015).

In addition, Liepins (1998) asserts that the focus on social differentiation in rural livelihoods has been largely misplaced in that studies have concentrated on the micro-level activity based social relations — such as the gendered nature of farm labour — whilst not adequately considering how rural livelihoods are socially constructed through discourse, in particular “...on the way discursive constructions of gender contribute to power relations in different agricultural spaces, ranging from the farm household and property, through to the various arenas of agricultural politics.” (, p.372). In this way, Liepins is arguing for a multi-scalar consideration of social differentiation and emphasises how discourse shapes “...the perceived truths and knowledges [sic]...” (p.372) about rural livelihoods in general.

The next section will turn to broader critiques of the Sustainable Rural Livelihood Framework.

Limitations to the Sustainable Rural Livelihood Framework

Livelihoods approaches in general and the Sustainable Rural Livelihoods Framework specifically have a number of recognised weaknesses (Amekawa, 2011; Morse & McNamara, 2013b). In this section, I will briefly review the following:

- (a) Lack of focus on an actor-led approach
- (b) Tendency to box and categorise rather than present livelihoods as entanglements in flux
- (c) Gender blindness, and
- (d) Intentional development approach.

(a) Lack of focus on an actor-led approach

Despite Scoones' (2009) assertion that the Sustainable Rural Livelihoods Framework facilitates "...negotiated learning between local people and outsiders..." (p.172) — the key elements of agency, empowerment and voice are almost completely lacking in the Sustainable Rural Livelihoods Framework. In this context, livelihoods are often discussed in absence of the acknowledgement of farmers and peasants as actors with agency (Arce, 2003; Turner, 2012). For example, Chambers and Conway 's (1991) earlier definition defines livelihoods as almost disembodied from individuals and their agency to make choices and decisions that drive their livelihoods — even within an acknowledgement of the boundaries of social structure. Whilst the Sustainable Rural Livelihood Framework was intended to be a more actor-centred framework than earlier conceptual tools that focused on macro-level analytics

of poverty (Scoones, 2009), in reality it was a shift toward micro-level contextual interpretations.

Indeed, critiques of livelihood approaches in general and the Sustainable Rural Livelihoods Framework specifically have noted that the managerial nature of these approaches does not address issues of power, human agency and conflicts of values which are important elements at community level (Brocklesby & Fisher, 2003). Perhaps more importantly is the observation that “Although...[there are] ideas about participation and empowerment... such ideas conflict with technocratic decisions and desires for particular outcomes.” (p.194). Brocklesby and Fisher’s point is that the Sustainable Rural Livelihoods Framework has been used by development agencies as an externally driven *outcome* focused tool to the detriment of local values and livelihood choices²⁵.

(b) Tendency to box and categorise rather than present livelihoods as entanglements in flux

Arce (2003) is critical of the Sustainable Rural Livelihoods Framework, arguing that notion of ‘capital’ (human, social, natural, financial and physical) can be misleading, as it tends to ‘box’ and ‘categorise’ rather than acknowledge complex arrangements of collective and private ownership in many societies, and that individuals understanding of their own reality should be given much heavier weight in judging social implications of development schemes. Indeed, there is critique about terminology of capitals which carries with it ideas that

²⁵ This is not to presuppose that all livelihoods studies consider livelihoods as externally driven.

all assets can be monetised, are equal in status and value and carry the same meanings to individuals across cultural and societal divides (Arce, 2003; Morse & McNamara, 2013a).

(c) Gender blindness

Another noticeable area that is not explicitly addressed within the Sustainable Rural Livelihoods Framework is that of gender. Unlike identified limitations — such as power dynamics which Scoones (2009) at least acknowledges and attempts to address in his recent re-examination of the Sustainable Rural Livelihoods Framework — gender critique remains at the fringes and is mentioned only as a “...dimension of social difference...” (p.16) along with class and ethnicity. Scoones proposes that the Sustainable Rural Livelihoods Framework needs to be ‘enriched’ through an explicit theoretical concern with “...class, gender and capitalist relations...” (p.17). However, this appears almost as a cursory nod to social differentiation and the centrality of gender as an organising principle in all social systems. Feminist scholars have argued that gender shapes perceptions, identities, institutions, labour divisions and does so in race and class specific ways. Sprague (2005) argues “If we did not see gender in social phenomena, then we are not seeing them clearly...” (p. viii).

(d) Intentional development approach

Beyond the explicit limitations of the components of the Sustainable Rural Livelihoods Framework, there are also implicit assumptions that underlie the framework. Morse and McNamara (2013b) emphasise that the Sustainable Rural Livelihoods Framework was developed in a particular context that

valued the idea of *intentional development* — that is, that externally driven (exogenous) intervention is necessary for livelihood development and that outsider expert knowledge is part of this process. Intervention and outside expert knowledge do not explicitly make up part of the Sustainable Rural Livelihoods Framework five key aspects — but they are implicitly present in how the framework is presented as a tool and concept.

Despite these limitations to the Sustainable Rural Livelihoods Framework — it remains an important analytical framework and conceptual tool not just for livelihood researchers or development practitioners but for scholars exploring social aspects of sustainability. This is because the Sustainable Rural Livelihoods Framework does provide a structured way to interpret the interaction between livelihood strategies and the ways that capitals are used for different circumstances that are temporally, spatially and context bound. Indeed, in order to overcome some of the limitations scholars have integrated the Sustainable Rural Livelihoods Framework with other conceptual frameworks — e.g. with Sen's 1999 'development as freedom' (Zoomers, Leung & Westen, 2016) and resilience and ecosystems services (Reed et al., 2013). Scholars have also adjusted the Sustainable Rural Livelihoods Framework by expanding, adapting or dismissing different components of the framework — e.g. Vargas (2010) expands the framework to include *political*, *cultural* and *built* capital — and by using alternative nomenclature (Vaidyanathan, 2009).

The Sustainable Rural Livelihoods Framework, although imperfect, offers a good starting point for exploring smallholder farmers' participation in biodiesel schemes as it attempts to systematically encompass complex, cross-

cutting issues that constituent rural livelihoods. I use key components of the Sustainable Rural Livelihoods Framework in the Autonomous Livelihood Framework, notably *Livelihood Strategies, Capitals and Context*²⁶. However, I move away from the prescriptive, intervention and outcome oriented model toward a model that is centred on the notion of *negotiating for autonomy* as driving force for constructing a livelihood. The next section will introduce *striving for autonomy* (van der Ploeg, 2008) as it is used in rural and agrarian studies. I later return to the Autonomous Livelihood Framework and provide a detailed overview of the integration between the two conceptual frameworks.

4.3 Autonomy of Peasants

Scholars have long attempted to understand and interpret the ways in which smallholder farmers simultaneously integrate, resist and adapt to the changing social and rural spaces in which they are embedded (Schneider & Niederle, 2010; Turner, 2012). One approach to address this complex and

26. These components, notably ‘capitals’ and livelihood strategies are not unique to the Sustainable Rural Livelihood Framework. Indeed, there is a substantial body of work that uses this concept in general livelihood and rural development approaches. I specifically refer to the Sustainable Rural Livelihood Framework here as it chosen as the model for the early research design as it offered a comprehensive and unified way of bringing these aspects together.

dynamic problem space is through the concept of autonomy²⁷. In this section, I introduce autonomy as it used in rural and agrarian studies and highlight the key aspects that are later used in the Autonomous Livelihood Framework.

The position that I advance here is that conceptually autonomy fills a part of the gap identified in livelihood approaches — notably by shifting away from the notion of livelihoods as externally driven (without dismissing the importance of social structure and context) to place the concept of negotiating for autonomy as a critical driver for smallholder farmers construction of their livelihoods. That is, negotiating for autonomy provides a way to ground *why* the farmer informants did certain things and not other things.

This section is focused on the seminal work by van der Ploeg's (2008, 2010b) peasant principle²⁸ which relies heavily on the concept of striving for autonomy²⁹.

Autonomy as a conceptual framework applied to understanding smallholder farmer livelihoods and rural development could be considered a

²⁷ Autonomy and agency are not congruent terms. The critiques of the Sustainable Rural Livelihoods Approaches have largely referred to agency and scholars such as Turner (2012) address agency, not autonomy. However, I have included agency as a sub-component of autonomy in this thesis. For further clarification see 5.6 Agency and the Glossary

²⁸ Referred to herein as the peasant principle without italics but specific to van der Ploeg's theory.

²⁹ van der Ploeg uses the terms *striving for autonomy* and *the struggle for autonomy* interchangeably. I have opted for striving for autonomy for consistency

relatively emerging field³⁰ and several studies (Nelson & Stock, 2016; Schneider & Grisa; Stock & Forney, 2014; Stock et al., 2014) attribute the development of notion of autonomy of peasants to van der Ploeg's (2008) peasant principle. Van der Ploeg himself places autonomy at the centre of his definition of what constitutes 'peasant agricultural practices': "...peasant condition is characterised by a struggle for autonomy" (p.14) and argues that this struggle for autonomy finds expression in the creation and development of a self-governed resource base oriented toward improving peasant livelihoods. In van der Ploeg's peasant principle themes of resistance to "patterns of dependency, deprivation and marginalization" in order to create "...degrees of autonomy..." (p.261) feature prominently.

Van der Ploeg (2008) uses interchangeably a number of terms when referring to autonomy, such as *striving for autonomy*; *the struggle for autonomy*; and *relative autonomy*, largely that only partly align with philosophical concepts and wider debates about autonomy. In addition, scholars such as Stock et al. (2014) whilst drawing on van der Ploeg's peasant principle and notion of striving for autonomy, use their own definition and terminology to refer to autonomy. As such, this section uses specific terms

30. Indeed, a search of the terms [autonomy] and [farms*] in the Scopus Database (2005–2015) returns less than 130 relevant results, with publishing rates increasing from 2010 onwards (more than 10 Journal articles published per annum). An important caveat should be noted here that important works by authors such as van der Ploeg (2008) and Smith (2015) on autonomy and farmers is not represented in these search results as they either did not explicitly meet the search criteria or present work in formats other than Journal Articles.

found in the various texts in italics, the definitions of which can be found in the Glossary.

I turn now to a detailed analysis of van der Ploeg's (2008) peasant principle.

Van der Ploeg's Peasant Principle

As noted by Edelman (2011) in his review of van der Ploeg's (2008) seminal work his "... exposition is complex and at times a bit convoluted... — as in parts of the text — it's easier to see the trees than the forest..." (p.111). In order to address this complex text I have separated van der Ploeg's "Figure 2.2 Choreography of the peasant condition" (p.23) into three primary themes of

- (1) Autonomy
- (2) Context and
- (3) Livelihood Strategies.

Figure 2 Three themes in 'Choreography of the peasant condition' shows van der Ploeg's original diagram (black text) with three overlaid boxes (coloured text) to group the themes.

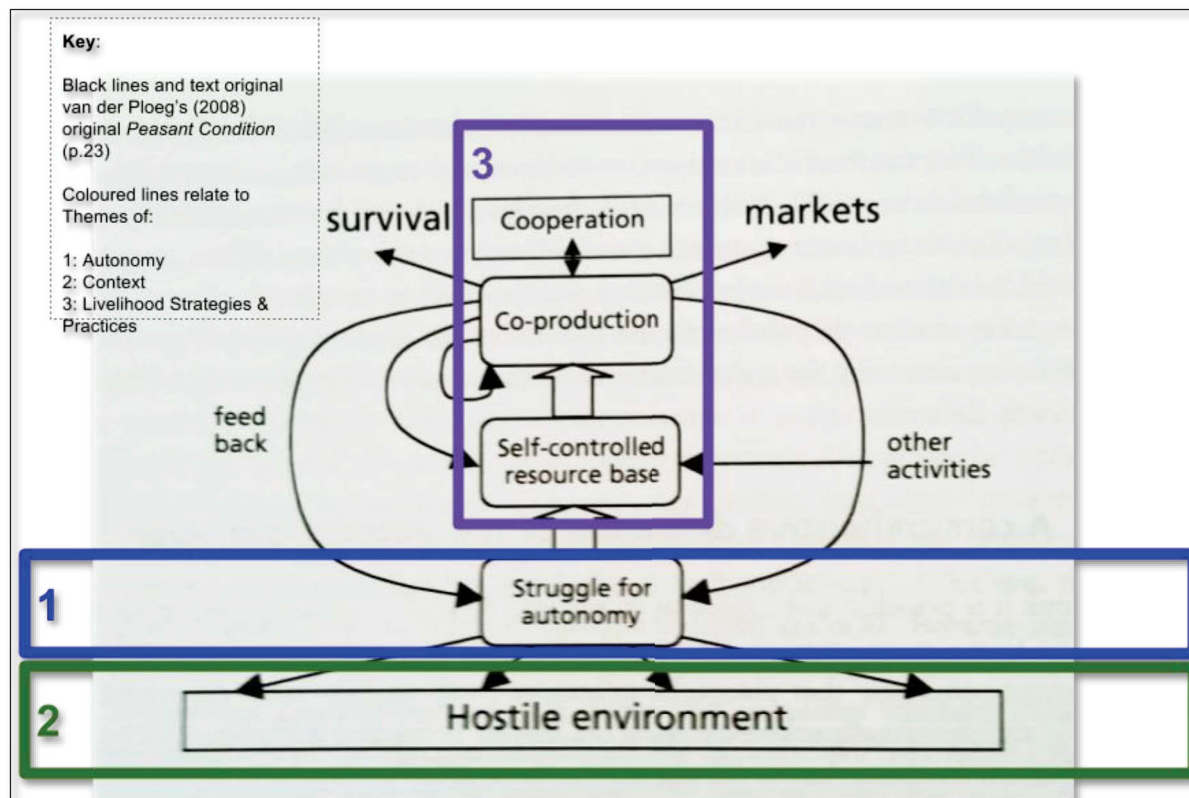


Figure 2: Three themes in 'Choreography of the peasant condition'

These themes can be further grouped. Firstly, at a theoretical level, there is the notion of autonomy (Item 1). Secondly, there is the notion of context (Item 2). Thirdly, there are the normative farmer practices that relate to livelihood strategies and practices (Item 3–7). I have summarised these in the following Table 1 Seven-Key Themes of the Peasant Condition.

Table 1 Seven-Key Themes of the PSeasant Condition

	Component of the Peasant Condition	Categorisation
1	Struggle for autonomy	Autonomy
2	Context characterised by dependency relations, marginalisation and deprivation	Context
3	Creation and development of self-controlled and self-managed resource base	Livelihood Strategies
4	Coproduction with nature	Livelihood Strategies
5	Interacts with the market	Livelihood Strategies
6	Patterns of cooperation	Livelihood Strategies
7	Engagement with non-agrarian activities	Livelihood Strategies

By de-tangling van der Ploeg's concepts into these three groups, it is possible to interrogate them and relate them to a broader set of literature about the nature of autonomy, agency–structure debates and livelihood strategies as part of rural development.

Theme 1: Struggle for Autonomy

Firstly, I turn to van der Ploeg's (2008) use of autonomy. Autonomy is central defining concept in van der Ploeg's peasant principle and he asserts two key points, being:

- (a) Autonomy as an intrinsic part of being a peasant, and
- (b) Autonomy as being (re)created through resistance to interference in one's life.

van der Ploeg relates his term of striving for autonomy to 'relative autonomy' and defines it as "The room for manoeuvre as defined by Long (1985) that consists as a constellation in which responsibility and agency are manifested" (p.32). Van der Ploeg uses the word *relative* to stipulate that autonomy itself is relative to the context in which the individual is located. In this way, van der Ploeg is theorising on agrarian social change — his 'relative autonomy' is a rejection of the idea of state or market based (exogenous) change but acknowledging that individual agency is socially embedded (Long, 1984).

In this way, van der Ploeg (2008) is drawing on the idea of *relational autonomy* (not to be confused with relative autonomy³¹). In philosophical studies, relational autonomy is an umbrella term premised on the shared centrality of the social embeddedness, relationships and structure — such as race, class, gender, ethnicity — and it also has a strong social justice focus (Mackenzie, 2014; Mackenzie & Stoljar, 2000). Relational autonomy is often presented in opposition to ideal autonomy:

...which the individual has the capacity to make their own decisions and speak for themselves, and be held morally accountable for their actions whereas ‘ideal’ autonomy is that ...which a person is maximally authentic and free from all forms of distorting influences on their judgment. (Christman, 2015, Section 1.1)

Christman’s (ibid.) refers to the notion of *ideal autonomy* — a dominant concept in modern Westernised interpretations that focused on hyper-individualism, which has been heavily criticised by feminists and post-modernists as being blind to the social embeddedness of our self-conceptions and the fundamental social nature of human beings (Christman, 2004; Deligiorgi, 2012; Mackenzie & Stoljar, 2000). Indeed, van der Ploeg (2008) distances himself from ideal autonomy when he states “...I wish to add that

31. Although van der Ploeg (2008) uses the term ‘relative autonomy’, he is not referring to the theory relative autonomy of state power based on Marxist ideas, whereby the state plays an important role in ensuring a stable capitalist society (Albo & Jenson, 1989; Song, 2013).

autonomy as discussed here is not to be interpreted as a negative category, as a ‘state of not being conditioned by anybody’ ” (p.32).

Social Embeddedness and Relational Autonomy

Van der Ploeg (2008) focus on social embeddedness aligns him with relational autonomy scholars. In the Autonomous Livelihood Framework, I embrace the idea of social embeddedness and relational autonomy. The next section will turn to how van der Ploeg approaches this idea of social embeddedness through his use of *context* and *resistance*. “The search for and construction of autonomy again focuses on the *interrelations* between the farm and its context” (p.32) (text is italicised in the original).

Van der Ploeg (2008) focuses on embeddedness both in a positive sense (interrelations between farmer, farm, context) and in a negative sense (dependency relations and marginalisation). Van der Ploeg’s striving for autonomy suggests that achieving autonomy is the result of resisting hegemonic — that is external market or government driven — approaches to agricultural and rural development. Van der Ploeg himself summarises this as embodying a double freedom: “there is freedom from direct external exploitation and there is freedom to do things in your own way” (van der Ploeg, 2013, p.1).

Although van der Ploeg (2008) uses the label double freedoms, part of his explanation aligns closely with the notion of *independence*. Independence is considered as “...fundamentally linked to the refusal to be subject to something alien or outside oneself.” (Anderson, 2013, p.3).

In this way, I take van der Ploeg’s (2008) “*freedom from*” to equate conceptually with independence in moral autonomy arguments. In moral

autonomy arguments, and in van der Ploeg's use of the term, independence occurs *within* social embeddedness. This is an important point of differentiation from dominant Western agrarian thought that equates independence with *individualism* and is conceived as promoting the pursuit of self-interest often in an antagonistic relationship with the surrounding society (Emery, 2015). The dominant Western discourse conceptualises farmer autonomy as belonging to the entrepreneurial individual and is associated with rational behaviour, individualism and on-farm profit maximisation (Stock et al, 2014).

In comparison, van der Ploeg's (2008) autonomy is not aligned with this view at all, and scholars building on his peasant principle have elaborated on this through the term "... actual autonomy ..."³² (Stock et al., 2014, p.1) of smallholder farmers. Actual autonomy involves a context specific conceptualisation that includes farm management for social and environmental goals as well as actions that contribute to community or collective well-being. In this way, social embeddedness is a core part of independence and subsequently autonomy: "The enactment and practice of autonomy is a complex relationship involving context, culture, situatedness (sic) and experience" (ibid.). Building on this idea of social embeddedness, I now move to address the ways that Context is addressed in the peasant principle.

32. It is unclear how actual autonomy differs from relational autonomy. Indeed, the key components that authors use would align these two concepts as being one and the same.

Theme 2: Structure

The view of independence of farmers being socially located is mirrored by other scholars such as Emery (2015) and Schneider and Niederle (2010). They argue that autonomy does not disregard the importance of social structures, power or the economic-political-historical context in which smallholder farmers act — but rather recognises that there is a constant tension, flux and two-way influence between autonomy and the system within which smallholder farmers are embedded. These social structures are spatial as well temporal. Autonomy is simultaneously “... exercised through and constrained by the state and global economic systems.” (Hébert & Mincyte, 2014, p.207).

Hébert and Mincyte (2014) argue that striving for autonomy by rural actors has always occurred through negotiations — the push and pull of agency and structure “... complex, tenuous, and continued negotiations with local actors, regional bureaucracies, and vast commodity chains ...” (p.207).

Autonomy scholars (Emery, 2015; Hébert & Mincyte, 2014; Schneider & Niederle, 2010; van der Ploeg, 2008) take on *Context* can be considered as primarily aligned with Giddens’ (1984, 1991) ‘structuration’ approach. That is, agency and social structure (context) are co-dependent, formed and constantly reformed by each other. What I now refer to as *Context* — macro level social structures — frame the boundaries for individual actors but in turn, their agency and acts can reproduce, redefine and resist the social structure in which they are embedded.

Context forms a key component of the Autonomous Livelihood Framework and although I largely align with van der Ploeg (2008) and autonomy scholars (Emery, 2015; Hébert & Mincyte, 2014; Schneider &

Niederle, 2010) definitions of actual autonomy and social embeddedness — there a few points where I am cautious in the outright use of a structuration approach. In particular, the feminist argument that the structuration approach of separation of individual and society as discrete entities is in contradiction to women's lived experiences and indigenous world views that often do not separate individual and society. I explore these themes in the description of the Autonomous Livelihood Framework (Chapter 5).

One of the central ways that van der Ploeg (2008) explores this push and pull between individuals and society is through the concept of resistance — specifically to resistance to a context of exploitation and marginalisation. In the next section, I turn to explore this theme.

Resistance

Whilst van der Ploeg (2008) does not specifically list resistance within his seven key themes of the peasant condition, it is a large part of his conceptual approach to autonomy and a reoccurring theme throughout his work. Here van der Ploeg's conceptualisation of resistance draws heavily on Italian autonomism and extends scholarship on the concept of *everyday resistance* in agrarian studies. The seminal work by Jim Scott (1986) in his *Weapons of the Weak: Everyday Forms of Peasant Resistance* introduced the idea of everyday resistance and implicitly drew on the understanding of autonomy of the individual as preventing (or attempting to prevent) paternalistic interventions in their lives (Christman, 2015). Scott argued that capitalist development ubiquitously, although in a piecemeal fashion, marginalised and eroded the social positions of smallholder farmers. He put forth that everyday resistance was the way in which smallholder farmers

resisted hegemonic changes through “footdragging (sic), dissimulation, false-compliance, pilfering, feigned ignorance, slander, arson, sabotage, and so forth” (p.6).

This idea of everyday resistance has since been used by many authors as a way of explaining and interpreting how peasants or smallholder farmers negotiate change, especially in an era of globalisation (Leopold, 2010; Schneider & Niederle, 2010; Turner, 2012). Van der Ploeg (2008) considers that there are three types of resistance: the first being the outward, public resistance; the second being Scott’s (1986) everyday resistance; and the third being an alternative pathway resistance “resistance ... [as] a form of production and action ... based on innovativeness..” (Negri, 2006 as quoted in van der Ploeg, 2008, p.271)

For van der Ploeg (2008), this ‘third way’ is positive, non-mainstream, non-conforming choices that peasants or smallholders make *in spite of* hegemonic modernisation and industrialisation in the farming sphere. This idea is echoed in the works of McMichael (2008) who asserts that peasants themselves are re-framing and embracing the idea of alternative choices as a form of resistance:

....reaches beyond the daily round of survival on the land to linking that struggle to a reframing of what is possible on the land in contradiction to what is being done to the land and its inhabitants by the neoliberal regime. (p.207)

Van der Ploeg (2008) is stridently anti-modernisation in his peasant principle. Van der Ploeg’s view of autonomy of smallholder farmers is based

on an actor-oriented theoretical perspective which recognises the agency of smallholder farmers to influence, change and pro-actively make decisions within the systemic structures that they are embedded (Long, 1990; Schneider & Niederle, 2010). “It has become increasingly clear that this particular form of modernisation not only excludes the majority of farmers, but that, in the end, it also tends to destroy those farmers who have followed the modernisation script.” (van der Ploeg, 2014, p.2). Importantly, this framing of smallholder farmers exercising autonomy as central to agricultural and rural development tends to run counter to modernisation theory, which conceives of development as a linear process, primarily driven by external structural changes (Long, 1990).

In modernisation theory, the move to capitalist commodity markets is perceived as inevitable and technical interventions (such as transfer of technology, rural extension, modern farming practices and mechanisation) are seen as the mechanisms by which ‘the less developed’ move toward being ‘developed’ (Long, 1990). Smallholder farmers are perceived and portrayed as the backward peasantry, exposed and defenceless in the face of strong industrial agriculture that represents the future (van der Ploeg, 2009). Long (1990) argues that this paradigm is essentially structural analysis by which the state or institutions are considered the external holders of power that drive development and social change. This narrative about so-called inevitable change and the necessity of technical intervention is apparent in biodiesel schemes as discussed earlier (Chapter 3). In particular, certain components of the modernisation theory such as state power as the driver for change are easy

to identify in the biodiesel schemes of both in Brazil and Timor-Leste. This is discussed in more depth in the Discussion (Chapter 9).

The use of an autonomy lens that has a positive focus on the agency of smallholder farmers to be self-directed is significant for this research as a central part of my epistemological approach is ‘farmer-centric’ and valuing farmer knowledge. I have included *Agency* as a key component of the Autonomous Livelihood Framework as it re-centres the individual to the discussion on livelihoods. That is, a livelihood does not occur without an individual making decisions and acting on those decisions.

Unlike van der Ploeg (2008), I do not include resistance as an essential component of the Autonomous Livelihood Framework as I do not concur that autonomy is created through the practice of resistance. I consider resistance to be sub-component of agency, and thus present in some contexts and individuals but not necessarily essential for forming an autonomous livelihood. I describe Agency as a component of the Autonomous Livelihood Framework in more detail in Chapter 5. Like van der Ploeg, the Autonomous Livelihood Framework is anti-modernisation in so far as rejecting the notion of development as an inevitable, externally driven and linear as a process. The next section turns to van der Ploeg’s use of livelihood strategies.

Theme 3: Livelihood Strategies and Practices

A significant part of van der Ploeg’s (2008) peasant principle focuses on independent components that I have grouped as ‘livelihood strategies’ (see Table 1 Seven-Key Themes of the Peasant Condition). Conceptually, van der Ploeg’s livelihood strategies are not new — indeed, broader literature on

sustainable agriculture and agroecology frequently promotes multifunctionality of farms, pluriactivity and sustainable use of ecological capital (Altieri & Nicholls, 2005; Pretty, 2008; Rosset, 2000).

I consider that van der Ploeg (2008) has fallen into the same trap as Scoones (1998) in developing the Sustainable Rural Livelihood Framework and specified livelihood strategies that are constrictive. I argue that the peasant principle livelihood strategies are *prescriptive* ways of defining how smallholder farmers use autonomy to negotiate their livelihoods — rather than acknowledging that actual strategies may vary and are likely to be context specific.

Nonetheless, autonomy and livelihood strategies are entangled and co-dependent. Autonomy scholars (Schneider & Niederle, 2010; Stock & Forney, 2014; van der Ploeg, 2008) argue that a sense of autonomy is intrinsic to being a farmer and that the process of exercising agency — decision-making through reflective processes — to choose and act upon a livelihood strategy both creates and reinforces a farmer's sense of identity as a farmer. In this way, livelihood strategies do not exist separate to the individual or the individual's sense of self and identity.

Schneider and Niederle's (2010) work acknowledges the importance of *perception of power* by the individual. That is — it is not only the actual livelihood strategies and practices that matter, but it is the individual's sense of agency and the experiential process of making a decision that is paramount to the experience. This point is argued further by Stock and Forney (2014) who refer to the idea that farmers form their knowledge of self in part through their relations and knowledge of others, and through their identifying with the role

of farmer. They emphasise that “...the farming self *experiences* autonomy as the freedom to do things while also hoping for a freedom from other things.” (p.161) (text italicised in the original).

This aligns with the philosophical view on autonomy that individuals vary in their capacity to undertake rational reflectiveness and implement one’s decisions (Christman, 2015). Autonomy is not only possessing the capacity to be one’s own person and to undertake actions according to one’s own reasons and motives — their “...actual capacities to reflect and choose...” (Christman, 2015, Section 2.1 para 5) — but also how individuals view themselves as having capacities. “We give special weight to our own present and past decisions, so that we continue on with projects and plans we make because (all other things being equal) we made them, they are ours.” (ibid.)

Separating Livelihood Strategies and Capitals

A key point of difference between van der Ploeg (2008) and the sustainable rural livelihoods literature is that the peasant principle does not differentiate between livelihood strategies and livelihood capitals. Although van der Ploeg (2008) refers to individual capitals — especially ecological capital as the basis for peasant farming — scholars such as Schneider and Niederle (2010) suggest that van der Ploeg’s (2008) approach could be enhanced by referring to the Sustainable Rural Livelihood Framework asset pentagon and five key ‘capitals’³³ to explain and interpret the different constellations of smallholder farmer livelihoods (Scoones, 1998, 2009).

33. Also referred to as *assets* or *resources* in the broader literature.

In van der Ploeg's (2008) peasant condition, capitals are primarily referred to as part of the Context in which peasants are situated. It more usual in livelihood and rural development approaches to separate Context, Capitals and Strategies. The separation of livelihood strategies and livelihood capitals is significant because, as emphasised by Schneider and Niederle (2010), a lack of sufficient capitals erodes peasants capacity to assert or fulfil their autonomy — not simply in terms of lack of material assets but also in terms of individuals *perceptions* of well-being and *possibilities* for livelihood strategies.

Schneider and Niederle (2010) emphasise that autonomy is a *process*, rather than an end outcome as they weave together the concepts of capitals and autonomy. Autonomy can only be perpetuated when there exists "...a wide range of possibilities and potentialities..." (p.380) and further that "... development consists of acquiring and securing a resource base which guarantees autonomy rather than its results, such as the quantity of products developed or the income produced." (p.381). In this quote, 'resource base' refers to capitals.

In this way, Schneider and Niederle's (2010) work aligns with Bebbington (1999) who emphasised that capitals function in three major ways by. I align with Schneider and Niederle and Bebbington's explicit reference to capital and the multiple ways that capitals can function to support, reinforce or erode the negotiation of autonomy for smallholder farmers.

In summary, the main ways that autonomy has been applied in rural and agrarian studies following van der Ploeg's (2008) model are:

- (a) Autonomy is a process not a specific outcome (Stock & Forney, 2014; van der Ploeg, 2008).

- (b) Autonomy can be thought about as double freedoms, that is freedom to do certain things and freedom from doing certain things (Schneider & Niederle, 2010; Stock & Forney, 2014; van der Ploeg, 2008).
- (c) Autonomy can be thought about as an experience. It is something that is valued as we are able to live our autonomy, regardless of specific outcomes. It is the process of feeling autonomous and experiencing autonomy that is valued (Stock & Forney, 2014).
- (d) Building on point (c), through experiencing autonomy, autonomy becomes a tool and basis of power (Christman, 2004; Stock & Forney, 2014).
- (e) Autonomy is not separate from the social interdependencies, relations and structures in which individuals are located.

I align with all these key points of autonomy. However, the concept of autonomy in the peasant principle is not without weaknesses. The next section will turn to some of the limitations of autonomy as a conceptual lens.

Limitations of van der Ploeg's striving for autonomy and peasant principle

In this section, I highlight what I consider to be the key limitations of van der Ploeg's (2008) peasant principle. Whilst van der Ploeg's work on autonomy of peasants is pioneering and significantly builds on previous work on peasants and understanding of agricultural transitions, there are a number of points that I consider as hazy generalisations, *non sequiturs* or gaps. In this section, I discuss six key limitations, being:

- (a) Romanticisation of peasant livelihoods as anti-capitalist
- (b) Resistance to empire as an inherent characteristic
- (c) An unqualified linking of peasant practices with sustainable outcomes

- (d) Gender blindness
- (e) Prescriptive definition of livelihood strategies
- (f) Lack of integration with closely aligned frameworks.

I also note how the Autonomous Livelihood Framework differs from van der Ploeg's approach and attempts to resolve some of the limitations of the peasant principle where relevant.

Firstly, van der Ploeg's (2008) work is aligned with the rational peasant approach that draws on an idea put forward by Alexandar Chayanov (1966) that the economic calculations of peasants are centred on subsistence needs, not profit (Turner & Caouette, 2009). Even a brief look at peasant livelihoods in many contexts globally would debunk this assertion and highlight multiple spaces and places where peasants allow for compromise and contradiction as they negotiate competing internal and external interests. Indeed, recent work by Nelson and Stock (2016) illustrates that even in highly industrialised market driven environments that there are "...unexpected interstices within neoliberalised agriculture where industrial farmers can exercise and produce autonomy." (p.1).

Van der Ploeg (2008) is stridently anti-modernisation and anti-capitalist in terms of defining the peasant principle. However, in doing so he overlooks the lived experience of smallholder farmers globally, many of whom do interact and chose to interact with capitalist markets. This is not to diminish van der Ploeg's critique of capitalist industrialised agriculture, but rather to point out that the assertion of that peasants are inherently more focused toward subsistence than profit is erroneous and dips into the romanticisation of peasant livelihoods.

Secondly, van der Ploeg (2008) focuses heavily on the concept of *Empire* — mirroring the work on food regime analysis (Baines, 2015; Holt Gimenez & Shattuck, 2011; McMichael, 2012; van der Ploeg, 2010a) and presenting agriculture as a politicised project whose “...only rationale concerns capital accumulation” (p.77). Indeed, van der Ploeg’s frequent use of the notion of Empire to describe capitalist industrialised forms of agriculture and his emphasis on the struggle for autonomy by peasants locates his work as a continuation of the autonomism movement. Autonomism theories (such as neo-Marxist autonomism or Italian autonomism³⁴) were articulated as a critique of capitalist modes of production and labour and focused on the working class ability to transform and create alternative pathways through their own labour (Dinerstein, 1997; Luisetti, Pickles & Kaiser, 2016).

Van der Ploeg (2008) declares his peasant principle as an “...emancipatory notion...” (p.262) with echoes of Negri’s (1979) self-valorisation. Indeed, a summary of van der Ploeg’s autonomy of peasants could almost be substituted for Negri’s notion of self-valorisation — being “the building of revolutionary subjectivity through workers’ opposition to capital and realisation of their own authentic needs” (in Harrison, 2011, p.29) — if ‘workers’ was substituted for ‘peasants’.

Locating van der Ploeg’s (2008) work within the autonomism movement is important because implicitly the re-peasantisation theory tends to be presented largely as a binary debate. That is, whilst van der Ploeg (2008)

34. Italian autonomism includes Antônio Negri, Sergio Bologna scholars associated with *Autonomia Operaia* and *La Lotta Continua* (Lopes de Souza, 2015).

acknowledges modern agrarian practices as a diversified mix of practices and he discusses at length the “... extended grey zones..” (p.36) of practices and identities of farmers — he nonetheless frequently returns to the idea of entrepreneurial farming (modernised, capitalist, market-oriented) as being in conflict with the peasant-condition³⁵.

Recent commentary has highlighted the limitations of food regime analysis as it assumes a unified, foreclosed corporate agenda rather than the dynamic, tangled, evolving and transitional systems in play (Friedmann, 2016). Van der Ploeg’s (2008) focus on Empire is limiting and creates a false dichotomy of: us (peasants) / them (empire). This does not align with my view of smallholder farmers as constantly negotiating the ways in which they resist or participate with external projects, markets and systems. In developing the Autonomous Livelihood Framework I do not align with the binary view that resistance by peasants *must* occur in the face of Empire or that capitalist modes of production are the Voldemort³⁶ (that is, an unnamed evil) of sustainable rural livelihoods for smallholder farmers.

Thirdly, van der Ploeg (2008) takes a large conceptual leap (a *non sequitur*) and links autonomy directly with resilience, sustainability and beneficence for farmers. Given the multiple contested meanings of these terms, it is not clear that autonomous peasants practices do result in ‘sustainability’ — social, economic or environmental. Indeed, certain smallholder farmer

35. For example see (van der Ploeg, 2008, p.114).

36. Voldemort was the prime evil character in a popular culture children’s book series *Harry Potter* by J.K. Rowling (1997).

practices under *striving for autonomy* could be considered unsustainable³⁷.

This does not diminish the importance of autonomy as a useful conceptual lens, but the link to resilience, sustainability and beneficence is not a direct pathway from autonomy.

Fourth, van der Ploeg's (2008) approach to autonomy and to the peasant condition has failed to apply a gender lens. Van der Ploeg (2008) assumes a level of homogeneity amongst peasants, without acknowledging the significant variations that gender has on experiences of both being a peasant and of exercising autonomy. As noted earlier in discussing the limitations of the Sustainable Rural Livelihood Framework, gender is an all-pervasive point of social differentiation and social organisation. Gender can be seen as a key determinant of how peasants can strive for autonomy, the context in which individuals are located and the resources available to individuals to negotiate their livelihoods.

This is particularly relevant to biodiesel schemes, partly because they fall into the same trap as van der Ploeg (2008) and (Scoones, 1998) — which is to assume a level of smallholder farmer homogeneity and not to consider gender as a significant point of differentiation. Although slightly dated, Liepins (2000) observation that whilst there is wide acknowledgement that discourses — particularly scientific and economic discourses — shape understanding of agriculture and rural livelihoods, there has been less attention given to the way that discourses are inherently gendered. This is apparent in the peasant principle as van der Ploeg (2008) rarely mentions gender and he primarily

37. See e.g. *Industrialised farmers in Kansas* in Nelson and Stock (2016) or the soy farmers of Southern Brazil in Schneider and Niederle (2010).

refers to women in the context of division of labour or as “... farmer’s wives ...” (p.198). — a loaded assumption about the role of women on the farm and their relationships.

In this way, the peasant principle (along with the Sustainable Rural Livelihood Framework and biodiesel schemes) is a framework developed within gendered power structures and subject to discourses about the “...perceived social “truths” about farming and the people involved...” (Liepins, 2000, p.606). Feminist scholars emphasise that gender influences the very way that frameworks and theories are constructed and the weight and attention given to certain phenomena (May & Powell, 2008).

Mainstream accounts of the practices of men... typically operate as though men did not have a gender. Feminists have shown how even something as apparently gender-neutral as foreign economic and military policy is actually thoroughly gendered, built on the assumed needs, priorities, and practices of a particular form of masculinity. (Sprague, 2005, p.17)

Fifth, van der Ploeg (2008) uses a list of prescriptive livelihood strategies and has not allowed for strategies that fall outside his definitions yet nevertheless reinforce autonomy. Van der Ploeg (2008) prescribed strategies are useful — indeed, as noted earlier they are practices that are reflected widely in the sustainable agriculture literature. Yet, reducing the plethora of peasant livelihood strategies and practices to a mere list of five seems overtly constricted.

Further, limiting the peasant principle to these livelihood strategies creates an epistemic barrier — what Carolan (2006) emphasises as the visible or known aspects that are perceived, acted upon and valued. The non-visible and unknown can be equally important to achieving autonomy. These are the “...socio-biophysical objects, effects, and relationships that are beyond direct perception...” (p.243).

In an era of climate change and significant global shifts in the ways that agriculture and rural livelihoods are assembled, I consider it more useful to examine *how* different strategies may support autonomy, rather than pre-empt what those particular strategies must be. An example of strategies that fall outside van der Ploeg’s (2008) prescription but still reinforce autonomy is Nelson and Stock’s (2016) study on industrial farmers in Kansas “... [There are] interstices within neoliberalised agriculture where industrial farmers can exercise and produce autonomy” (p.1).

The final limitation of van der Ploeg’s (2008) peasant principle is the lack of reference to the long history of autonomy as a philosophical concept and centrality of autonomy to many social and peasant movements. In using van der Ploeg’s (2008) peasant principle, I struggled with his limited treatment of autonomy at a theoretical and philosophical level. Whilst I acknowledge that is impossible for any scholar to know, incorporate or reference all possible bodies of work that relate to their own, the centrality of autonomy to van der Ploeg’s peasant principle and the diverse ways that autonomy can be interpreted — for instance, personal autonomy, moral autonomy and political autonomy — mean that van der Ploeg’s application of autonomy is not clear and at times crosses the boundaries of several philosophical concepts.

I return to several of these limitations in the Discussion (Chapter 9) and propose how the integration and merging of autonomy with the Sustainable Rural Livelihood Approach in the Autonomous Livelihood Framework may overcome some of these limitations.

4.4 Chapter Summary

In this chapter, I have provided a conceptual overview of the Sustainable Rural Livelihood Framework and the concept of autonomy in the peasant principle.

I firstly introduced the Sustainable Rural Livelihood Framework and identified its influence on the early stages of this research. I discussed the limitations of the Sustainable Rural Livelihood Framework, noting in particular the delinking of livelihoods from the individuals at the centre of those livelihoods.

Secondly, I turned to the concept of autonomy in rural and agrarian studies, concentrating primarily on van der Ploeg's (2008) peasant principle. I introduced the peasant principle as a critical theoretical perspective that is actor-focused and considers peasants as striving for autonomy within particular patterns of social relations. In this section, I identified autonomy as a way to theorise about issues of values, identity and decision-making and place the smallholder farmer at the centre of a livelihood approach.

The next chapter will turn to developing the Autonomous Livelihood Framework.

Chapter 5: Autonomous Livelihood Framework

5.1 Introduction

In this chapter, I propose the merging of the concept of autonomy with the Sustainable Rural Livelihood Framework into an integrated framework that broadens the conception and interpretation of rural livelihoods in such a way that centres autonomy as a critical driver for the diverse ways that smallholder farmers construct their livelihoods through the process of negotiating for autonomy. I have titled this conceptual framework the *Autonomous Livelihood Framework*.

The Autonomous Livelihood Framework is more than ‘autonomy *plus* livelihoods’. By combining these concepts I respond to what Turner (2012) has identified as a call for “...more inclusive, actor-oriented approaches to livelihoods that focus attention on social relations among individuals, embedded within local socioeconomic, political, and cultural systems” (p.404). I seek to advance the development of both rural livelihood debates and the emerging use of autonomy as a conceptual lens in agrarian studies — and through combining these two approaches I offer a novel framework.

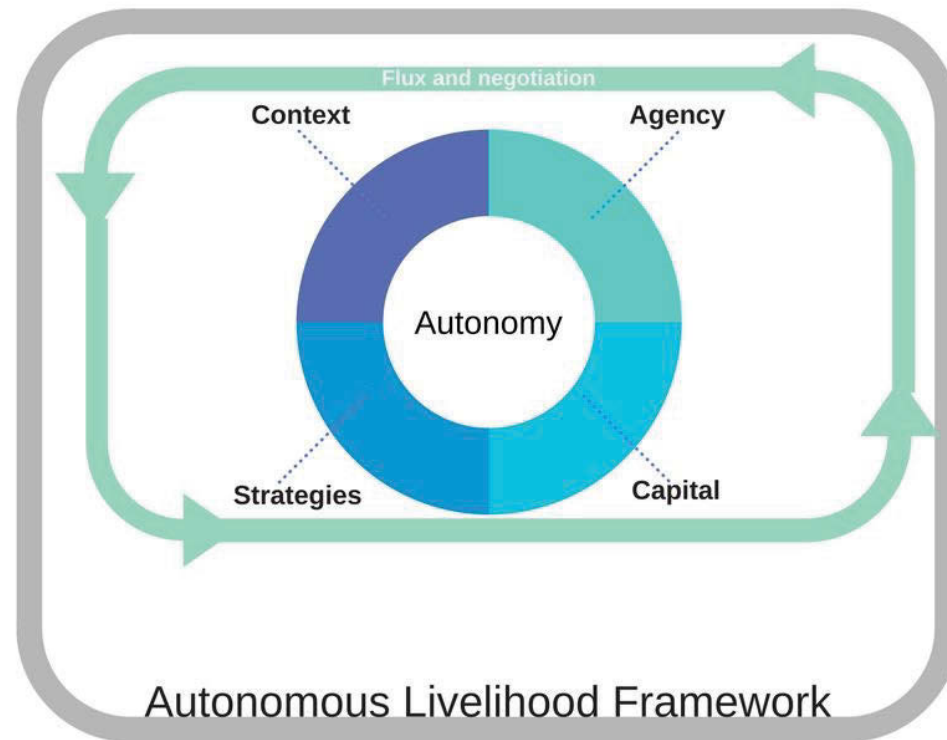


Figure 3 The Autonomous Livelihood Framework

Source: Original Material for this thesis

I assert the view that smallholder farmers are *morally autonomous beings* that are embedded in social and economic structures, value systems and political processes and that these are not static but simultaneously reproduced and changed by smallholder farmers negotiating their autonomy — a view referred to as *relational autonomy*. This starting point is significant because it infers that as *morally autonomous beings*, smallholder farmers are capable of making their own decisions that merit respect and recognition even if such decisions do not conform to outside experts' ideas of success or best practice. This is particularly pertinent for interpreting smallholder farmers' participation in biodiesel schemes because this approach provides a more complex interpretation of why farmers do what they do — in particular beyond notions of rational choice and profit maximisation.

This Chapter is structured as follows:

Section 5.2 provides a definition of the Autonomous Livelihood Framework and introduces the four primary components of

- (a) Strategies
- (b) Capitals
- (c) Agency
- (d) Context

that are used within the framework. The sub-components relevant to Brazil and to Timor-Leste are also outlined here.

Section 5.3 provides a definition of autonomy and illustrates how autonomy is a key driver for the ways that smallholder farmers construct their livelihoods. This section also address the key research question of whether the farmer informants considered themselves as negotiating for autonomy.

Sections 5.4 – 5.7 provide a definition of each of the individual components of the Autonomous Livelihood Framework.

Section 5.8 clarifies the scope of the Autonomous Livelihood Framework.

5.2 Defining an Autonomous Livelihood

The Autonomous Livelihood Framework is centred on the idea of *relational autonomy* whereby individuals (actors or in this case, smallholder farmers) have the capacity to make their own decisions, be guided by their own morals and values and yet do this from within contextual boundaries (spatial, temporal, structural, cultural). The livelihood resources, labelled here as five capitals — social, human, financial, physical and ecological — are utilised in the practice of livelihood strategies — chosen through the exercise of agency. I define an *autonomous livelihood* as:

The pursuit of freedom to govern one's own affairs from within a socially embedded context, that drives and shapes instrumental, hermeneutic and emancipatory livelihood strategies and use of capitals.

The Autonomous Livelihood Framework is a heuristic device — a conceptual formulation to give shape and direction to the interpretation of the complexities of smallholder farmer livelihoods and participation in biodiesel schemes. The separation of *Livelihood Strategies—Capitals—Agency—Context* is a nuanced way of discussing the discrete components that smallholder farmers employ in forming their livelihoods, whilst acknowledging that the lived experience of doing so means that these components are often linked in deeply entangled ways³⁸.

The Autonomous Livelihood Framework centres on the *negotiation of autonomy* as an experiential process in flux — something that is lived, created and constantly re-created. Indeed, I have purposefully use the term *negotiation* to recognise that autonomy is not an end-goal or static state of being.

Autonomy is the key factor that drives and influences how the other components of Livelihood Strategies-Capitals-Agency-Context are negotiated; thus it's centre position in Figure 3 The Autonomous Livelihood Framework.

The Autonomous Livelihood Framework is an actor-centred framework, in this specific case, farmer-centric. This was a deliberate choice and reflects ontological and epistemological choices made in this research — in particular the notion that smallholder farmers are agents and their knowledge and explanations are key to understanding the construction of rural livelihoods.

38. For instance, whilst it is useful at a theoretical level to discuss land as type of ecological capital, access to land is determined both by context (e.g. agrarian norms in a particular place and time), social capital (e.g. gender as a determinant to land access), livelihood strategies (e.g. land use for a particular crop) and cultural meanings (e.g. as sacred or prohibited land).

I assert that it is the process of negotiating for autonomy in a contextually bound way that determines why smallholder employ particular livelihood strategies, prioritisation or use of capitals. Through the Autonomous Livelihood Framework, I shift focus away from *prescriptive outcomes or practices* to a focus on *process* and consider how a diverse range of livelihood strategies used by a smallholder farmers can be considered part of an autonomous livelihood.

This framework helps interpret the farmer informant narratives about biodiesel schemes. The Autonomous Livelihood Framework was developed for this research study on biodiesel schemes in Brazil and Timor-Leste and the proposed integrative framework is not exhaustive — it is preliminary and schematic but I have endeavoured to develop a framework that could be conceptually useful elsewhere. I return to reflect on the use of the Autonomous Livelihood Framework in Chapter 10.

Grounding the Autonomous Livelihood Framework in Brazil and Timor-Leste

In order to ground the Autonomous Livelihood Framework in this research project I have taken the components of Livelihood Strategies-Capitals-Agency-Context and developed specific sub-components during the application of Grounded Theory Method to the empirical data (see Table 2 Components and Sub-components of the Autonomous Livelihood Framework). In this way, the empirical chapters between Brazil and Timor-Leste differ, although overlap as the same research tool was used in both locations. The sub-components reported in this thesis are not intended to be transferable to other

locations nor prescriptive — rather they are a way of organising and explaining these specific farmer narratives. In the following sections, I provide definition of the sub-components used in the empirical chapters.

Table 2 Components and Sub-components of the Autonomous Livelihood Framework

Autonomous Livelihood Framework	
General Component	Research Specific Sub-Component
Livelihood Strategies	Pluriactivity Diversification Enhancing an independent resource base
Capitals	Human Capital Social Capital Financial Capital Physical Capital Ecological Capital
Agency	Resistance Identity
Context	Social Values Social Differentiation

The next section of this chapter will explore and define the components used in the Autonomous Livelihood Framework.

5.3 Autonomy as an overarching theme

Negotiating for autonomy is both integral to *being* a smallholder farmer and as an instrumental tool for the ways that smallholder farmers utilise and adapt the other components of Livelihood Strategies-Capitals-Agency-Context. I start from an understanding that autonomy does not equate with agency nor with individualism. As noted in the Introduction, in the Autonomous

Livelihood Framework I align with a view that individuals are morally autonomous beings that are embedded in a set of social relations and social context — a view called *relational autonomy*. Relational autonomy is an umbrella term premised on the shared centrality of the social embeddedness, relationships and social differentiation with a strong social justice focus (Mackenzie, 2014; Mackenzie & Stoljar, 2000). Specifically:

Relational views [of autonomy] are premised on a socially embedded conception of agency and argue that an adequate theory of autonomy must be based on recognition of the ways in which, as agents, our practical identities and value commitments are constituted in and by our interpersonal relationships and social environment. (Mackenzie, 2008, p.519)

Autonomy is presented as an overarching component because it is the lens through which the other components are brought into utility. As noted earlier, I use the term negotiate autonomy to show that it is a concept in flux and that shifts in social context, ecological environment, state policies — indeed, any myriad of livelihood factors, cause the negotiating for autonomy process to begin again.

Using a relational autonomy approach in the Autonomous Livelihood Framework is to recognise that the negotiation of autonomy may result in plans, actions and decisions that are more than the rational or logical outcome of specific livelihood strategies based on an audit of available capitals. That is, smallholder farmers may do things that seem irrational to outsiders based on a

simplistic economic maximisation model but that are explainable when it is accepted that smallholder farmers are socially embedded actors.

Autonomy is not only an outward facing concept that affects how the other components are brought into utility for a livelihood (instrumentally) but autonomy is also inward facing and is deeply tied to issues of self-congruence and identity. Autonomy is “...an integral part of being and (continuously) becoming a farmer.... Autonomy provides meaning in farming regardless of scale...” (Stock & Forney, 2014, p.160). In this way, autonomy is hermeneutic — that is, it provides a way to a meaningful life through its role in forming identity and providing a compass for values and morals. Further, autonomy is emancipatory in that the process of being autonomous is experiential and highly valued. In this way, autonomy becomes a tool and basis for challenging restrictive structures, practices or policies.

Did Farmer Informants Consider Themselves as Negotiating for Autonomy?

In addressing whether the farmer informants in this research considered themselves as negotiating for autonomy, I propose that this question is tangential and less relevant than it may first appear. This is because in adopting an autonomy lens, there is an acceptance of the moral status of autonomous beings and associated normative implications for taking this stance (Anderson, 2013). To attribute persons as being morally autonomous is to respect their authority, dignity and responsibility regardless of an individual’s self-awareness or alignment with the concept of autonomy. By authority, I refer to the notion that smallholder farmers:

...concerns, sensibilities, and judgments as worthy of consideration, particularly in cases of disagreement. If a person is morally autonomous, others are required to engage with him [sic] as having a perspective that merits consideration, even if it seems morally repugnant. (Anderson, 2013, p.4)

Building on this, to be morally autonomous in terms of dignity and responsibility refers to the notions that not only should an actor's authority be valued, but that individuals have an intrinsic worth (dignity) and are accountable for their judgements and actions (responsibility) (Anderson, 2013).

I return to Christman's (2015) discussion on whether the ability to undertake reflective practice about our actions and decisions increases our moral status as autonomous beings. Christman (2015) argues that the realisation of autonomy is not dependent on the outcomes of decisions nor on an individual's ability to engage in reflective practice about their decisions and actions. Rather, "...the attribution of autonomous agency, and the respect that purportedly goes with it, is itself a normative stance, not a mere observation of how a person actually thinks and acts..." (Section 2.1 para. 5).

In this way, I propose that smallholder farmers do not have to consider their decisions as being made under the light of negotiating for autonomy for this to actually be the case. Further, I do not assume that individuals themselves would necessarily express their choices, actions and decisions as 'a negotiation of autonomy'. Autonomy in this sense is an analytical component applied by the researcher, rather than a concept that the farmer informants spoke directly to.

5.4 Strategies

In the Autonomous Livelihood Framework, I adopt a two-step approach to livelihood strategies. Firstly, at the component level, I acknowledge that livelihood strategies are diverse, multi-faceted and will be context specific. I define livelihood strategies as the practices and ways in which smallholder farmers utilise capitals to support and sustain a given standard or way of living. Livelihood strategies are embedded actions (Amekawa, 2011) in that a livelihood is a process in flux. Echoing Bebbington (1999), I assert that livelihood strategies can fulfil three functions of being instrumental, hermeneutic and emancipatory. Livelihood strategies are not simply about surviving or a specific end purpose or product — they give meaning to individual lives and can be used to create, reinforce or transform individuals' identity, relationships and access to capitals.

Secondly, specifically for this research study focused on smallholder farmer livelihood in relation to biodiesel schemes in Brazil and Timor-Leste, I align with Schneider and Niederle's (2010) approach that focuses on livelihood strategies that "... strengthen a 'post-productivist', territorialised, and endogenous development path by reconnecting production and consumption and embedding them in their socio-cultural context..." (p.380).

Specifically, I have chosen to focus on the livelihood strategies of:

- (a) Pluriactivity
- (b) Diversification
- (c) Enhancing an independent resource base
 - Auto-consumption

- De-commodification and Internalisation of resources.

These categories differ slightly from Schneider and Niederle's (2010) specific strategies³⁹ as they reflect the use of Grounded Theory Method used in the analysis.

Pluriactivity

Pluriactivity refers to non-agricultural activities performed by farmers — primarily in relation to income earning activities. In the case of smallholder farmers, it could be argued that pluriactivity includes income derived from agricultural sources off-their-own farm, for instance, working as manual farm labour in another property or region to gain a wage. Further, non-farming activities that occur on farm, such as tourism, sporting or educational activities would fall under the umbrella of pluriactivity.

Arguably pluriactivity has historically been a livelihood strategy for rural people and smallholder farmers to ensure self-sufficiency (Blad, 2010). Van der Ploeg (2008) asserts that pluriactivity contributes towards autonomy and reinforces and strengthens smallholder farms and farmers. This is because in his view pluriactivity and its associated income enters the farm as a 'value'. It can be invested in the farm — in infrastructure, livestock, maintenance of

39. Schneider and Niederle's (2010) strategies include:

- (a) internalisation of productive resources through farming with low-cost external inputs
- (b) de-commodification and food improvement by association with a 'traditional world' that is increasingly appreciated by consumers added value through the development of agrifood processing within production units, and the establishment of alternative marketing networks that enable direct sale to consumers.

other ‘on-farm’ family members or used to invest in social or human capital — pay school fees, pay medical bills, lent to a neighbour or used to allow a buffer for on-farm experimentation, innovation and risk-taking.

However, interpreting pluriactivity simply as a reaction to adverse farming conditions and as an economic adaptation strategy is limiting. Indeed, pluriactivity can be adopted due to “... non-economic motivations such as... personal development, career aspirations and family lifestyle considerations.”(Bessant, 2006, p.67). In addition, pluriactivity has primarily been applied through a gender-bias lens in that male-farmers undertaking non-agricultural labour are considered to be engaging in pluriactivity, whereas female farmers undertaking non-agricultural labour that is considered the in the realm of ‘the household’ — such as care for children or relatives — is rarely reported as pluriactivity. Whilst acknowledging the limitations of the conventional definition of pluriactivity, I have largely used this approach to explore how the farmer informants engaged in off-farm work and labour.

Diversification

Diversification can be considered a sub-group of pluriactivity and diversification is conventionally associated with activities undertaken internally on the farm (Blad, 2010). Diversification can be considered in both agrarian terms being activities such as diversification of crops and livestock, as well as diversification of livelihood strategies such as value-adding on farm or accessing different markets.

Diversification of farmers ecological resource base and livelihood strategies can strengthen their overall autonomy as it moves away from

dependency on one particular crop or economic activity (Schneider & Niederle, 2010). Diversification allows for risk to be spread across multiple assets and strategies and reduces vulnerability to dependency and deprivation (van der Ploeg, 2009). Indeed, diversification as a livelihood strategy amongst smallholder farmers in the global south is a widespread, enduring phenomena that is considered as inherent to peasant modes of farming rather than as a feature of agrarian changes toward industrialised agriculture (Ellis, 2000).

Understanding how and why smallholder farmers diversify has important implications for rural development programs. It means that conventional approaches that treat smallholder farmers as siloed — for instance, assuming that smallholder farmers are only involved in farming as an occupation — are unlikely to procure the desired results as smallholder farmers may react in unexpected ways due to the diversified nature of their livelihoods (Ellis, 2000).

Enhancing an independent resource base

Enhancing an independent resource base is a notion adopted from van der Ploeg's (2008) peasant principle and refers to actions that smallholder farmers take that support their ability to increase their on-farm autonomy, primarily by using livelihood strategies and exploiting capitals that serves the purpose of self-sufficiency and agro-ecosystem maintenance. Actions that are included as enhancing an independent resource base include auto-consumption and the de-commodification and internalisation of productive resources (Schneider & Niederle, 2010; van der Ploeg, 2008). Van der Ploeg's (2008) *enhancing an independent resource base* is largely articulated in terms of

livelihoods strategies that smallholder farmer's employ that are not subject to what he calls Empire — that is externally driven, commodified ways of farm management.

I do not align with van der Ploeg's (2008) definition on this point about Empire. In contrast, I consider enhancing in independent resource base to draw on notions of agroecology, specifically that "...agroecosystems can be manipulated to improve production and to produce more sustainably, with fewer negative environmental or social impacts and fewer external input" (Altieri, 2002, p.8).

I use the following orienting definitions:

Auto-consumption refers to consuming food primarily produced on the farm or through social relations — in comparison to food that must be purchased.

De-commodification and internalisation of productive resources refers to utilising the ecological, physical and social capital to meet the farm needs rather than commodified goods or services purchased from outside the farm.

5.5 Capitals

The five capitals (social, human, financial, physical and ecological) are central to conventional livelihood approaches and provide clear meta-categories to talk about the plethora of assets, resources and networks that smallholder farmers use to construct their livelihoods. Capitals are both tangible and intangible, and vary in value in both a subjective and objective sense. That is, capitals are heterogeneous and their perceived value and utility is dependent on the context in which they are exploited and the actor that is

doing the exploiting (Sung Kyu Kim, 2015). In this way, the link between capitals and agency in the Autonomous Livelihood Framework is important as it transforms the capitals from mere ‘things’ to tools to exercise agency via livelihood strategies.

I use the following orienting definitions:

Human capital refers to the skills, education and knowledge that individuals accumulate over a lifetime. Human capital includes the realms of formal education and training as well a much wider conceptualisation that embraces experiential knowledge, indigenous knowledge, skills and wisdom at an individual and collective level (Amekawa, 2011). Human capital has instrumental use in the assembling a livelihood — for instance, a particular skill that is used on the farm — and hermeneutic use, for instance contributing toward individuals’ self-identity and their perceived capability to undertake certain actions.

Social capital is the mutual connection between individuals in networks of social resources, relations, including trust and reciprocity, that facilitate coordinated or collective action (Lehtonen, 2004). Social capital is often referred to as the “... master capital ...” (Flanigan & Sutherland, 2015, p.3) through which other capitals can be accessed or utilised — indeed it is “...a crucial mechanism through which livelihood assets are distributed, accessed, and claimed...” (Vervisch, Vlassenroot & Braeckman, 2013, p.268).

Bourdieu’s (1985) definition of social capitals emphasises its mutual nature (Bourdieu in Flanigan & Sutherland, 2015) — it is membership to a group that provides both benefits and obligations.

The state and smallholder farmers can define social capital differently. Indeed, how outsiders and insiders perceive of relations of social capital and its utility is relevant to rural development schemes (and in this particular research study, biodiesel schemes) because social capital is *necessarily* in flux and is an ongoing process of exchange. As such, social capital can be withdrawn or enhanced.

Financial capital refers to all economic assets including cash, saving, access to credit and debit schemes (Scoones, 1998). Economic capital is both about the available stock of financial resources such as cash or bank deposits and also about regular inflows such as income, pensions or remittances. Importantly, economic capital should not be taken to equate with poverty or well-being.

Physical capital can be defined as built infrastructure including roads, electricity, potable water, sanitation, machinery and equipment, irrigation channels, housing and transport (Amekawa, 2011). In this framework, included in ‘physical capital’ are also services such as TV reception, mobile phone reception and internet access (wireless or wired).

Ecological capital⁴⁰ is defined as environmental resources including land, water, animals, vegetation and minerals. Ecological capital includes essential ecosystems goods and services (such as water catchments and biodiversity).

Ecological capital has not received as much attention as social capital in critiques of the Sustainable Rural Livelihood Framework — however, as

40. Also referred to in the literature as *Natural capital*.

argued by McMichael (2014), there are important consequences from the different ontological ways that ecological capital is understood. Without digressing too far into this discussion, it is relevant to note the different ways that ecological capital is perceived insofar as peasant livelihoods are often portrayed as integrated with ecological capital and that smallholder farmer agricultural practices are co-dependent on natural processes (van der Ploeg, 2008). In comparison, the conventional paradigm — part of what has been termed the *metabolic rift* that disrupts and divides human-nature relations (McMichael, 2014; Schneider & McMichael, 2010) — views ecological capital as external, exploitable and of import primarily in terms of its material utility (McMichael, 2014). This distinction is important for interpreting smallholder farmers' participation in biodiesel schemes because it could be argued that biodiesel schemes have been designed under an inherently different ontological viewpoint about ecological capital in comparison to smallholder farmers.

5.6 Agency

Agency is a cross-cutting theme both central to philosophical discussions on autonomy and highly relevant to rural livelihood approaches that incorporate an actor-oriented approach (Long, 2015). Including agency as part of the 'Livelihood Components' in the Autonomous Livelihood Framework (see Figure 3 Autonomous Livelihood Framework) reflects a schematic decision and locates agency as a key element to how smallholder farmers construct their livelihoods. That is, the ways that smallholder farmers pursue a certain livelihood strategies reflects the exercise of agency. Autonomy and agency are philosophically entangled — in order to delineate them for this

framework, I propose autonomy as a construct is internal to the individual whereas agency is outward facing and manifests in actions:

An autonomous person is someone who guides the course of her life from her perspective, whose actions genuinely express her 'self' or her point of view. This contrasts with someone whose actions are shaped by 'compulsion,' whether by others or by forces within her from which she is alienated.

(Hasselberger, 2012, p.255)

Thus, *agency* sits within the Livelihood Components in the Autonomous Livelihood Framework because it is action that brings in play the components of strategies and capitals. Further the exercise of agency does not always contribute toward negotiating for autonomy as individuals can be subject to coercion, force or conditions that reduce their autonomy.

In defining agency, I have chosen to align with Long's (2015) definition due its grounding and relevance to a rural development context:

Agency refers to the knowledgeability, capability and social embeddedness associated with acts of doing (and reflecting) that impact upon or shape one's own and others' actions and interpretations. ...

In addition, they may attribute agency to various objects and ideas, which, in turn, can shape actors' perceptions of what is possible. Agency is composed, therefore, of a complex mix of social, cultural and material elements. (p.38)

Agency in the Autonomous Livelihood Framework is treated as an individual's *perceived* capability to reflect, identify and choose goals and act upon those choices. Agency is taken as having *transformative power* and not simply as rational choice. By transformative power I refer to the notion that the individual has “ ... the capacity to intervene in a given set of events so as in some way to alter them ... ” (Giddens, 1985 quoted in Campbell, 2009, p.409).

That is, agency is an internal force drawn upon by individuals in ‘doing human action’ — agency itself is a power (Campbell, 2009). I emphasise ‘perceived’ here in the Autonomous Livelihood Framework as actual capacities can differ from perceived capacities. I align strongly with Christman’s (2015) assertion that

We give special weight to our own present and past decisions, so that we continue on with projects and plans we make because (all other things being equal) we made them, they are ours, at least when we do them after some reflective deliberation (Section 2.1, para 5).

Whilst I align with the view that agency can be exercised against the constraining power of social structures — I do not use agency as per “the capacity of individuals to act *independently* of structural constraints (Abercrombie et al. 1984:6 in Campbell, 2009, p.408)(emphasis added). I treat agency as individuals making decisions about Livelihood Strategies, based on their Context with the resources that are available to them.

Importantly, I draw upon a feminist understanding of agency that recognises that agency exists and is exercised with in social structures, norms,

relations and self-conceptualisations (McNay, 2000). This is reflected in the Autonomous Livelihood Framework through the inclusion of the component Context. In defining agency, I move away from the idea of rational choice that prioritises economic well-being and an overemphasis on logical thought. Instead, I embrace a conceptualisation of agency that includes action based on feelings, desires, concerns, choices that reinforce values and morals in a shifting notion of self (Friedman, 2003).

Indeed, this *shifting notion of self* is important as agency is generally attributed to the individual at a static point in time. Yet, individuals (smallholder farmers) do not necessarily have one static identity, one ‘role’ or associate themselves with one particular social niche (Hospes & Clancy, 2011; Stock & Forney, 2014). As noted by Mackenzie (2014), an individual’s sense of agency is located within temporal dimensions:

... human agency manifests its self over time. Our actions and choices at a particular time are intelligible only in the context of our personal histories and manifest character traits, dispositions, habits and skills that have developed over time. They are also directed towards a future that we aim to realize through agential activities like planning, intending, developing long-term projects, imaginative projection and so on. (p.154)

In this way, agency is exercised through metaphorically looking backwards (i.e. ‘what are the choices or actions I have made in the past’) and

looking forwards (i.e. ‘what do I anticipate or plan for the future’). In this way, I see an agency is also a process in flux because it is dependent on:

- (a) Social contexts and
- (b) Ways that agency can be exercised within these contexts and
- (c) Multidimensional identities of farmers that influence how they exercise their agency at any given spatial or temporal point.

I return to highlight the importance of a shifting notion of self of smallholder farmers in the discussion chapter (Chapter 9).

Resistance

As part of agency, I have included the sub-component of Resistance — that is, of individuals acting in resistance the social structures and norms in which they are located. Resistance resonated with the empirical data during analysis with Grounded Theory Method and it forms an integral part of the peasant principle. I use van der Ploeg’s (2008) three understandings of resistance outlined earlier, being:

- (a) Outright resistance: activism, protest
- (b) Everyday resistance: foot-dragging, non-compliance
- (c) Resistance of the Third Kind: Active alternatives or alternative pathways from Empire.

Resistance of the Third Kind is an important emerging concept and can be thought of as alternative livelihood trajectories:

The weapons of such peasants reveal their remarkable capacity to produce technical and organisational innovations and to translate those

innovations into concrete alternatives for the construction of life trajectories they consider significant. (Schneider & Niederle, 2010, p.387)

Turner (2012) notes that resistance can be *purposive action* and is a way that people whose knowledge may have been subordinated by the state are able to interact, negotiate and challenge macro policies.

Unlike van der Ploeg (2008), who considers that autonomy is formed *through* resistance, I consider resistance as one possible strategy of contributing toward autonomy. As such, I work from the basis that individuals can both resist and non-resist simultaneously with both actions (that is, exercise of agency) contributing toward their autonomy.

Identity

Identify is related to notions of self in relation to notions of other — dependent on the multiple dimensions of social differentiation and modalities of social relations. In defining identity, I align with Hospes and Clancy's (2011) assertion that actors (smallholder farmers) are not statically located with one identity or in one particular social niche. Indeed, smallholder farmers may hold multiple farming identities and non-farming identities which "...may guide farming behaviour, in particular family-oriented identities which may determine how the farmer follows a specific economic development path (e.g. business expansion) for the successor/s, even where his/her personal agricultural preference lies elsewhere (Burton and Wilson, 2006, p.100)

Identity is associated with "...articulations of the self and community..." (Ofstehage, 2015, p.445) and is both created and reinforced

through everyday action and exercising of autonomy. Autonomy both contributes toward identity and simultaneously draws on identity in what Stock and Forney's (2014) define as a reciprocal feedback loop. Importantly, identity is socially embedded because it requires notions of 'other' to define notions of 'self':

...The self, as "a reflection of complete social process" (Mead, 2004: 224), helps delineate what is what is unique about people in relation to others — how they see themselves and how others see them and the interplay between the two. Thus, to understand the self, the (generalized) other is necessary, as the self is a relational process. (p.161)

5.7 Context

Context refers to the social structures in which smallholder farmers are social embedded. By social structures, I draw primarily on Giddens' (1984, 1991) work and consider "... social structures as 'reproduced relations between actors or collectives, organised as regular social practices' ..."(Giddens, 1984, p.25). Social structures include those that are 'visible' and 'known', institutions and organisations such as bureaucracy, economy and religion, and also refers to the 'invisible' relations of power and social domination such as culture and social differentiation.

I have taken a 'structuration' approach to defining the component of Context. That is, structure and agency are treated as interdependent. This is an important clarification, because in terms of critical agrarian and rural

development studies, treating agency and structure as interdependent aligns with a view as espoused by Bernstein (2007) that individuals are affected by social patterns:

...[a] belief that the cause of poverty is the very terms of poor people's insertion into particular patterns of social relations; the solutions therefore are transformative policies and political processes that restructure such social relations. (Borras, 2009, p.13)

In this way, I distance the component of Context from modernisation theories that consider rural livelihoods as being transformed primarily by external forces or exogenous driven development.

As noted earlier, autonomy in the Autonomous Livelihood Framework does not equate with freedom from the roles and obligations of society. Indeed, societal structures are complex recurrent practices in which smallholder farmers participate, reproduce and alter. In this sense, Context should not be taken as something that smallholder farmers aim to be free from but rather something that smallholder farmers are embedded within.

Through the use of Grounded Theory Method, the two primary ways that the farmer informants spoke to the notion of Context was through the idea of

- (a) Social values and
- (b) Social differentiation.

I use the following orienting definitions:

Social values refers to the ways in which smallholder farmers perceived the importance that their broader society placed on different actions, roles, practices and lifestyles between farming and non-farming livelihoods. In particular, how smallholder farmers self-identity interacted with “... social imaginations of what constitutes good and legitimate work ... ” (Ofstehage, 2015, p.445). Specifically, I adopt the following definition: “For both individuals and groups, values serve as standards for evaluating whether actions, events, and people are desirable or undesirable. Values guide what people attend to, what they perceive, and how they interpret and process information.” (Manfredo et al., 2016, p.5)

Social differentiation refers to distinctions made between individuals or groups on the basis of physical, economic or social characteristics such as race, gender, ethnicity, and religion (Haan & Zoomers, 2005). In the Autonomous Livelihood Framework, I primarily concentrate on gender as a key point of social differentiation. I acknowledge that this is a limited scope for social differentiation but in pragmatic terms, it reflects the use of Grounded Theory Method and the farmer informant narratives.

5.8 De-Limitations of the Autonomous Livelihood Framework

There are delimitations of the Autonomous Livelihood Framework that should be made explicit. By delimitations I refer primarily to scope of the Autonomous Livelihood Framework as a schematic, heuristic tool that is in the process of development. Although the Autonomous Livelihood Framework is an integrated theory in that it merges components of the Sustainable Rural

Livelihood Framework and the notion of autonomy from the peasant principle, it is fundamentally different to both these approaches.

Firstly, unlike the Sustainable Rural Livelihood Framework, the Autonomous Livelihood Framework does not regard livelihoods as grounded in the pursuit of increased incomes (cf. Amekawa, 2011). Nor does the Autonomous Livelihood Framework presume the opposite as per van der Ploeg's (2008) alignment with the Chanoyvian idea that peasants are primarily interested in subsistence production.

Indeed, a key difference of the Autonomous Livelihood Framework is that it assumes that in the process of negotiating their autonomy, smallholder farmers will construct a unique mix of *Livelihood Strategies—Capitals—Agency—Context*. Both the pursuit of increased income or the pursuit of subsistence production can be accommodated as legitimate ways to construct a livelihood whilst simultaneously fulfilling the need to *pursue the freedom to govern one's own affairs* (see definition of an Autonomous Livelihood). The Sustainable Rural Livelihood Framework and the peasant principle offer primarily instrumental views of how smallholder farmers construct their livelihoods. In comparison, in the Autonomous Livelihood Framework the experiential process of negotiating of autonomy is foregrounded — it both drives the other components and is renewed through the other components.

Secondly, the Autonomous Livelihood Framework is not intended as a framework for intervention in terms of agrarian or rural development. Scoones (2009) has highlighted a number of problems with the use of the Sustainable Rural Livelihood Framework as a tool for intervention, notably that the Sustainable Rural Livelihood Framework became a type of checklist

assessment and that economics dominated the use of the Sustainable Rural Livelihood Framework, leaving important components of power, politics and social differentiation “...in the margins...” (Scoones, 2009, p.180). As the Autonomous Livelihood Framework is a conceptual heuristic tool applied to interpreting and understanding smallholder farmer livelihoods, it is not designed to be tool for rural development programs.

Thirdly, the Autonomous Livelihood Framework is not an outcome focused framework. By outcome focused, I refer to the notion that by applying the Autonomous Livelihood Framework to interpreting smallholder participation in biodiesel schemes as part of their livelihoods, the analysis will result in a specific conclusive outcome or actions to be taken. The Autonomous Livelihood Framework is a meta-theory and is intended to contribute to a broad discourse on rural and agrarian studies, but it is not a direct framework for action or theory of change.

The Autonomous Livelihood Framework is intended as a ‘better starting point’ for interpreting livelihoods. Changes to policy, programs or development models would need to be considered as an ‘integrating approach’ beyond the bounds of the Autonomous Livelihood Framework as these open up questions such as *What outcomes are different actors seeking? How may change occur? How has change occurred in the past in this context?* These questions are well outside the boundaries of the Autonomous Livelihood Framework in its current form.

Finally, I have aimed to offer a nuanced and novel approach to livelihoods analysis in a way that both speaks to the current literature in this realm and extends the ways in which livelihoods analysis is conducted.

Nevertheless, the Autonomous Livelihood Framework is a theory-in-progress and will benefit from critique and interrogation from a wider audience.

5.9 Chapter Summary

In summary, this chapter has outlined and defined the key components of the Autonomous Livelihood Framework that is used in the analysis and interpretation chapters of this thesis.

I started the chapter by describing at a broad level how the Autonomous Livelihood Framework is an integrated conceptual framework comprised of elements of the Sustainable Rural Livelihood Framework, peasant principle and research-specific elements that were chosen during the use of Grounded Theory Method.

I then synthesised earlier insights about the nature of autonomy and aligned the Autonomous Livelihood Framework specifically with a relational autonomy view. I noted how autonomy is the critical driver that determines how the other components are brought into utility in the construction of a livelihood.

Finally, I outlined the four key components of *Livelihood Strategies—Capitals—Agency—Context*. I located each component within a broader set of literature and provided a specific definition for both the primary component and the sub-components. This definition is used to guide the interpretation sections of the thesis (Chapters 7–8).

The next chapter will turn to the Research Design.

Chapter 6: Research Design

6.1 Introduction

This PhD research is grounded in a transdisciplinary approach — drawing on epistemologies and methodologies from the social sciences and sustainable agricultural studies. By transdisciplinary I use Leavy’s (2011) definition “...an approach to conducting social research that involves synergistic collaboration between two or more disciplines... transdisciplinary research practices are issue- or problem-centred and... follows responsive or iterative methodologies...” (p.9).

Wickson, Carew and Russell’s (2006) characteristics of transdisciplinary research proved useful throughout the research design and provided the initial framework for the research approach. These included:

- (a) Problem-centred approach to defining the research focus and questions
- (b) Collaboration with stakeholders, and
- (c) Evolving methodology to meet the needs of the research problem.

This chapter does not include an exhaustive documentation of the decisions, adaptations, techniques, reflections and re-framings undertaken throughout the study. It provides a broad orientation to the methodology and reflects both ethical and pragmatic choices of myself as a doctoral researcher, influenced by the scoping visits undertaken in the design phase of the research

project (2009) and adapted to meet the realities of fieldwork in Brazil and Timor-Leste.

As per any piece of qualitative research, the best-laid design still required modifications, in part due to fieldwork ethical dilemmas and in part due to changing context between design and implementation phases. “We do not write up all that we saw or heard or were told. Rather we write up what all of our thinking and comparing has led us to believe our field experience means.” (Golden-Biddle and Locke, 1997, p.7 quoted in White, 2011, p.237)

This Chapter is structured as follows:

Section 6.2 provides an overview of the research design by focusing on four key stages (Initial Design, Data Creation, Analysis, and Framework Development) of the research, explicating stating my epistemological stance and discussing the ethical considerations of the study.

Section 6.3 explains Transdisciplinary Research Design and provides details on how a transdisciplinary approach informed this study

Section 6.4 – 6.5 details the research design and process undertaken in Brazil and Timor-Leste.

Section 6.6 explains the data analysis and use of Grounded Theory Method. I highlight the exclusion of certain data generated in the study that was not used in the analysis or thesis and the pragmatic reasons for doing so.

Section 6.7 focuses on the *process* of developing the Autonomous Livelihood Framework. Here I used Carew and Wickson’s (2010) Transdisciplinary Wheel as a heuristic device to illustrate the various iterations and adaptations that informed the final version of the Autonomous Livelihood Framework.

Section 6.8 concludes with locating myself as author and researcher within this thesis and study.

6.2 Overview of the Research Design

In order to address the core focus on this research — How can we explain smallholder farmer’s participation in biodiesel schemes as part of a rural livelihood in Brazil and Timor-Leste? — the research design was centred on an actor-oriented qualitative research approach. This section provides an overview of the research design based on a chronological approach— though activities such as collaboration and reflexive practices were cyclic and iterative (see Figure 4 Key Stages of the Research Process).

The primary data creation method was centred on in-depth on-farm interviews conducted with smallholder farmers in Brazil and Timor-Leste. The interviews were transcribed and analysed in several rounds using Grounded Theory Method, which led to the development of a novel framework the Autonomous Livelihood Framework. The findings in this thesis represent the analysis conducted with the Autonomous Livelihood Framework. The research occurred in several key stages being:

- (a) Initial Design
- (b) Data Creation
- (c) Analysis, and
- (d) Framework Development

The following figure illustrates the activities undertaken through each of these stages.

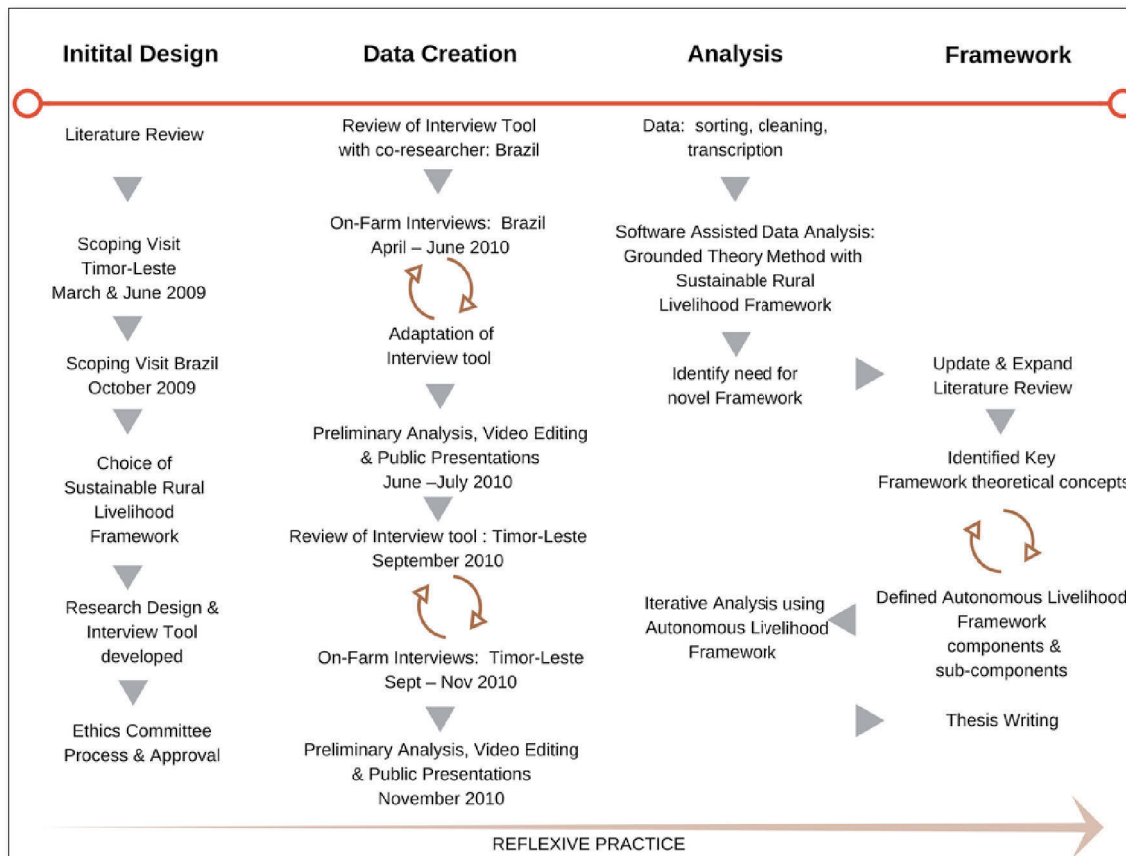


Figure 2 Key Stages of the Research Process

Initial Design

An epistemological and ethical position on how, what and whose knowledge is valued had significant influence on the research design. A participatory action research methodology was chosen as it best aligned with my own ethical stance as researcher, the research problem focus and transdisciplinarity. By ethical stance, I refer to my concern with the nature of knowledge and the ways certain knowledge is valued or privileged over other knowledge — in particular in this context, how to bring smallholder farmers' *voices* to the fore on the debate on biofuels. I secured research collaborators in both Brazil and Timor-Leste who worked together with me to develop the research tools, to secure participation of the farmer informants, conduct interviews and preliminary analysis. The initial design stage included making decisions on the following key elements:

- (a) Determining Key Informants: Smallholder farmers participating in the government biodiesel schemes
- (b) Designing the Research Tool: In-depth interviews based on the Sustainable Rural Livelihood Framework, and a Household Agricultural Survey tool based on input from the Faculty of Agriculture, University of Timor Lorosa'e (Timor-Leste)
- (c) Audio and Video Recording: Interviews audio and video-recorded as a way to be able to distribute the research to non-academic audience.

- (d) Type of Analysis: Grounded Theory Method analysis applied to transcriptions of audio-recorded material together with the Sustainable Rural Livelihood Framework to develop an enhanced framework
- (e) Type of Collaboration: Research interviews and preliminary analysis to be undertaken together with co-researchers in Brazil and Timor-Leste.

Data Creation

Smallholder farmers were the primary research informants and in-depth interviews were conducted in three regions of Bahia, Brazil and in six districts of Timor-Leste. The interviews were undertaken together with in-country collaborators and the process differed for Brazil (see Section 6.4) and Timor-Leste (see Section 6.5).

Analysis

Analysis was undertaken in two phases: firstly, in-country preliminary analysis based on reflexive practice and peer feedback processes; and secondly, the application of Grounded Theory Method to transcripts. The Sustainable Rural Livelihood Framework informed the theoretical design and was initially used in round one coding for analysis. However, as the research progressed, reflexive practice, input from co-researchers, insights from the interviews and preliminary data analysis with Grounded Theory Method meant that key findings were beyond the scope of the Sustainable Rural Livelihood Framework. As analysis progressed, further rounds involved the iterative

development of a novel framework — the Autonomous Livelihood Framework (see Section 6.7).

Framework Development

The farmer informant narratives contained contradictions, gaps, messiness, and yet an underlying commonality in that constructing livelihoods was more than a rational choice of using capitals. Wolford (2006) — drawing on the work of Abu-Lughod (2000)— identifies this type of informant narrative as *counter-discourse* is because it forces us⁴¹ to consider the contradictions, contrary positions, the nonsense of interviews as legitimate, significant and contributing toward a richer understanding of people rather than an aspect of interviews to be dismissed, silenced or ignored in the search and creation of coherent, whole narratives: “Contradictions are not always contradictory: they are windows onto the messy relationship between agency and structure. Or rather, they reflect the ways in which people reconcile their personal circumstances with a view of how the world ought to work.”(Wolford, 2006, p.349)

Here Wolford (2006) and Abu-Lughod’s (2000) work intersects with the work of Turner (2012) and Long (2015) amongst others who have questioned and built on rural livelihood approaches by the explicit incorporation of an actor perspective and attempts at interpreting livelihood decision-making process from a peasant perspective. This led to the iterative development of the Autonomous Livelihood Framework (Chapter 5). I return

⁴¹ us’ as academics, ‘us’ as sociologists

to reflect on the process of a novel integrated framework later in this chapter (see Section 6.7).

I now turn to my epistemological stance.

Epistemological Stance

My epistemological stance draws on Healy's (2003) notion of *epistemological pluralism*, emphasising the importance of non-expert involvement in creating knowledge and believing that knowledge is essentially socially constructed, a viewpoint labelled *constructivist* (Charmaz, 2014). I align strongly with Healy's (2003) assertion that the practice of knowledge creation is context-specific, and should be transparent in process and procedure. This viewpoint intersects with a transdisciplinary approach to collaboration in that knowledge from 'laypersons' is both valued in the research process, and influences and changes the research process.

To meet these dual goals of inclusion of non-expert knowledge and collaboration I undertook the research focused on smallholder farmers as the primary research informants and with in-country co-researchers and collaborators. I align with the view that social research data is constructed with both *the researcher* and *the researched* (referred to in this thesis as farmer

informants⁴²) actively involved in the meaning-making process (Charmaz, 2006, 2014).

This approach dismisses the notion that the researcher can maintain a detached, objective position and be a ‘receiver’ or ‘gatherer’ of knowledge that exists externally as ‘facts’ in a value free reality (Thomson, 2013). A constructivist view also dismisses the notion that the researched can and will explain their thoughts, experiences and opinions in a factual manner that is free from any internal filtering, judgements, worldviews or motivations.

As part of the research design I acknowledged that the farmer informants would have agency to choose what was devolved, what was held back, what was reinterpreted for the researchers (i.e. my own) sake and what narrative allows the farmer informants to present the situation in a light most beneficial to themselves, their internal narrative and aligned with their world view.

Use of Orthonyms

A notable outcome of this epistemological stance taking data as co-created is the naming of farmer informants with their orthonym in the empirical chapters rather than using pseudonyms. The use of pseudonyms for

42. I have chosen to use the term ‘farmer informants’ but acknowledge that it is value-laden. I have moved away from the term ‘respondents’, as this offers a more one-dimensional view of ‘the researched’ and assumes they only *responded* to predefined questions rather than negotiated the terms on which the interview took place. *Farmer informants* moves toward acknowledging that the interview was a process and negotiation between ‘researcher’ and ‘researched’.

research informants largely arose from biomedical research methods and ethical concerns and is now conventional practice in qualitative research (Tilley & Woodthorpe, 2011). However, the use of pseudonyms can be considered as a way of stripping the researched of their knowledge, input and agency in shaping the research (Sikes, 2013) and “Forcing biomedical human research standards on research participants risks paternalising participants and taking away their autonomy, which is a fundamental reason human research ethical codes were created...” (Lahman et al., 2015, p.446).

The Australian *National Statement on Ethical Conduct in Human Research* (National Health and Medical Research Council & Australian Vice-Chancellors’ Committee, 2007) does not require that adults who have from an informed position consented to participate in research be made anonymous through the use of a pseudonym. Through the process of informed consent, the farmer informants were given a choice to remain anonymous or have their real name used in the research documentation that would be made public beyond the research team.

Between Brazil and Timor-Leste, there was only one farmer informant who chose to remain anonymous, and her interview was excluded based on other criteria (see Box 2 A failed interview). The use of the farmer informants’ orthonyms reflects a commitment to critical methodologies that reflect that the research process is a collaborative, co-constructed space informed by both the researcher and the research (Denzin & Lincoln, 2008).

Interpretation of the Co-created Data

As a sole researcher I undertook the following activities in isolation from my in-country co-researchers and collaborators:

- (a) Substantive data analysis (see Section 6.6)
- (b) Conceptual development of the Autonomous Livelihood Framework (see Section 6.7), and
- (c) Thesis writing.

As such, this thesis presents my individual interpretation of the empirical data and smallholder farmer's experiences in biodiesel production, and I acknowledge that the research transcripts could be re-interpreted in other ways. This in this sense, this thesis offers a partial truth: "There are multiple versions of the elephant in this parable. Multiple lessons. We can never know the true nature of things. We are each blinded by our own perspective. Truth is always partial." (Denzin & Lincoln, 2009, p.153). I make no claims that the farmer informants, collaborators or co-researchers would agree (nor disagree) with the way in which I have ultimately framed the research.

Ethical Considerations

A central component of the methodological approach was ensuring that ethical considerations and value statements were made clear in the research process. I developed a comprehensive Ethics Management Plan that explicitly addressed language and cultural considerations, informed consent for research participation, an option for informants to remain anonymous, consent and

release forms for informants⁴³, in country risk assessment matrix, letters of support from in-country collaborators and a data archiving plan (see Annex 6 – 8). As part of the University of Technology Sydney Human Research Ethics Committee approval, annual reports were submitted to confirm that the research was conducted in line with the Ethics Management Plan.

It was necessary to be explicit about the inherent power imbalance that would exist between the farmer informants and myself as an outside researcher. A key consideration was the cross-cultural nature of this research. As a middle class white woman, undertaking research in countries and locations in which I am clearly identified as an outsider by language, culture and physical appearance presented significant cross-cultural ethical considerations at play throughout this research. At the outset, I conceptualised myself as being ‘more powerful’ within the research process due to my outsider Westerner status. Being aware of this power imbalance allowed me to attempt to mitigate it through on-site strategies. Being female and undertaking research in patriarchal societies allowed this power imbalance to shift as I could play a role of ‘less knowledgeable’ due to my gender and attempt to disrupt the power dynamics. For example, I would preference questions with “... *as a foreigner and I don't really understand how things work around here, can you please explain to me...*”.

This purposeful use of language to place myself in the less powerful position had two purposes. Firstly, I used it to frame the farmer informants as important knowledge holders and creators. Beginning interviews in this way (I

43. Transcripts, audio, video and data archiving were all included on the consent and release forms.

imagined) would assist to set the tone for interviews that would support farmer informants as authoritative voices. Secondly, this method also allowed me to elicit further information on topics that occasionally I already had knowledge of (and an opinion about). This is not to imply that the farmer informants were duped throughout the research process, but more to acknowledge the interview as ‘public performance’ as each of us took a role. However, this approach of withholding opinion is not without its limitations: “This (often guilt-driven) behavior [sic] can have the opposite effect of reinforcing existing unequal power relations because it implies that the research participant must work for the researcher without the latter having to reciprocate.” (Manzi, 2013,p.32).

Indeed, as an ethical dilemma, this point was discussed at length between Catarina, the co-researcher in Brazil⁴⁴, and myself. At the time, I adhered to the idea of attempting to not ‘contaminate’ the interviews by discussing my prior knowledge and opinions of the biodiesel scheme. However, Catarina as a rural development and community practitioner felt that this was essentially dishonest and unethical — that attempting to be ‘falsely neutral’ and not sharing information was manipulative of the interview process⁴⁵. Catarina’s approach mirrors that of a committed outsider (Bozalek,

⁴⁴ See 6.4 Creating Data in Brazil / Collaboration for more details about co-research and collaboration.

⁴⁵ Catarina and I had visited the Petrobras Refinery at Candeias and spoke with a wide range of management and technical staff as part of our research preparation. At the time, Petrobras was the only operating biodiesel refinery in Bahia and the primary contractor of biodiesel Cooperatives that were recruiting smallholder farmers to the PNPB. Catarina had also been involved in an early biodiesel pilot project through Petrobras and the Permaculture Institute of Bahia circa 2007.

2011) in so much as her approach was not just to understand smallholder farmer perspectives but to provide constructive criticism and raise questions of equity and justice in relation to the PNPB. Catarina and I arrived at a compromise during the interviews, whereby we did share our opinions and information about the PNPB — but not as part of the main interview.

6.3 Transdisciplinary Research Design

Examining smallholder farmers' participation in biodiesel schemes and considering how smallholder farmer perspectives assist to explain and interpret the rural development outcomes from biodiesel schemes lacks a clear-cut technical solution and crosses disciplinary and knowledge boundaries. As such, a transdisciplinary approach was necessary in order to address the core research problem area. As Thompson Klein (2004) notes, the point of a transdisciplinary approach is not to be a *superdiscipline* but rather to discover and link different epistemologies and ontologies, and create ways to talk about the meta *problematiques* that face today's society. In order to move beyond the disciplines toward a transdisciplinary approach, being explicit about values and ethics is essential (Max-Neef, 2005). Whilst discipline-based approaches can present techno-solutions to a problem as though they were value-free, in fact, Max-Neef (2005) laments the naivety of disciplines that undertake this course. "... conventional economic discourse increases the belief in the efficiency of the market; ethical, political and value judgments are plainly excluded or left along the road. Economics... is presumed to be a value-free science..." (p.8).

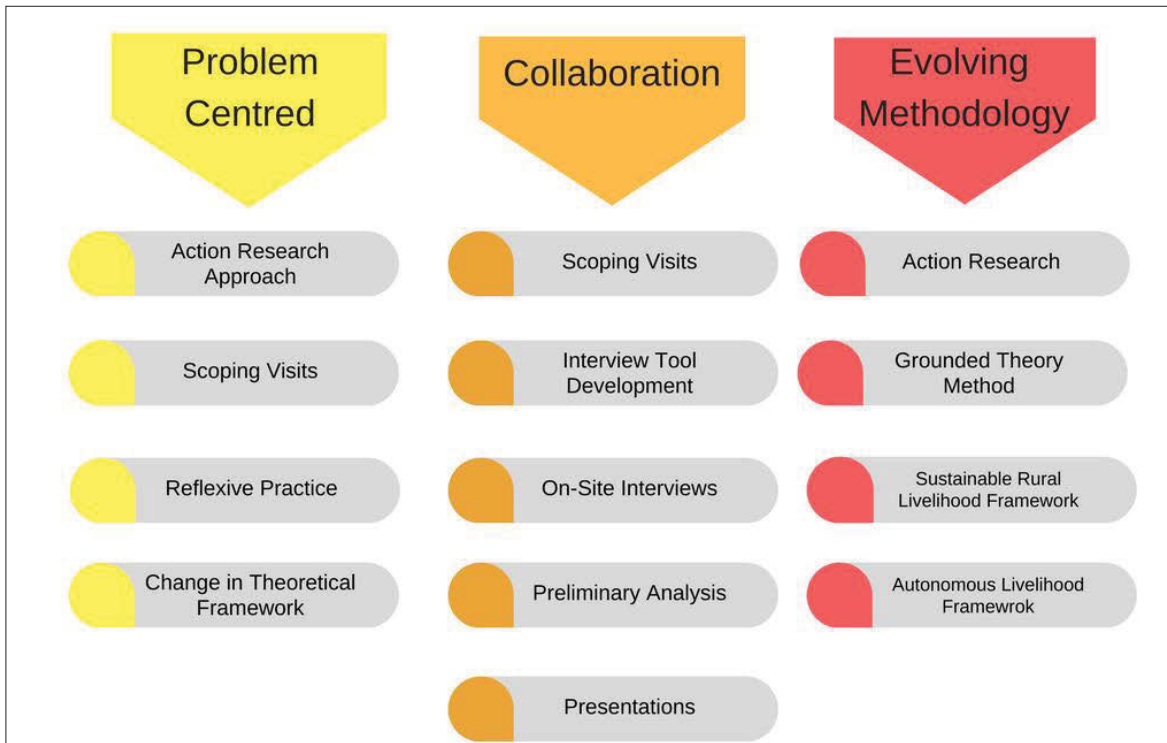


Figure 5 Transdisciplinary Research Design

Indeed, earlier in I highlighted the scientific-rational approach of biofuel social certification schemes, the value-laden nature of social inclusion analysis and a general absence of smallholder farmer perspectives and world-views on the biodiesel schemes that are specifically targeting their livelihoods for change. In this way, the development of the Autonomous Livelihood Framework presents a new way to talk about livelihoods and biodiesel schemes for rural development.

I now turn to the three key components of transdisciplinary research and ground each in this particular research project. The activities undertaken as part of a transdisciplinary research approach are summarised in Figure 5 Transdisciplinary Research Design.

Problem Focus

An inherent characteristic of transdisciplinary research is the notion of being problem centred — in particular, wicked problems — elusive, complex, multi-dimensional and often crossing societal and environmental disciplinary boundaries (Rittel & Webber, 1973; Wickson et al., 2006). Indeed, biofuel schemes are well-recognised as a wicked problem as their expansion has led to the creation of further societal issues, for instance indirect land use change (Fast & McCormick, 2012; Wubben & Nuhoff-Isakhanyan, 2013). By commencing this research with a problem-focused view I was able to broadly define the problem-space without precluding different methodologies or methods.

The relationship between the problem-space and specific research questions can be thought of as temporal, spatial and conceptual. The problem-space of a wicked problem is broad, shifting and evolving — the research questions are more bounded, specific and in this case, developed out of the application of a transdisciplinary research design. For instance, whilst defining the problem space as:

What are the social sustainability issues and rural livelihood outcomes for smallholder farmers participating in Government-Led-Biodiesel-for-Rural-Development schemes in Brazil and Timor-Leste?

The refined research questions were defined during the research process and informed by collaboration and evolving methodology. For instance, I did not at first define the third research question in the initial design phase: *In what ways does smallholder farmers' participation (or non-participation) in biodiesel schemes reflect their negotiating for autonomy?* This was done later, after several rounds of data analysis when autonomy became a central component to the analytical and theoretical framework.

The problem-focused nature of the research was refined during scoping visits to Brazil and Timor-Leste. The initial research plan was to examine the Timor-Leste biodiesel schemes and the impact of these schemes on smallholder farmer livelihoods — yet, at the commencement of my research in 2009, Timor-Leste had no official biofuel policy or program at a National Level and only one pilot project (non-government) that by anecdotal accounts was no

longer active. The choice of Brazil as a complementary research site was influenced by a number of factors including:

- (a) The PNPB specifically stated social inclusion goals for family farmers
- (b) Anecdotal reports that indicated the Timor-Leste government biodiesel pilot project was influenced by the Brazilian PNPB model (A. Coelho da Silva, SEPE, Personal Communication, March 2009).
- (c) Expected transferability of farmers' experiences between Bahia, Brazil and Timor-Leste
- (d) Common language between Brazil and Timor-Leste (Portuguese)
- (e) Accessibility to the research areas and in country collaborators.

The scoping visits conducted in 2009 (see Annex 5) and the extensive literature review in the early stages of the study (2009–2010) showed that a majority of academic research on the PNPB at that time was either theoretical (for instance Garcez & Vianna, 2009) or had been conducted with traditional experts — that is, representatives of government, cooperatives, non-government organisations (NGOs), academics or other formal knowledge holders (see Santos & Rathmann, 2009) — rather than directly with smallholder farmers⁴⁶. In contrast, this study focused on interviewing smallholder farmers — based on the premise that smallholder farmers themselves are best placed to offer explanations and interpretations of the social and livelihoods implications of their participation (or non-participation) in the biodiesel schemes.

46. This is based on literature published pre-March 2010. Since this time, there have been several more studies conducted directly with smallholder farmers. (see Manzi, 2013; Stattman & Mol, 2014).

I conducted two scoping visits during 2009. Firstly, I visited Timor-Leste to secure collaboration with local co-researchers and commence contact with the SEPE who were responsible for the Agro-Energy Program pilot project. Secondly I visited Brazil to conduct informal interviews with potential collaborators and gain a better understanding of the PNPB in Bahia (see Section 6.4).

Maintaining a problem-focus also led to the initial choice of Action Research and the latter change of theoretical framework.

Collaboration

Collaboration in transdisciplinary research refers to engaging with stakeholders and/or the broader non-academic community in order to incorporate knowledges and worldviews. Collaboration is “...the science and art of discovering bridges between different areas of knowledge and different beings. The principal task is elaboration of a new language, logic, and concepts to permit genuine dialogue” (Nicolescu (1996) in Thompson Klein, 2004, p.516). Collaboration was an essential feature of my research design and I worked with in-country collaborators and researchers in both Brazil and Timor-Leste during the initial design, data creation and preliminary analysis stages of the research study.

Yet, collaboration as a “... genuine dialogue...” (Thompson Klein, 2004, p.516) involved compromise and negotiation — whilst simultaneously affecting the very problem centre and evolving methodology — a delicate action when attempting to ensure that the research process continued to fulfil the formal university requirements for Doctoral Research. As noted by Carew

and Wickson (2010) “ ... TD [transdisciplinary] researchers are expected to actively seek and use knowledge from the community that has a stake in the problem (p.1147) but this involves mutual learning (ibid.) — and as such the collaboration aspect of the research process involved my own development and maturation as a researcher.

Action Research was chosen as the primary methodology as core aspects of Action Research complement both the epistemological stance and a transdisciplinary research process — principally notions of incorporating stakeholder knowledge, evolving flexible design centred on the problem and collaboration. According to Pleijte, Schut and During (2011) Action Research is a powerful tool to assist researchers understand the local context and how research may contribute toward sustainable solutions: “In collaboration with stakeholders, research questions are jointly elaborated, as well as the methods, and expected outputs; making research more accessible and robust for stakeholders in the process” (p.224).

In 2009 I conducted scoping visits to both Timor-Leste (Dili) and Brazil (Brasilia and Bahia) where I met with non-government organisations, government representatives, politicians, aid agencies, academics, biodiesel refinery corporations, church based groups, landless peasant organisations, research institutes, university students and local activists. These scoping visits allowed me to both clarify the research focus toward smallholder farmers and build networks with local researchers. Importantly, in Timor-Leste there was very limited published material or information about the development of biofuels. The scoping visit meant I was able to meet with Timorese colleagues

who had knowledge both of past biofuel proposed schemes and the government biodiesel pilot project. (See Annex 5: Scoping Visits).

I chose to collaborate with in-country co-researchers, rather than directly with farmer informants, as I did not have the time or resources required for building rapport and robust working relationships with smallholder farmers. In Timor-Leste, I collaborated the Faculty of Agriculture, National University of Timor-Lorosa'e (Tetum: *Universidade Nacional Timor Lorosa'e*⁴⁷). In Brazil, I collaborated primarily with the Permaculture Institute of Bahia and the Institute for Society, Population and Nature. Collaborations involved:

- (a) Jointly defining the focus of the problem
- (b) Developing and refining the research tools (surveys, interview questions, process of informed consent)
- (c) Undertaking interviews with smallholder farmer informants (collaboration in Brazil only)
- (d) Preliminary data analysis (collaboration in Brazil only)
- (e) Presentations to wider academic and public audiences (collaboration in Brazil only)

Evolving Methodology

Transdisciplinary research "... is characterised by an interpenetration of epistemologies in the development of methodology..." (Wickson et al., 2006, p.1050). In this way, evolving methodology refers to considering what and how

⁴⁷ *Lorosa'e* is the Tetum term for 'east' and this is the official name of the University

knowledge is valued in the research project — and reflects on and iteratively adapts this throughout the research process. In practice in this research study, *evolving methodology* meant making choices throughout the study about how best to design the research to include smallholder farmers’ ‘voices’ and to be explicit about the ways that knowledge was created and valued (or not valued) in the research process. In addition, reflexive practice was used to consider how my world-views and role as a researcher has contributed to the meaning making process.

Through being open to an evolving methodology, I have undergone a significant transformational learning experience that challenges my own notions about the role of biodiesel schemes for smallholder farmer livelihoods. In particular, this involved a shift from the idea that biodiesel schemes would be inherently non-beneficial to smallholder farmers toward a view that accepts more nuanced interpretations how smallholder farmer’s may or may not incorporate such schemes into their livelihoods.

The early literature review and scoping visits strongly informed my decisions to adopt an actor oriented approach, specifically choosing smallholder farmers as my target informants. An actor oriented approach to understanding livelihoods focuses attention on individuals and emphasises their individual experiences, knowledge and their ‘embeddedness’ in local systems (socio-economic, political cultural, historical, temporal and spatial) (Turner, 2012). At the outset of the study, female farmers were a key target group of the farmer informants — however, in both Brazil and Timor-Leste I was unable to secure as many female farmer informants as I had hoped. Further, in some cases, interviews with female farmer informants were

influenced by the presence of male relatives. This affected the analysis as the initial research design included a component of gender analysis applied to extend the Sustainable Rural Livelihood Framework. For further discussion see Box 1 Female Farmer Informants.

Box 1 Female Farmer Informants

Female Farmer Informants

Gender is a major point of social differentiation that creates gendered experiences of farming and *being a farmer* as unique. Female farmers have different roles and responsibilities on farms, meaning that biodiesel schemes are likely to impact on their livelihood in different ways to male farmers.

A gender lens applied to biodiesel schemes could illustrate in what ways growing biodiesel feedstock is gendered and how female farmers access resources, cooperatives and social networks associated with biodiesel.

Female farmer informants were a key target group in this study. However, I was unable to access significant numbers of female farmer informants for several reasons.

Firstly, female farmers were rarely considered as the 'head of the household'. As such, men were the primary liaison point for the household's participation in biodiesel feedstock production and self-nominated to participate in this study.

Secondly, social norms meant that even when female farmer informants were interviewed, male relatives attended the interviews. It was a concerted effort to ensure that the interview was not dominated by the male voice.

Finally, as I relied on local collaborator referrals — it was most often men who were identified as key informants.

As part of an *evolving methodology* this meant reconsidering and adapting how gender was included as a component of the analysis and discussion.

In order to specifically incorporate evolving methodology as part of the design, I used Action Research and Grounded Theory Method to ensure that the research process was flexible, iterative, incorporating ‘other’ types of knowledge, and open to emerging findings (Dick, 2007). I chose Action Research as a methodological approach as (a) the research *process* is considered as important as the research outcomes and (b) a focus on working with co-researchers and collaborators intersected with a transdisciplinary approach to collaboration (c) reflexive practice and subsequent adaptation are inherent and explicit as part of the Action Research cycles of plan–act–observe–reflect–adapt—re-plan (Dick, 2007) and as such, would accommodate and converge with a process of *evolving methodology*.

I embraced the notion of research as being messy, unruly and disruptive (MacLure, 2006) — although working through the messy and unruly data analysis phase was challenging. Indeed, ‘being open’ to the messiness of qualitative research did not necessarily make the hard work of forming a novel framework easy.

The development of the Autonomous Livelihood Framework as an integrated and novel framework was part of evolving methodology that is problem-focused and grew out several iterations of Grounded Theory Method primary data analysis. Whilst the initial research design included the use of Grounded Theory Method, it was designed around the notion of enhancing the Sustainable Rural Livelihood Framework, rather than developing an entire novel framework. I elaborate on the process of developing a novel framework in Section 6.7.

6.4 Creating Data in Brazil

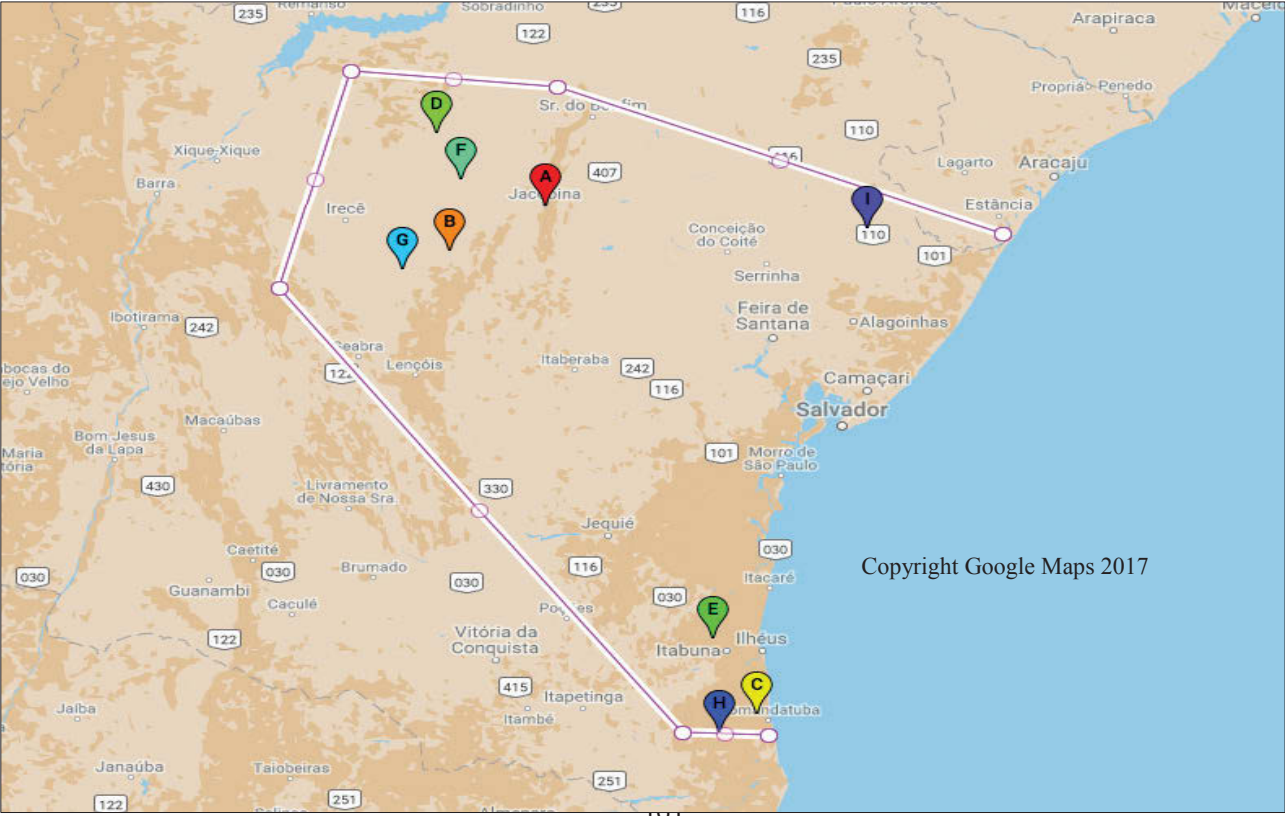
I visited 18 smallholder farmers and three rural extension workers on farms and in homesteads in the Northeast State of Bahia, Brazil. The context of the inquiry was smallholder farmers participating, or in the past participated, or chosen not to participate in the PNPB. There were a range of gender, age, land-ownership and crops grown amongst the farmer informants (see Annex 11: Farmer Informants Brazil)

Bahia was chosen as an appropriate research site within Brazil due to:

- (a) An established biodiesel policy, and mechanisms for biodiesel production as a tool of rural development
- (b) The apparent influence of South-South Cooperation on promoting biofuel production within developing countries
- (c) Transferability of characteristics — such as high a ratio of family farmers and levels of poverty — to other nations in the Global South considering biodiesel production for rural development⁴⁸, and
- (d) Familiarity, access and professional contacts in Bahia.

48. I no longer align myself with the view of transferability of research findings. However, this was the initial basis for the choice of Bahia and as such, is recorded here. I return to this in the Discussion (Chapter 9) and Conclusion (Chapter 10)

Figure 6 Study Sites in Brazil



The study interviewed farmer informants within a 500km radius of the State Capital Salvador. A map of interview locations is presented in Figure 6 Study Sites in Brazil.

The study sites are situated within two regions of Bahia namely the central savanna (Portuguese: *Caatinga*) region and the coastal Atlantic Forest (Portuguese: *Mata Atlantica*) region. Both of these study sites are located within the regions targeted under the PNPB as they have high indexes of poverty, high concentration of family farmers and potential production of oleaginous feedstock.

Collaboration

In Brazil, I partnered with the Permaculture Institute of Bahia (Portuguese: *Instituto de Permacultura da Bahia*) and the Institute for Society, Population and Nature (Portuguese: *Instituto Sociedade, Populacao e Natureza*). The Permaculture Institute of Bahia have strong local networks with smallholder farmers across Bahia, experience in experimenting in feedstock crops for biofuels, and interest and availability of staff to work as a co-researcher. The Institute for Society, Population and Nature provided support with my research visa and conceptual development of the research as well as valuable knowledge about conducting research into government programs within the political and social context of Brazil.

My primary co-researcher was Catarina Camargo, a Brazilian with qualifications in Forestry, Agro-ecology and long-term experience working

with smallholder farmers. Catarina was a *co-researcher* in that she devised interview questions, facilitated gaining entree with farmer informants, conducted interviews, undertook in-field reflections and analysis, presented preliminary results and generally had a large degree of influence over the research design and implementation.

I also worked with research *collaborators* — people who had less direct influence over the research design but provided some facilitation, support or networks that allowed the research to occur. There were many NGO, government and industry professionals who spent time discussing the research project, possible links and connections with other researchers and contacts throughout Bahia. I have included a full list of contacts (see Annex 1: Brazil: Co-Researchers and Collaborators).

Recruitment of Farmer Informants

I aimed to recruit a range of farmer informants taking into consideration key variables such as gender, age, land-ownership, level of activity in the biodiesel program, feedstock grown and location. In practice, securing participation was a dynamic, negotiated process at the research. Participation of the farmer informants in the study was primarily secured via:

- (a) Research collaborator's extended social networks whereby rural development practitioners introduced us to farmers or secured participation prior to our farm visit, or

(b) Farmer network exposure where farmer informants provided us with details of other farmers to contact for the study ⁴⁹.

In this way, several of the farmer informants had some prior knowledge of our research intent from third-parties before we conducted the interview. In other cases, farmer informants agreed to be interviewed after a *cold-calling*⁵⁰ process without prior knowledge or familiarity with anyone on the research team. Through this process, several farmer informants were approached who declined to participate in the research and interview process.

As we⁵¹ could not know before interviewing the farmer informants if they were *family farmers* as per the Brazilian National Programme for the Strengthening of Family Farming (PRONAF) criteria ⁵², we primarily relied on

49. I have purposefully used the term ‘exposure’ here as the idea of sampling comes from positivist scientific paradigm and signals that the researcher has some control over the selection process — even in purposeful or snowball ‘sampling’ there is underlying link to the idea of probability requirements for statistical purposes, which is often at odds with the intent of qualitative research. Yanow and Schwartz-Shea (2012) argue that the qualitative researcher should instead embrace the term ‘exposure’ to reflect the process that involves choice-making in systematic way but that recognises the process as dynamic and securing participation of individuals if often a negotiated process.

50. *Cold calling* refers to approaching individuals without prior warning or their expectation of your visit.

51. I use the term ‘we’ to include the Brazilian Co-researchers Catarina and Carla, the videographer Ednilson, and myself.

52. PRONAF defines *family farmers* with the following criteria:
The majority of the labour used on their farm is from the family
The majority of the income is from the property, and
The farm is managed by the family.

self-identification of the farmer informants. A list of Farmer Informants is included in Annex 11: Farmer Informants Brazil

Interview Processes

The interview process was designed on two phases being

- (a) semi-structured interview conducted on the farm or at the household, followed by
- (b) unstructured farm visit.

Semi-Structured Interviews

Prior to commencing the interview, farmer informants were verbally informed about the research project intent and data storage and the research participation consent form was read aloud to every farmer informant. Despite our efforts to simplify the forms and accommodate varying levels of literacy — the consent form in and of itself is a formal document and was an uneasy way to commence the interviews. Indeed, these processes created a sense of formal unease — the opposite of the rapport needed to be developed between the researcher and the researched.

Secondly, the set-up of audio and video recording devices clearly made some farmer informants uncomfortable. A dedicated videographer reduced the impact of this as the researchers (and the driver) were able to hold casual conversation whilst the technical devices were being prepared. The videographer was also able to create some comfort around this procedure through talking the farmer informants through the set-up.

The first part of the semi-structured interview was based on general farm focused questions dedicated to building rapport with the farmer

informants. We allowed a long time for interviews and commenced the interviews with questions that we thought would ‘ground’ the farmer informant and make them feel comfortable. For example, the initial interview questions asked about family, length of time in farming and details about their farm. These processes were not always successful.

For example, in an interview with one farmer informant, the initial questions about family that were aimed at building rapport resulted in the farmer informant distressed and crying due to personal family circumstances. Further, there were several instances of ‘technical failure’ whereby recording devices did not record (low battery, human error, windy conditions).

Farm Visits

After the semi-structured interview, we were often offered food or drink by the farmer informants and spent some time socialising. When it was possible, we walked around part of the farm or property to continue the interview in an unstructured manner. This part of the process was unstructured but it was still intentional and purposeful. Riley (2010) identifies that the inherent spatial nature of agriculture calls for “emplacing the research encounter” (Riley, 2010, p.651) and how “... the particular spaces and places in which we do our thinking contribute to the knowledge we create....” (Riley, 2010, p.652). In this way, the farm visits changed the researcher-researched interactions and the ways that the research process was co-constructed.

Farmer informants were more relaxed by this stage and comfortably talked about their farming practices, strategies and opinions about the biodiesel scheme. We used this time to develop conversation and rapport with the farmer

informants. This approach elicited additional narratives — some that had arisen briefly during the semi-structured interview process and others that had not been revealed in the more formal process. This was also a time for the farmer informants to lead the conversation and in essence, change part of the power balance between the researcher-researched.

As an Action Research project, the ‘on the ground’ reality meant that plan-act-observe-reflect cycles occurred in an overlapping, iterative way. On a single day, we often revised interview questions or strategies (research design), incorporated new ideas or relevant literature (theoretical basis), undertook an interview and farm visit (data co-creation), reflected on the interview content (data analysis) and revised our approach for the next day.

It should be noted, that due to prior commitments, my co-researcher Catarina was only able to attend interviews held in the *Caatinga* region. All interviews held in the *Mata Atlantica* region were conducted by myself as sole researcher, with Ednilson as the videographer and Edson the driver.

Preliminary Analysis Brazil

Preliminary analysis involved identifying themes and points for reflexive practice through listening and watching interviews shortly after they were recorded — usually within a four-week timeframe. The initial list of themes was then refined in discussion with the co-researcher Catarina Camargo and edited into a short documentary by Ednilson Ribeiro Santos to use as a presentation and discussion tool in Brazil, Australia and Timor-Leste. These themes also informed the report prepared for ETC Energy which funded part of the Brazilian Research (see Kilham et al., 2010).

The Action Research design included undertaking reflexive practice during the interview phase as a way of developing ourselves as researchers and as preliminary data analysis. Catarina, Ednilson, Carla and myself undertook reflexive practice together which was audio recorded. Reflexive practice questions included:

1. What does this mean?
2. How do we make sense of the informants' responses?
3. What were our impressions from the interview?
4. How does this relate to other informants' responses?

These reflections were primarily audio recorded but also occurred during ad hoc conversations undertaken in the car or over dinner at the end of the day. In Timor-Leste, I undertook reflexive practice individually and documented this via written reflections and audio-recordings.

6.5 Creating Data in Timor-Leste

I visited 11 smallholder farmers (see Annex 12: Farmer Informants Timor-Leste) located in different growing regions and districts of Timor-Leste (see Figure 7 Study Sites in Timor-Leste). The context of the inquiry was smallholder farmers participating in the biodiesel-for-rural-development pilot project titled the *Agro-Energy Program* as initiated by the Secretary of State for Rural Energy. The majority of the informants were family farmers (10/11) who were either providing land and/or labour to grow *Jatropha* as part of the *Agro-Energy Program*. The exception was one informant who was the caretaker for the Biodiesel Processing Plant established at Metinaro.



Figure 7 Study Sites Timor-Leste

There were a range of gender, age, land-ownership and crops grown amongst the farmer research informants. Farm size varied considerably and was unable to be recorded reliably due to varying nature of estimating farm size, the custom of farming fields separate from the main house and rotating slash and burn agriculture.

Timor-Leste was chosen as an appropriate research site due to:

- (a) a relatively new policy approach to experiment with liquid biofuels as a tool of rural development
- (b) the apparent influence of South-South Cooperation on promoting biofuel production within Timor-Leste, and
- (c) familiarity, access and personal contacts in Timor-Leste.

The study sites reflect the list of participants in the Agro-Energy Program provided by Secretary of State for Energy Policy. The Secretary of State for Energy Policy's criteria for participation in the Agro-Energy Program included:

- (a) Farmers to self-identify as smallholder farmers
- (b) Farmers to be part of a (Farming) Cooperative for Biodiesel
- (c) A single biodiesel cooperative per District.

Collaboration

In Timor-Leste, I partnered with the Faculty of Agriculture at the National University of Timor-Lorosa'e (UNTL). I met with four academic staff

twice during 2009 and stayed in irregular contact via email⁵³. We discussed research approaches and appropriate methods relevant for the Timor-Leste context.

My Timorese colleagues noted that as biofuel production in Timor-Leste was primarily a rural and agricultural development program, it would be necessary for the research to include quantitative data in order to carry any ‘weight’ in the local context. Specifically, data that focused on household agricultural practices (crops grown, mechanisation, off-farm labour, small livestock etc.) would need to be collected. This need to be ‘locally response’ was purposefully built into early iterations of my research design — each interview was to be accompanied by a technical survey, specifically in order to meet the needs of my co-researchers in Timor-Leste and the Faculty of Agriculture.

However, by the time of arriving to commence my research in late 2010, the Dean of the Faculty of Agriculture had passed away unexpectedly and the three other co-researchers were no longer available due to promotions and overseas study scholarships. This created an ethical research dilemma as I was strongly committed to research with in-country co-researchers. I presented my research to Faculty of Agriculture staff but there was no interest in undertaking ‘fieldwork’ for an outsider’s research project that had no clear financial or academic rewards — in particular as at this stage of the research, as none of the current staff had been involved in the earlier conceptualisation

53. My Timorese colleagues had poor access to email and the internet. As such, most collaboration occurred face-to-face and was followed up through emails.

phases. As such, despite planning to the contrary, in Timor-Leste I had no potential co-researchers.

After discussion with my academic Supervisors, I ultimately decided to continue to undertake the interviews by myself. I had a list of potential farmer informants provided to me by the Secretary for Energy Policy and two undergraduate students willing to accompany me to their home district. This change represented a significant shift in my proposed methodology as it meant that the data creation in Timor-Leste would no longer be part of a collaborative process.

Recruitment of Farmer Informants

The Secretary of State for Energy Policy had provided a contact list with individuals' names, mobile phone numbers and village name for all the Agro-Energy Program participants in Timor-Leste. However, due to poor mobile phone coverage, several participants could not be reached by telephone. In order to contact the Agro-Energy Program participants, I either telephoned and pre-arranged an interview or I sought out individuals by name in each sub-village. A few locations had to be visited multiple times in order to locate the Agro-Energy Program participants, invite them to participate in the research and secure an appropriate time for the interview. One farmer informant was secured via student contacts from UNTL.

In several instances, the farmer informants were initially wary and wanted to ensure that the appropriate cultural and political protocol had been followed. By cultural and political protocol, I am referring to processes whereby those in the more 'senior' or 'respected' positions — such as a Village

Chief — are contacted first and have given their tacit support. In this instance, several farmer informants only agreed to be interviewed after they had contacted the Secretary of State for Energy Policy directly to confirm that they were aware of my research activities.

I accessed the districts and farms with the assistance of a Timorese driver and hire car. As I did not have a co-researcher, I conducted the majority of interviews as a sole researcher. The exceptions were:

- (a) for two interviews, I was fortunate enough to have a colleague⁵⁴ able to accompany me as a videographer, and
- (b) two university students accompanied me to Maliana District in order to provide directions to their relatives' farm⁵⁵.

It has been noted that due to the heavy presence of aid agencies and NGOs in Timor-Leste since the Popular Consultation of 1999, that Timorese can suffer from 'consultation fatigue' and there are definite expectations around interviews. One of these expectations is the provision of small gifts⁵⁶ (Tetum: *sabun*) provided to recognise the time of people participating in

54. Jill Hickson from Art Resistance was in Timor-Leste filming an educational video. Jill accompanied me as a volunteer to video two interviews in Metinaro.

55. The student's lecturer had initially suggested that the students accompany me as 'research assistants'. However, I declined this suggestion as I was unable to commit to providing the students with the training, guidance or mentoring required for them to develop the skills as research assistants in such a short timeframe and as I considered this beyond the focus and remit of my research project.

56. The gift is typically small personal goods or food snacks but can involve the payment of cash.

surveys, interviews and consultations. The second expectation is around the provision of refreshments. I chose not to provide *sabun* due to ethical boundaries of the research project but I did provide a bag of coffee, a box of tea and a bag of sugar to each farmer informant before the interview began. This was an important part of building rapport and following appropriate cultural protocol.

Interview Processes

The interview process was conducted in two phases, being:

- (a) On a semi-structured interview conducted at the household, and
- (b) Unstructured visit to the *Jatropha* greenhouse or farm.

One interview was undertaken at the Biodiesel Processing Factory.

As with Brazil, prior to commencing the interview, farmer informants were verbally informed about the research project intent, data storage and the research participation consent form was read aloud to every farmer informant. The sense of unease around the formal process of informed consent present in Brazil was less marked in Timor-Leste. This may have been due to adhering to cultural protocol prior to the interview and establishing myself as a ‘credentialed outsider’. Indeed, my fluency in Tetum (national indigenous language of Timor-Leste) inevitably raised conversation about who I was, where I had previously lived in Timor-Leste, where I had previously worked in Timor-Leste and if the farmer informant and myself had friends, family or colleagues in common. In this way, I went from being an ‘unknown outsiders’ to what I term a ‘credentialed outsider’ — I could be ‘placed’ and understood

by the farmer informant. This approach worked well in all but one case — see

Box 2: A Failed Interview.

A Failed Interview

I was accompanied by two university students to their home village as their relatives were participating in the Timor-Leste Agro-Energy Program. Their village was a long five hour drive away. The students were excited to be visiting their family as they lived in the capital for their studies. Unfortunately they were car-sick the entire journey.

After we arrived and had freshened up, the students encouraged their older female relative to participate in the research. There were several young men in the house keen to talk about the Agro-Energy Program but I was interested in interviewing a female farmer. It took some negotiation to convince the quiet and shy farmer that I would prefer her participation than the boisterous young men.

We sat outside on long wooden benches under an open-air thatched roof. It was a communal space. The university students, the boisterous young men and several children joined us.

From the outset, it was impossible for myself and the farmer informant to establish rapport. I had overlooked that the female farmer most likely spoke a local dialect rather than Tetum. I felt that she didn't understand the informed consent process which made me uneasy and unsure about continuing the interview. Early in the interview, the students stood behind me to take 'selfie' photos with me, completely oblivious to my efforts to conduct an interview.

The young men sat behind the farmer informant and interjected their answers before she had a chance to respond. When I checked the audio-recorder after about 20 minutes and found that the batteries had gone flat — it was a relief and good excuse to end the interview early.

Box 2: A Failed Interview

The interview tool and process used in Timor-Leste was drawn from the same tool used in Brazil. The process was essentially the same, although with more time was given to building rapport and establishing credentials prior to the interviews as was culturally appropriate.

Farm Visits

After the semi-structured interview, when it was possible, I spent time with the farmer informants, walking around the farm or visiting the *Jatropha* greenhouses to continue the interview in an unstructured manner. As several farmer informants farmed away from their primary household, this was not always possible. This approach elicited several additional narratives — but more importantly for the Timor-Leste context it enabled me to see the agronomic challenges that the farmer informants were having with *Jatropha* — primarily within the greenhouses as few farmers had planted *Jatropha* in their fields.

This process created new knowledge for me — I could see and observe the greenhouses and *Jatropha* seedlings yet developed a sense that there was a performative nature to them. The level of disease and weak seedlings prevalent in the greenhouses made the likelihood of harvests sufficient for liquid biodiesel processing less realistic and the farmer informants were aware of this. The use of reflexive thinking after the interviews and these farm visits essentially created a new question for the research: *if farmer informants in Timor-Leste were participating and yet knowing that the production of liquid*

biodiesel was unlikely, what could be possible alternative explanations for their participation? In this way, the farm visits ensured that I questioned my proposed analytical approach and later reviewed the transcripts from a different point of view.

Preliminary Analysis Timor-Leste

As I was researching without a co-researcher in Timor-Leste, preliminary analysis was undertaken through reflexive practice in research journals, listening to the audio-recordings of the interviews in the evening or following days and recording preliminary themes. Once the interviews were transcribed, I searched for converging or diverging themes that had been identified in the Brazilian analysis. This process highlighted for me the insufficiencies of my initial conceptual framework as the differences between the Brazilian and Timorese data were significant, and the Sustainable Rural Livelihood Framework did not offer a way to address the major emerging finding from Timor-Leste, which was that even with knowledge that the Agro-Energy Program was unlikely to result in income from liquid biodiesel, farmer informants continued to participate and consider the project as a positive contribution to their livelihood.

I presented the preliminary analysis to peers in Timor-Leste and Australia as a way of receiving feedback and input on the preliminary analysis and developing my theoretical framework.

6.6 Analysis and Sense Making of Data with Grounded Theory Method

I used Grounded Theory Method as the primary way of analysing the empirical data and developing the Autonomous Livelihood Framework. Early iterations of pure Grounded Theory stated that the researchers should not engage with academic literature before undertaking Grounded Theory analysis and that findings should ‘emerge’ from the data (Charmaz, 2014). However, this approach of considering findings as ‘emerging’ as though disembodied from the researcher and the researched is in conflict with my epistemological stance that considers research co-created throughout the research process. It was also a requirement of a PhD at my educational institute to provide a written literature review as part of the Human Research Ethics Committee approval processes prior to any generation of research data.

As such, I primarily used Grounded Theory *Method*, which distinguishes itself from pure Grounded Theory as a way of being open to alternative views, findings or explanations in data that were unexpected or not included in initial literature reviews. Specifically, within my research project the concept of autonomy was not part of the early literature reviews nor was the development novel integrated theoretical framework part of the research design and yet these are now core concepts to this thesis.

Data analysis occurred in series of phases with a slightly altered approach for Brazil and Timor-Leste. The phased methodological approach ensured that my data analysis was an iterative approach — initial themes and

ideas from the first phases of data analysis were adapted, discarded or revisited throughout the data analysis processes⁵⁷.

Data Sorting

Prior to undertaking analysis, I undertook a process of data sorting and cleaning. I reviewed all interviews to ensure that the audio and/or video had both correctly recorded (e.g. a check for technical failure) and that the interview was clear and able to be transcribed.

In Brazil, of the 18 farmers visited and three rural extension workers interviewed, I excluded seven interviews from the analysis. These interviews were excluded primarily due to the group nature of the interview that resulted in overlapping conversation, difficulty ascribing dialogue to a specific speaker for transcription purposes and overall limited utility of the audio-recording. However, the audio data will still form part of the data archive (Annex 4: Data Sharing and Archiving via Databank).

In Timor-Leste, of the 11 farmers visited, I had a technical failure of audio recording equipment (flat battery) at one location. I have included only the observations based on my reflections and research journals for this farmer informant.

⁵⁷ The author Sarina Kilham speaks Portuguese and Tetum fluently, as such, most transcripts were not translated into English but analysed in the original language of the audio-recording.

Exclusion of the Video Material from Analysis

I made a pragmatic choice to exclude the video material from detailed analysis based on a number of factors. There are two major collections of video material being:

- (a) Semi-structured interviews: All interviews in Brazil, only two interviews in Timor-Leste.
- (b) Farm visits: partial recordings in Brazil. Location difficulties meant it was not possible to physically walk around all parts of every farm with a video-recorder. No farm visits in Timor-Leste were recorded.

The incomplete nature of the video-recording material created some doubts about the best way to incorporate it within the research study and analysis. In addition, I did not have the time or financial resources to have the audio from the video material transcribed — whilst lack of transcriptions should not be problematic in itself, at the time I received external advice that analysis based on direct viewing of video would be considered unreliable data analysis⁵⁸.

As such, the video material was not included in the final analysis for this thesis. However, the video material did inform the preliminary analysis and two short documentaries were developed that have been shown at all

58. This advice was given to me at a workshop on Qualitative Data Analysis. I no longer accept this approach as valid and instead consider a rigid conventional approach to data analysis. However, it did inform my decision not to include the video at that particular stage of my research.

presentations for peer-feedback. These documentaries can be viewed online (Kilham & Ribeiro Santos, 2011a, 2011b).

Iterative Data Analysis

The data analysis was necessarily an iterative process — as part of a transdisciplinary research project that utilised action research, the process of reading, note-taking, thinking, reflecting, adapting the research tools, coding and in general *sense making* occurred recurrently across the life of study. The initial research design aimed to use the Sustainable Rural Livelihood Framework combined with grounded theory as the main framework for analysis.

The second phase of data analysis was conducted in Australia and I used Qualitative Data Analysis Software *Nvivo* (license from QSR International) and undertook a mixture of *thematic coding* and *middle-range coding*. In middle-range coding, categories can come from both the empirical data and the literature — if the categories become large then they are considered themes (Urquhart, 2012).

However, as noted above, I found the Sustainable Rural Livelihood Framework inadequate at the analysis phase and struggled with the puzzle of representation, explanation and theorisation at the *post-coding* stage. Childers (2014) description of data analysis resonates with my experience:

... a nonlinear, sometimes tedious, sometimes joyful, always uncertain process of analysis that addressed constantly emerging methodological and ethical issues. Data analysis is often described as a

second phase of qualitative research nested between data collection and writing; however, engaging in the rhizomatic and iterative nature of inquiry quickly disrupts such perceptions. Writing, thinking, and theorizing happen all at once and exceed the containment of phases, time, and space. (p.820)

Indeed, in moving toward developing the Autonomous Livelihood Framework, I used processes of data analysis that are less conventionally described in qualitative methods handbooks and yet felt essential to the research process.

Promiscuous analysis

Promiscuous analysis refers to engaging with research material in a way that moves away from what Childers (2014) terms “hegemony of systematicity and over-coded conventions” (p.824). Like Childers, I sought to re-engage with the research, not simply through processes of coding but with “... thinking–feeling the materiality of fieldwork...”(p.821) through listening to interview audio, watching the videos, looking at photos from the research sites and through the idea of percolating data where “... phenomena [become] data over and over, through different times, moods, contexts, and formats.” (Daza & Huckaby, 2014, p.803).

6.7 Developing a Novel Framework

The Autonomous Livelihood Framework was developed in this research study as heuristic device to interpret the farmer informant’s narratives

about participation in biodiesel schemes. I have drawn upon Carew and Wickson's (2010) *Transdisciplinary Wheel* a way to discuss the development of the Autonomous Livelihood Framework as a context specific process and product of transdisciplinary research design. In this section, I focus on the *process* of developing the Autonomous Livelihood Framework, and I return to reflect on the *product* in the Conclusion (Chapter 10). The purpose of this section is to illustrate and reflect on novel theoretical framework development as *creative engagement* (Hibbert, Sillince, Diefenbach & Cunliffe, 2014) and to highlight the Autonomous Livelihood Framework as a standalone contribution beyond its application to this research study.

The Transdisciplinary Wheel is a heuristic device that portrays transdisciplinary research as a function of three key elements being:

- (a) Context: divided between Problem context and Research context
- (b) Processes and
- (c) Products

The Transdisciplinary Wheel shows these elements as dynamic, non-linear and iterative. Whilst Carew and Wickson's (2010) focus on the role of researcher, I use the Transdisciplinary Wheel to explore the process of novel framework development and the various iterations, practices and design elements that were considered.

The Process Loop

The first loop of the Transdisciplinary Wheel is that of process. Carew and Wickson (2010) argue that the key features of process in transdisciplinary research manifest idiosyncratically as they inherently emerge from context—

that is, engagement with stakeholders, collaboration, ongoing adaptations, integration novel methods and intentional iteration. I have chosen to draw upon Hibbert et al. (2014) three key stages to developing novel theories to give structure to describing the processes undertaken in developing the Autonomous Livelihood Framework (these are illustrated in Figure 8 Adaptation of the Transdisciplinary Wheel). These stages are:

- (a) Pre-research conceptualisation
- (b) Emerging theorisations in the process of conducting research and
- (c) The refinement of theory in its context.

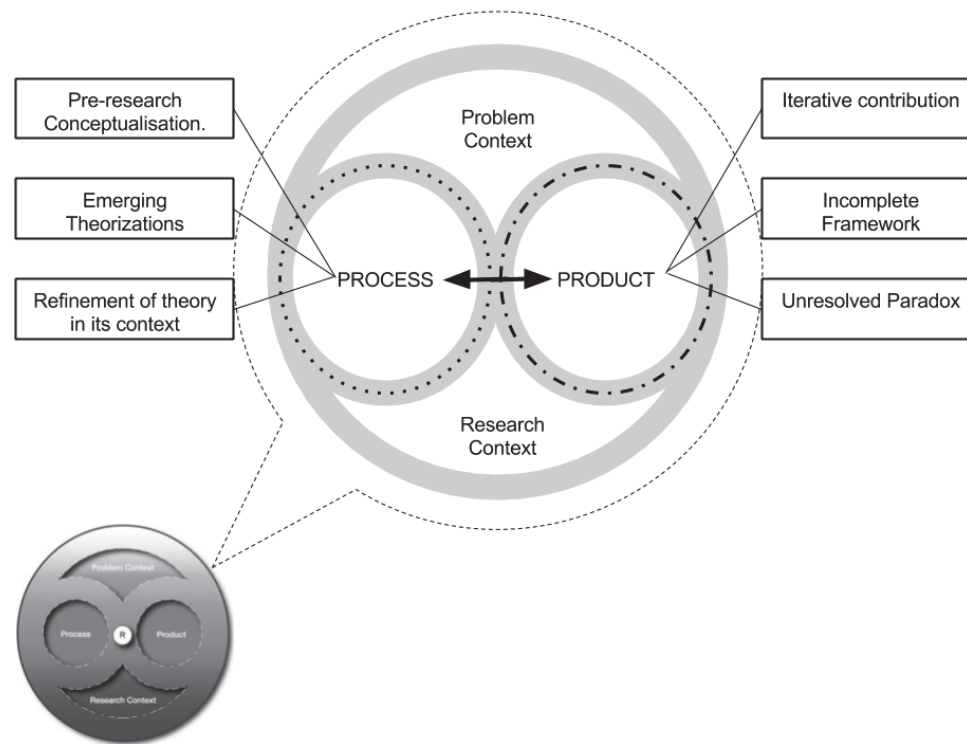


Figure 8 Adaptation of the Transdisciplinary Wheel

(Carew & Wickson, 2010, p.1150)

Stage 1: Pre-research Conceptualisation:

As a Doctoral Researcher initially focused on the broad problem area of smallholder farmers in biofuel production and committed to a collaborative research process, Hibbert et al's (2014) proposal that researchers should be open to challenging their own world-views through scholarly conversations and moving beyond conventional knowledge communities resonates strongly with my scholarly experience. Specifically, finding an academic institute that embraced a transdisciplinary problem-centred approach, rather than a discipline-centred approach, was significant as it allowed the scholarly space and freedom within the study for emerging insights, serendipity and a partial suspension of conventional practices for an emerging-theory-in-development. At the pre-research conceptualisation stage, I was granted the freedom to undertake scoping visits to Brazil and Timor-Leste to negotiate with potential collaborators and co-researchers before the formal requirements of a specific research design. This allowed the research design to reflect and accommodate external input.

Stage 2: Emerging theorisations in the process of conducting research

This study was designed to ensure that emerging theorisations in the process of conducting the research were relatively easily incorporated into the research. For example, a transdisciplinary approach that was sensitive to evolving methodology, Action Research Methods that supported reflexive thinking and the ongoing adjustments to research tools, and Grounded Theory

Method which incorporated inconsistent and contradictory findings as potential future themes or components. This meant that there was an inbuilt level of flexibility and expectation of change throughout the research process.

However, there was a frustrating pause in this research process whereby it was clear that the Sustainable Rural Livelihood Framework was inadequate — but I was unfamiliar with the notion of autonomy and lacked the language and conceptual basis to adequately articulate the emerging theory. I experienced *stagnation* in the research process. This stagnation is important to acknowledge, as despite high levels of inbuilt flexibility and openness to emerging insights, the actual process and steps from *insights to framework* required a combination of creative engagement and systematic research skills.

As such, the development of the Autonomous Livelihood Framework was not a simple outcome from sorting data and coding data into themes, categories and making memos. Indeed, the creative and innovative stages of imagining a novel framework were *un-codable* and embodied in myself as a researcher through ongoing processes of thinking, reflecting, sketching, talking, imagining and dreaming. To move beyond the period of stagnation I used promiscuous analysis (see Section 6.6) as a way to engage in deep reflection on the data and the sense-making process. At this time, I serendipitously read Schneider & Niederle's (2010) work on Brazilian family farmers and was thus introduced to the work of van der Ploeg (2008) and the concept of autonomy.

Stage 3: Refinement of theory in its context

Once introduced to the idea of autonomy, I found that it allowed for recognition that smallholder farmers are active agents in making choices within the social, political and historical structures in which they are embedded. In this way the actual outcomes of the farmer informant decisions were less important— for example, to participate or not-participate in the biodiesel schemes— because different choices could still be considered analogous through the lens of autonomy.

It was the act of making a choice and following it through contributed toward negotiating for autonomy. Indeed, this use of autonomy aligns with framing biodiesel schemes as a wicked problem. It leads us away from the notion of ‘specified outcomes’ and toward the incorporation of layperson knowledge in order to better explain and interpret the social question of biodiesel schemes.

Through the incorporation of an autonomy lens — that at its core is a complex set of relations between the individual and society — the interpretation of livelihoods widens to allow for any number of variations of opting in, opting out, re-purposing or resisting biodiesel schemes, in a way that is temporally and spatially dependent. Autonomy in this sense does not equate with notions of individualism. Using a structuration approach, autonomy can only ever be exercised, negotiated or enhanced within the bounds of the social structure, acknowledging that structure itself is not static and is changed by the exercise of autonomy.

In this way, incorporating autonomy with a Sustainable Rural Livelihood Framework allows for re-centring the farmer within any analysis of

their livelihood and accept that decisions, strategies and use of resources may be messy, contradictory and irrational and prioritise facets of human life that have largely been overlooked by conventional livelihood approaches such as emotion, social obligation, identity and sense of self. The incorporation of the autonomy lens also spanned the two country research sites. Though from vastly different contexts, the farmer informants narratives aligned with Stock and Forney (2014) assertion that “Farmers, regardless of national context, emphasized autonomy ... as an important virtue and tool.”(p.164) ⁵⁹.

The integration of autonomy and the Sustainable Rural Livelihood Framework into a coherent framework underwent several iterations where I looped back and forth between analysis, theory refinements and sense making through writing. The various iterations involved conceptual refinement on how the different components related to each other — both conceptual disentangling and reconnection.

The development of the framework involved pragmatic scholarly decisions — in particular the location of certain elements. For example, agency is a key part of autonomy and its separation in the Autonomous Livelihood Framework may appear theoretically idiosyncratic. However, there are also established scholarly discussions about agency and social structure (e.g. Giddens, 1991) — as such I decided, in light of the farmer informant narratives in this research project, that agency was better situated ‘outside’ of autonomy as it was the interaction between Agency–Structure–Capitals that was paramount. These decisions are reflected in the graphical representation of the

59. I discuss whether farmer informants considered themselves as negotiating for autonomy later in Chapter 9

framework development — see Annex 15: Iterations of Autonomous Livelihood Framework Development.

Theoretical Considerations: Incorporating autonomy

One of key considerations of developing the Autonomous Livelihood Framework was the way that the concept of autonomy would be used and defined. Van der Ploeg's (2008) approach to autonomy is theoretically light in that his use and articulation of autonomy is not strongly tied into scholarly discussions about the nature of autonomy (Edelman, 2011). Further, van der Ploeg (2008) operates under several assumptions about the new peasantry's choices and behaviour that leaves limited room for the contradictions and pragmatism of the ways smallholder farmer's negotiate their autonomy that was present in this empirical research. I wanted to illustrate how the farmer informants participated and resisted simultaneously, showing the inherent messiness of negotiating autonomy— messiness that van der Ploeg seems to largely overlook.

Van der Ploeg (2008) does not explicitly recognise it in his writing on autonomy but much of his argument about autonomy draws on the agency–structure debate. Ethnographers, anthropologists and sociologists have long theorised on questions of agency and structure and the ways that the messiness of human lived experience is interpreted, analysis and represented. Scholars such Abu-Lughod (2000) emphasise that we must move away from a type of fetishisation of other people: "... [we must not] turn people in it into something object-like, coherent, whole and separate from ourselves:" (p.262) and instead recognise the counter-discourse that "... everyone is different, that people are confused, that life is complicated, emotional and uncertain" (p.263).

In addition, in van der Ploeg's (2008) repeasantisation there is an assumption that peasants want to be free from Empire and state-intervention. Yet as elaborated later in the Discussion (Chapter 9), in Timor-Leste the farmer informants saw a specific role for the state — and in some cases state intervention was anticipated and expected as positive act of social obligation. I find the use of Empire one dimensional and lacking in way to account for the farmer narratives in this research that aligned more closely with approaches that recognise the smallholder farmers' framing as essential to the ways that agrarian change occurs

change arises not only from shifting conditions in the farming system or its context, but also from the framing of the system by the farmer, in other words, how a farmer perceives and conceptualizes the potentials and limits of his or her farm, the risks emanating from economic, social or ecological changes, and the options that he or she can employ to face them.”(Darnhofer, Fairweather & Moller, 2010, p.192).

I explored at depth the possibilities of incorporating comprehensive definitions of autonomy — such as the work by Stock and Forney (2014) who articulate an integrated conceptualisation of autonomy centred on self-congruence, independence, power to decide and identity of a ‘farming self’. However, as the interview tool was based on the Sustainable Rural Livelihood Framework, I made the pragmatic decisions to not to emphasise the broader philosophical discussions about autonomy, as I did not have:

- (a) Farmer informant narratives that aligned well with the multi-faceted nature of autonomy and
- (b) An ‘autonomy-heavy’ lens would have shifted the focus away from the core research question of smallholder farmers in biodiesel schemes.

Forging a new framework

I kept aspects of the Sustainable Rural Livelihood Framework (Scoones, 1998) — notably the concepts of Livelihood Strategies and Livelihood Resources (capitals) as they provide a strong framework for the farmer informant narratives. I discarded the concept of Sustainable Livelihood Outcomes as I thought it poorly theoretically developed, compiled of irrelevant sub-categories — such as a “increased number of working days created” (p.4)— and value laden in attempting to address the question of sustainability. I also disregarded the sections “Institutional Process & Organisational Structures” (ibid.) and “Contexts, Conditions and Trends” (ibid.) as these were too broad to be useful and superseded by a focus on Context (i.e. structure) in the Autonomous Livelihood Framework.

Hibbert et al (2014) argue that the third stage of refining theory in context should involve input and open collaboration with “...broad practitioner audiences...[and that]...emerging theory will integrate the researcher’s “reflective conversations with the data” within a pattern that is a shared creation between researcher, research participants, and research “users.”” (p.288). In this way, I have engaged with broader audiences through conference presentations (Kilham, 2014a) and ongoing dialogue with academic

supervisors. This thesis also represents part of the ongoing conversation about the utility and configuration of the Autonomous Livelihood Framework.

6.8 The author as researcher

This section discusses how the research approach, design, interviews, analysis and thesis writing were all essentially *personal* experiences for myself as a researcher. I have written this section as a reflective, subjective account — there is much of myself (author) as the researcher in this section, indeed a level of *attachment* as opposed the *detachment* that is usual of academic writing. This has been a purposeful choice as part of my research practice involved reflexive practice — specifically, an awareness of my own influence on the ‘meaning making’ aspects of the research.

A risk with reflexive practice is that it can privilege the researcher’s experience or crowd out the participants experience (Olesen, 2007). Indeed, that was real risk with this thesis and the balance of weaving both the reflexive practice and the thesis narrative together was a tenacious one. However, I also acknowledge that as I made meaning throughout the research process and underwent a process myself of *becoming a researcher*. I kept extensive research journals and notes, including objective facts such meetings dates, times, places and people, but also subjective thoughts, reflections, questions to self and mapping shifts in my own assumptions and conceptualisations as the research progressed.

As an undergraduate I trained in social science, so began this doctoral research with the view that qualitative research is subjective and that the self cannot be removed from the research activities. Nevertheless, I was

underprepared for the intimately personal experience of doctoral research. My development as an academic, writer and researcher involved a change in my sense of self and identity. Indeed, it was not until I stumbled across the work of Kamler and Thomson (2014) and their focus on "...textwork / identitywork..." (p.17). I had the language to express the tensions in the transition to becoming a researcher. Namely that "When doctoral researchers write they are producing themselves as a scholar... the doctoral candidate... is being inducted into a community of practice..." (ibid.)

My personal life events during the research project meant that I had several periods of leave of absence from my studies. These periods of leave from my doctoral research were highly essential and highly disruptive. Essential in that as a female academic I have a role, obligations and desires outside of academia that required my full attention. I embrace the feminist idea that "Care work is work. It is not self-indulgent; it is radical and necessary..." (Mountz et al., 2015, p.1238).

Institutional and organisational policies aimed at doctoral researchers assume high levels of productivity, mobility and academic speed (Mountz et al., 2015) and have limited resources available at postgraduate level to ensure equity to achieve these outcomes. Despite my social privilege, combining my care role with my development as a researcher has been arduous at best and despairing at times. Initially, this experience was highly isolating both as an individual and as a researcher. It was through academic communities on social media and academic blogs⁶⁰ that I was able to consider my experience as a part

60. See for examples: feministkilljoys.com / phdisabled.wordpress.com / thesiswhisperer.com

of larger system and to re-focus on my researcher development through embracing the idea of slow scholarship: “Given the chance to marinate, ideas ripen, often resulting in some of our most thoughtful, provocative, and important work. Good scholarship requires time: time to think, write, read, research, analyze, edit, and collaborate” (p.1237)

My periods of leaves of absence were disruptive in that familiarity with the empirical data tended to fade during my leave and I spent significant amounts of time re-familiarising myself with up-to-date literature, re-writing large components of the thesis as the conceptual framework shifted and ensuring that I was immersed in the empirical data on my return to study. Over this time, I moved from attempting to work with an existing conceptual framework toward developing my own conceptual framework.

Interpreting and aligning the farmer informants’ perspectives into a conceptual framework was a challenging and ambiguous task — made more complicated by the diverse locations, cultures and languages of the farmer informants. Interviews from Brazil were transcribed in Portuguese and interviews from Timor-Leste transcribed in Tetum — meaning that I could not use language-based shortcuts of Nvivo as I was essentially working across three languages (English, Portuguese and Tetum).

Conceptually, I started writing the thesis before completing the software assisted analysis. This was in part to follow the advice that “ Insight develops as a consequence of writing because thinking and writing are inseparable processes ” (White, 2011, p.153) and using the time of writing to develop the non-linear connections I could sense in my data to the linear, sequential, monologic written form (ibid).

This negotiation of roles and co-construction of data was highly evident throughout the study. As a relatively young, foreign, white researcher from the Global North, I was highly conscious of how the farmer informants would perceive me and my role and the ways in which their responses could or would conform to the observer effect or participant bias (Merriam & Tisdell, 2015).

Whilst embracing the notion of co-construction of data, I also wanted to avoid an extreme version of responses that were tailored to preconceived notions of what a foreign white researcher would be seeking through interviews with smallholder farmers. As an outsider, I felt the need to collaborate with an insider and designed the research based on collaboration with in-country local researchers (see Section 6.3). In addition to mitigating against farmer informants bias, I was aware of the need to mitigate against my own preconceived notions and world-view about smallholder farmers' experiences and values in the context of biodiesel production. This mitigation was primarily done through reflexive practice and involved conceptual and ideological shifts as a researcher.

Finally, the research was a learning experience for myself as a researcher. I used unfamiliar interview techniques such as video recording for later editing into mini-documentaries. My aspirations and goals changed as I encountered situations during the in-country fieldwork that I had not planned. Notably, the death of a colleague in Timor-Leste and subsequent shuffling of responsibilities amongst academic staff meant that I had no local counterpart to conduct interviews with — requiring a significant shift in my approach and an internal compromise that I could undertake interviews as the sole researcher without undermining my overall research approach that valued collaboration.

6.9 Chapter Summary

In summary, in this chapter I have outlined the overall research design, providing both a chronological account of the key stages as well as an explanation of the ways that a transdisciplinary approach informed the research design through a problem focus, collaboration and evolving methodology.

I then described in detail the processes of creating data in Brazil and in Timor-Leste, highlighting collaboration, recruitment of farmer informants, the interview processes and preliminary analysis in a location-specific manner.

I described the process of data analysis with Grounded Theory Method and promiscuous analysis and emphasised how this led to the development the Autonomous Livelihood Framework.

I drew on Carew and Wickson's (2010) Transdisciplinary Wheel to discuss the process of developing a novel framework. This process has been documented and included in this thesis to support the assertion that the development of the Autonomous Livelihood Framework makes a scholarly contribution to rural development debates.

Finally, I provided some explanation of author as researcher and located my influence and reflexivity on these research processes.

Chapter 7: Brazil: Empirical Findings

7.1 Introduction

In this chapter, I present empirical data from farmer informants located in Bahia, Brazil. As an interpretive chapter, I present the empirical data through verbatim quotes, paraphrasing and *thick description* to enhance and facilitate understanding of smallholder farmers' experiences and perceptions as it relates to negotiation autonomous livelihoods in the context of participation in biodiesel schemes. Thick description was considered a necessary tool as quotes alone fail to capture the full breadth and depth of the interview context. That is, context that was discussed during the interview (and is thus evident in the transcripts) as well as farm visits, the researcher's reflections on the interview and context gleaned from the literature.

In presenting the empirical, the Autonomous Livelihood Framework (Chapter 5) is used as the structuring framework to identify, illustrate and interpret responses across all farmer informants — however, not all farmer informants' responses are recorded under each component. This would render the empirical chapters unwieldy. Several activities are cross-cutting and there are intersections between the four components of Livelihood Strategies, Capitals, Agency and Structure. I acknowledged these intersections and report on material just once. Sub-sections of each component are based primarily on the outcomes from using Grounded Theory Method during the data analysis. These sub-sections are listed in the following table:

Component	Sub-Component	Brazil Specific
Livelihood Strategies	Pluriactivity	
	Diversification	
	Enhancing an independent resource base	Auto-consumption De-commodification Internalisation of Productive Resources
Capitals	Social Capital	Access to Information Family Support Networks The limits of Social Capital
	Human Capital	Experiential Knowledge Technical Assistance
	Financial Capital	Credit Schemes and Bank Loans Liquid Assets
	Physical Capital	
	Ecological Capital	
Agency	Resistance Identity	Decision-Making Experiential Knowledge
Context	Social Values Social Differentiation	

Table 3 Brazil Specific Sections of the Autonomous Livelihood Framework

As a qualitative study, this thesis attempts to present a range of views and perspectives. As such, this empirical chapter does not seek to have multiple informants necessarily agreeing or converging. Indeed, given the small sample size, the experience and perception of just one individual is considered an important gateway to opening discussion about autonomy, livelihoods and smallholder farmers. A central premise of this thesis is that smallholder farmers are not homogenous, either in their identity or in the ways that they negotiate and employ strategies to enhance their autonomy. As such, they value and prioritise different aspects of autonomy depending on personal circumstances that are in temporal flux. Where there has been convergence or divergence on

certain dimensions, these are discussed and quotes used to exemplify my arguments.

I have not addressed explicitly as separate sections how these four components ‘come together’ under the overarching theme of autonomy in this chapter. This chapter is focused primarily on farmer informants’ own accounts, although at times I apply an analytical lens and relate specific accounts to the negotiation of autonomy. The Discussion (Chapter 9) provides a richer exploration of autonomy in relation to the empirical material.

Farmer informants’ quotes are presented in italics with the farmer informants’ name, gender and the biodiesel feedstock crop as an identifier.

This Chapter is organised as follows:

Section 7.2 provides a brief background to rural livelihoods in Bahia and the policy context of the PNPB

Section 7.3 reports on the livelihood strategies, being pluriactivity, diversification and enhancing an independent resource base.

Section 7.4 explores how the five capitals (Social-Human-Financial-Physical-Ecological) serve the three functions of instrumental, hermeneutic and emancipatory for the farmer informants.

Section 7.5 discusses agency in terms of decision-making, experiential knowledge and resistance.

Section 7.6 briefly covers the specific aspects of Context of the farmer informants that were not captured in any earlier components.

Section 7.7 discusses how autonomy was expressed by the farmer informants; and the link between negotiating for autonomy and the PNPB.

7.2 Brazil: Context of the Study

The PNPB can be considered in the context of the Brazilian Government's approach to rural development, agrarian policies and the historical patterns of social relations involving smallholder farmers within Brazilian society. As I assert in the Autonomous Livelihood Framework, I align with a relational view of autonomy that considers an individual's agency as interdependent on the social structure in which they live (see Chapter 5). This broader context forms the base for the empirical and discussion chapters, and in order to develop an answer to the research question of *How can we explain smallholder farmer' participation in biodiesel schemes as part of a rural livelihood in Brazil and Timor-Leste*, it is first necessary to provide some context to the broader rural livelihoods of the farmer informants. This section will provide a succinct historical overview of smallholder farmers and the transformation of rural livelihoods in Brazil, in particular the shift toward capitalist commodity markets.

Colonial Brazil has conventionally been defined by the notion of slave-dependent *fazendas* (elite controlled large estates) and export oriented agricultural production — consequently defining all aspects of political, cultural and social life in Brazil through class and race distinctions partly linked to modes of agricultural production (Schwartz, 1996). In Bahia, slaves were concentrated on sugar plantations and with the abolition of slavery in 1888, the elite of Bahia resisted social change and rural relations of power largely continued with minimal disruption through the “...Conversion of slaves to dependent and subordinate rural workers...” (Kraay, 1998, p.10)

The historical significance of slavery defined rural livelihoods and in particular, the development of a patriarchal economy structured to benefit landowners, elite and the aristocracy (Robles & Veltmeyer, 2015). However, this conventional view of Brazilian colonial history is partly based on stereotypical notions and over-emphasises the importance of *fazendas* (estates) and export-oriented agriculture to the detriment of acknowledging the importance of internal markets and smallholder farmers (Schwartz, 1996).

Indeed, smallholder farmers have largely fed the Brazilian population and "...[are currently] responsible for 70 per cent of beans, 87 per cent of cassava, 38 per cent of coffee, 46 per cent of corn, and 34 per cent of rice produced in Brazil" (Fernandes, 2013, p.284). Further, the ethno-ecological knowledge of African slaves transformed Brazilian landscapes and practices — for instance, African palm oil is now central to subsistence and commercial production in the Northeast (Watkins, 2011). The significance of this is that it creates a paradox — smallholder farmers have historically been excluded from political and social power but are central to the agro-ecological sustainability and food security of the nation.

Throughout the 1900s, the state focused on the transformation of subsistence economies toward an agricultural export model that benefited large producers (Pereira, 2003; Wittman, 2009). There was a push from the state to commercially integrate regions that were contested by rebellious country folk (Portuguese: *sertanejos*) and industrialised agriculture was increasingly seen as a way to socially control rural and peasant social movements (Oliveira, 2015).

In the push for agricultural modernisation, the rural northeast household became increasingly marginalised and 'left behind'. This took place both

literally, as waves of people from the Northeast (Portuguese: *Nortedestinos*) travelled south to be migrant labour on the booming sugar cane, soy and construction industries in metropolis' such as São Paulo, and also metaphorically as development was synonymous with mechanisation and links to international trade. Indeed, in Bahia state intervention acted as a market distorting policy as support was provided to large-scale, exportable agricultural commodities and industries which would have gone into decline and freed land for smallholder farmers and alternative agricultural production (de Sousa, Singer & Flinn, 1985; Gomes, Bittencourt & Dufumier, 2011; Pereira, 2003).

In this situation, smallholder farmers were structurally disadvantaged. By 1990, one third of the rural population was living below the poverty line and around 10% of the population owned 80% of productive land (Fernandes, 2013). From the government's perspective, there was no place for smallholder farmers in the modern Brazilian agro-industrial model of agricultural production. Marginalisation and social exclusion were accepted as inevitable consequences of a modernising economy and state (Pereira, 2003). It was in part this lack of state action that by the 1990s, led to the rise in social movements, especially around agrarian reform and the rural poor "... these 'family farmers ... have become an increasingly active social force, competing for public resources and social legitimacy with the so-called 'agribusiness' ...'" (Schneider & Niederle, 2010, p.383)

In Bahia, government subsidies to support agro-modernisation since the 1970s have had particularly harsh outcomes for smallholder farmers — land-grabs, evictions and violent conflict over land became common place and the government's support to rich absentee estate (Portuguese: *fazenda*) landlords

was used to reinforce political and social hierarchies (Caldas & Perz, 2013). Despite agrarian reform agendas, the process remains sporadic, poorly funded and under-resourced internally and it is only through the pressure and continued active participation of civil society actors that the state fulfils the most basic of its remit in regards to agrarian reform (Wolford, 2010). In addition, agricultural modernisation policies have pushed expansion and intensification into the savanna grass lands (Portuguese: *Cerrado*) region and more than 1.5 million hectares of savanna has been transformed into farmland — primarily large farms with low levels of workers (Spera, Mustard & VanWey, 2014).

As such, smallholder farmers in Bahia have largely “.... only been able to subsist in areas abandoned by large farms for ecological, economic, or social reasons...” (Gomes et al., 2011, p.2). Poverty, malnutrition and extreme land inequality remain commonplace in Bahia. With a high concentration of smallholder farmers there are approximately a quarter of the population living in rural areas and half of these aged 24 years or younger and although poverty has been dropping over the past decade, nearly 40% of the state’s population remains food insecure (Brazilian Institute for Geography and Statistics (IBGE), 2003, 2009, 2013; Dal Belo Leite, Bijman, Giller & Slingerland, 2013).

The historical goals and outcomes from state-led policies in relation to agricultural and rural development provide important context to interpreting the current PNPB and smallholder farmers in Bahia. This broader context explains why the PNPB included a particular focus on the Northeast of Brazil. In particular, with the election of President ‘Lula’ from the Workers Party (Portuguese: *Partido dos Trabalhadores*: PT) in 2003, the emerging

government agenda was (in theory or rhetoric) focused on national poverty reduction and support to *campesino* (peasant) agriculture. The PNPB was a key policy that purported to ‘rectify’ the mistakes of past agricultural policies by ensuring the integration of smallholder farmers and was strongly supported by civil society organisations such as the Landless Movement (Portuguese: *Movimento sem Terra*; MST) who considered the PNPB as a peasant (Portuguese: *campesino*) friendly policy (Stedile, 2007).

7.3 Livelihood Strategies

Through the use of Grounded Theory Method, the main livelihood strategies that I present are:

- (a) Pluriactivity
- (b) Diversification
- (c) Enhancing an independent resource base

These align with van der Ploeg’s (2008) peasant principle.

Pluriactivity

Pluriactivity refers to non-agricultural income or activities performed by farmers — although in the Autonomous Livelihood Framework I adopt a broader definition that includes income from agricultural labour for others. Contextually, pluriactivity could be considered an integral part of life for smallholder farmers in Northeast Brazil, as historically access to ownership of land by smallholder farmers has been tenuous, meaning that alternate sources of income and activities form part of the norm. As noted in the section on Context (Section 7.2), smallholder farmers have traditionally worked as labour

on *fazendas* as paid or indentured labourers — often permitted to farm smaller plots for self-sufficiency outside of their formal plantation duties.

Many of the farmer informants had spent time as itinerant farm labourers or as urban dwellers and had opted for a life as a smallholder farmer. As such, being a smallholder farmer was part of a livelihood in flux — both temporally but also spatially and in terms of identity and notions of self.

Pluriactivity across the lifespan was the norm rather than the exception amongst farmer informants. Farmer informants such as José initially worked in the agricultural sector but not as an independent landowner:

“When I got married I was earning my money by working [as a labourer] on someone else’s farm, before I bought my own farm.”

José [M] Sunflower

Whereas others reported themselves as itinerant labourers:

“... At the time we didn’t have much that we could do, sometimes we were living on the street. I came from a very poor family...”

Raimundo [M] PNPB non-participant

Edvalice’s account illustrates how pluriactivity is linked to farm ownership and as essential financial strategy

“[My parents] had a small [plot of land], but at least they had it. Because he [my Dad] bought this area when he had nothing. He had a cottage, and then he sold the cottage, he exchanged it for a donkey. My Mother still says to this day that he was going to sleep underneath that donkey. So, he exchanged [this land] for the donkey, and then he went and bought a small plot of land, said it was larger, but to be able to pay for it, he had

Sunflower: Edvalice's Case

The local PNPB cooperative encouraged Edvalice's family to grow sunflower. Edvalice's eldest son took a bank loan in order to buy sunflower seed from the cooperative and they planted several hectares. Edvalice's family was unfamiliar with sunflower as a crop and they did not know:

- Harvest rates per hectare
- Companion Planting recommendations
- Farm gate prices post-harvest

Pre-harvest, the sunflower crop was destroyed by migratory birds. Edvalice's family had contacted the PNPB Cooperative agricultural technician seeking advice, but he did not know how to control the birds or protect the crop as it was new to the region.

With no harvest, Edvalice's son was unable to pay back his loan and he migrated to São Paulo to work as a labourer to fund his bank loan debt.

Edvalice decided in the subsequent year that she would plant sunflower herself with no bank loan. Edvalice (contrary to the PNPB cooperative advice) had saved some seeds and used these to plant her next crop. Edvalice experimented with a small plot first. After migratory birds attacked the second crop, Edvalice decided not to continue.

to go to São Paulo to earn money there, he was working as a bricklayer, to pay off this plot of land.” Edvalice [F] Sunflower

Box 3 Sunflower: Edvalice's Case

Although in this instance Edvalice was discussing her father, the livelihood strategy of working interstate for remittances continues to be a part of rural life for the families of the farmer informants. At the time of the interview, Edvalice's young adult son was away working in São Paulo in order to pay off-farm debt associated with the PNPB (see Box 3 Sunflower: Edvalice's Case).

Certainly, leaving the farm for wage labour in other states was a reoccurring theme from farmer informants and this off-farm wage labour was linked with on-farm activities. For instance, Edvalice's son borrowed bank

funds to invest in sunflower seed for biodiesel. After a failed sunflower crop and unable to fund bank repayments from other crops such as beans due to a dry year — he too left to work in São Paulo

... But to be able to make the repayments he [my son] had to go to São Paulo to earn money there; he is working as bricklayer, to pay this piece of land...

Edvalice [F] Sunflower

Like other farmer informants, Preto had gone interstate (notably to São Paulo) several times since his mid-teens to spend time working away in labouring positions to gain a wage. Preto explains that his motivation for his first foray working interstate as a 15-year-old was primarily his desire to “*have things*”.

“The first time that I left I was 15 years old, I left, I went to São Paulo... because of the financial question and also because I wanted new things, because when we are this age we all want new things. The main thing that made me come back, each time was my family, because I missed them you know? And as well as that the tranquillity that we people have here in the rural areas, it’s another [type of] tranquillity, people are more friendly and there is not as much violence...”

Preto [M] Dendê.

Preto’s leaving to seek waged employment and his return to the farm show the complex and intersecting factors related to pluriactivity. In part, Preto is choosing to seek off-farm employment but he also driven by financial circumstances beyond his control. Preto’s ability to earn a wage gives him a certain autonomy or freedom from dependence on market access for on-farm

income or access to farm finance. In this way, off-farm work (that is, pluriactivity) is an important strategy for supporting a farming livelihood.

For some farmer informants, pluriactivity was a deliberate and considered strategy.

“You need to look for something external to complement your income from agriculture right; it was for this reason that I went and started working but I’m still good because I get to work with farmers and I’ve never had to go to the city to work. I work daily with farmers.”

Carla [F] Community Mobilizer

As a young woman, Carla’s pluriactivity is notable as she works as a community mobiliser for a state-funded water project (waged income), and as the President of a local agriculture association. Indeed, Carla has endured some criticism of her ability as a woman and as a young person to represent the community, highlighting the difficulties that female smallholder farmers face when opting for non-traditional roles.

“I suffered prejudices [and] I still suffer now — a lot of people do not trust my work, do not believe [in me] because I’m a woman and because I’m young right [and] because, generally, the president of the association is forty or fifty years old and I at twenty-five was elected president of the association! Then a lot of people said: this girl is very young: she will not be accountable; she will not be able and a woman can’t travel and a woman can’t be our representative of a community of this size.”

Carla [F] Community Mobilizer

Carla's role as a leader in her community contributes toward her autonomy in many facets. Carla is using her pluriactivity not only as a financial survival technique but also as a way of developing her individual identity, human capital, and social capital within her community. Pluriactivity allows her to continue a connection with her farming livelihood and to experience financial and social independence.

For this group of farmer informants, pluriactivity was an important livelihood strategy that increased their autonomy, either through providing income that supported their farming activities, or through developing their own skill set or for meeting specific needs at a certain time.

Whilst participation in the PNPB would not strictly be considered part of pluriactivity as it is an activity that involves on-farm activities, rather than alternative off-farm activities, nevertheless it would appear that pluriactivity as a norm certainly influenced the farmer informants' perception of the PNPB. The majority of farmer informants were accustomed to undertaking a variety of activities that mixed on-farm and off-farm income and labour. In this sense, the PNPB was perceived as another possible avenue for income generation. This leads to the next section, which discuss on-farm diversification.

Diversification

Diversification can be considered a sub-group of pluriactivity and diversification is typically associated with activities undertaken based on the farm's land or other resources (Blad, 2010). Diversification can be considered in both agrarian terms, such as diversification of crops and livestock, as well as diversification of livelihood strategies such as value-adding on farm or

accessing different markets. Diversification of a farmer's resource base and livelihood strategies can strengthen their overall autonomy as it moves away from dependency on one particular crop or economic activity (Schneider & Niederle, 2010). Diversification allows for risk to be spread across multiple assets and strategies and reduces vulnerability to dependency and deprivation (van der Ploeg, 2008).

In this research, on-farm diversity was considered essential by farmer informants for food security, resilience to market and climate fluctuations, as well as ensuring social reproduction and cultural life of communities.

“I've lived here for 24 years, and we plant a little bit of everything because our land is small, but we have experience in everything, we have beans, corn, cassava, cashew, palm, we have a little bit of everything. Last year we planted sunflower too...”

Edvalice [F] Sunflower

Current diversification strategies were particularly associated with farmer informants' past experiences. Farmer informants were asked if they had ever passed through a crisis or difficult time on the farm, and if so, what strategies did they use to survive these times. Farmer informants reported past occurrences in relation to household food security associated with crop failure, extreme weather conditions or market gluts.

Diversification strategies used by farmer informants included having a variety of crops planted both for consumption and for income generation. Many of these diversification strategies intersect with other aspects of the autonomy framework. For instance, exchanging food with neighbours fulfils the function of building social capital with neighbours and extended family,

and serves the function as a livelihood strategy. Several smallholder farmers spoke of swapping food with neighbours — in particular, staples such as beans and cassava flour (Portuguese: *Farinha*).

The majority of farmer informants considered a diversified base important and desirable but being able to diversify successfully was met in varying degrees of success depending on a variety of factors. For instance, Antônio and Carlos were farmers on a land reform settlement established on what was previously a large cocoa estate. The majority of farmers on this settlement were landless peasants and the settlement had only been established for around eight years. Antônio and Carlos spoke of the difficulties in accessing financial capital to invest in agricultural diversification — a strategy that they considered as essential but difficult given the degraded conditions of the soil. Indeed, they emphasised that the cocoa crops were the most successful produce.

However, the settlement was successfully growing many varieties of food including cassava, local tropical cultivars such as *cupuaçu*, guava, several cultivars of banana and small amounts of bean and corn.

Personal accounts from farmer informants suggest that diversification was seen as an important livelihood strategy

“Our source of income? Like I said, there are few. Before when we had no other security, it was cassava, corn, bean, pumpkin, pineapple, passionfruit, long bean, string bean, all the plants that are easy for us, and in 90 to 120 days are giving us sustenance. And then, we collect, eat, take them out [to market], sell those that can be sold and this is the way things go, right? We peel the cassava, make cassava flour, make

cassava pancakes from the cassava gum, make little cassava cakes from the dough; everything is income, everything is sold there in the city and with everything we survive.”

Raimundo [M] PNPB non-participant

José’s account also supports diversification as an important financial strategy.

“You can’t invest everything in cassava, or bean; you can’t repay your loans. My Dad took many loans and each one revolves and you need to get involved in different things. This is what we’ve always done — been prepared...”

José [M] Sunflower

Importantly, it should be noted here that José’s account supports the idea that diversification has long been a strategy of smallholder farmers. Farmer informants’ narratives referred to the multiple benefits of diversification from managing risk by ensuring diversified crops that will thrive under different conditions, ensuring variety for consumption (and thus health) and providing different sources of income in a way of living that by its very nature is unpredictable.

Some farmer informants saw participating in the PNPB as a diversification strategy. For instance, Reinaldo talks about his community’s participation in the PNPB as a diversification strategy. People in Reinaldo’s village were participating in the PNPB as one of their many on-farm activities

“Everyone here knows about biodiesel, only that no-one has a strong conviction or feels like “I’m going to work only in this...” they just plant a little here [or there].”

Reinaldo [M] Castor Bean

In fact, Reinaldo's account shows an interesting dismissiveness toward the PNPB and its importance in terms of contribution toward on-farm income.

“No-one really wants to work in biodiesel, there is no-one here that feels ‘I’m going to work hard to increase production for this program’ — there is not this conviction here. People just sell [their castor bean] to the local broker.”

Reinaldo [M] Castor Bean.

Diversification and pluriactivity and the normative role that these strategies play in the lives of these farmer informants can provide important insights to farmer's participation in the PNPB. Indeed, participation in the PNPB can be considered one of the many activities that some farmers are willing to undertake to diversify their risk and potential income sources. However, the PNPB was not considered the *primary* strategy of diversification for any of the farmer informants, and indeed in some cases the farmer informants prioritised local relationships, established cash crops or simply decided that the risk was unviable for their farm and did not participate in the PNPB.

Enhancing an Independent Resource Base

This section will consider how farmer informants used strategies to enhance an independent resource base through a variety of ways including auto-consumption, co-production and internalisation of resources.

Auto-consumption

Auto-consumption is the production of food for consumption by the farmer and their family. This includes variations on auto-consumption, for instance, gifting or trading food with family or within an immediate social network could also be considered auto-consumption. Unlike Schneider and Niederle (2010) case in the south of Brazil, whereby farmers were ‘returning’ to auto-consumption, many farmer informants in Bahia had maintained auto-consumption habits either through necessity, choice or a combination of both. Farmer informants who were willing to experiment with new crops and produce crops for income, continued to produce crops for auto-consumption even at a financial loss. This was in part due to on-farm risk management and as a livelihood strategy.

“...Even with the cashew trees producing well, I can’t say no to corn and beans, cassava, because these are the small things that make up our daily necessities. Beans haven’t been that productive this year, and also they are cheap, but we’ve still got to plant them right? To eat. But the beans here this year are only getting R\$30 a sack. It feels hard to sell a sack of beans, that’s 50kg of beans for just r\$30. It’s ridiculous.”

Edvalice [F] Sunflower

In Edvalice’s account, planting and consuming corn, beans and cassava was integral to her farming practices. Edvalice used on-farm animal manure to fertilise her crops and grew her own feed for raising small livestock, primarily pigs and chickens. Further, Edvalice described her custom of storing cassava flour in vessels as a food security measure. In fact, Edvalice preferred to store cassava flour rather than sell it for profit due to her fear of being food insecure.

“When we make cassava flour here, we have the custom of storing it, we have these large vessels, we call them vases, our reserves and we store it. There are other people, our relatives included, that don’t have the custom of storing cassava flour; they make it and sell it, if they’ve got a need they sell it straight away, whatever little need or want, often just a little luxury, to buy something... so they sell it, so when Summer arrives, the end of year, they don’t have any cassava flour to eat, and that’s when we start giving away our cassava flour, because we can’t let them be without, right? They are our relatives... We store it because I’m afraid of being hungry. I remember the time, when we didn’t have any beans...I’m afraid to sell it and then be in need.”

Edvalice [F] Sunflower

Food insecurity was a common feature across many farmer informants’ accounts. Raimundo, Carlos, Antônio, Edvalice, José and Antônio-Luis all recalled periods of food insecurity with a plethora of strategies that individuals and families had used to survive those periods. Separate to earning a wage income or selling produce for income other strategies to minimise food insecurity included food exchange with relatives, slaughtering livestock for sale or exchange, money lending to purchase food and fishing to sell ‘high profit’ items such as prawns in order to purchase food staples. In this context, auto-consumption where possible was practiced by all farmer informants.

Farmer informants gave different accounts of the practice of auto-consumption on their farms. Olimpio was formally retired, receiving a pension and was considering moving away from planting any commodity crops and planting only enough food for household consumption

“I will tell you something, I’ve been thinking that next year I’ll plant these five tariffs [of land] only for household consumption, and I alone will take responsibility [for them]. I’m not up for planting fields, no. I don’t have any more faith, I don’t want to plant fields.”

Olimpio [M] Castor Bean

Carla, being employed off-farm with an independent source of income, did not share the same concerns about food security as Edvalice but her motivations for auto-consumption were related both to well-being of her family and to the well-being of the environment.

“...In twenty or thirty years’ time we’ll have a nation of monoculture, where sustainability will be more difficult, where food will be more expensive, where [good] health will be more difficult, where well-being is so dependent on us, the new generation, and it also depends on our parents to place in our heads [the idea that] agriculture is the best form of a sustainable base for the world... we should not let monoculture enter into our properties; we must plant a diversity for us to eat diversity as well, if we are just eating rice and beans every day this is abuse you know... we also need to eat rice, beans, melons, banana and [that means] we need to plant all this as well.”

Carla [F] Community Mobilizer

Antônio-Luis gave a similar account to Carla, in this, his motivations for auto-consumption being related to personal and environmental well-being.

“To feed yourself with the healthiest produce, those products have a lot of agrottoxins and I don’t use these anymore, when you are a certain age, more or less young but not anymore, because these things will

harm you in the future. If possible I try not to eat those greens because I've seen them sprayed with pesticides so I left behind... we tend to try and feed ourselves from what we produce here so we know what we are eating without being afraid.”

Antônio-Luis [M] Castor Bean

José employs multiple strategies on his farm and his account illustrates the intersections between diversification, internalisation of productive resources and de-commodification. José's farm has a diverse base of crops (cashew, beans, corn, peanuts, cassava and sunflower) and livestock (cows and turkeys). José employs a variety of internalisation *of resources* activities including:

- growing crops specifically as livestock feed to be used on farm
- stockpiling fermented corn for livestock in case of food shortage
- keeping 20–30% of his property as ‘environmental reserve’ to serve as a source of wood for fencing and as an animal reserve (specifically for birds).

De-commodification and Internalisation of Resources

In terms of de-commodification, José discussed his attempts at sourcing local bean varieties. This can be seen as both a move toward diversification, co-production to enhance the environmental resource base as well as farm productivity and de-commodification as farmers reject bean seed varieties that require annual purchase

“... At times the bean seed that comes [commercial bean seed] when the bean plant is flowering — it withers up and burns. Whereas beans that

are local to the region are fine. There are many people experimenting and many people are talking about this. We have two types of beans here — “Cariocinha” that has little flecks and “Mulatinho” that is uniformly one colour and this bean Mulatinho is doing better because it is from our region whereas the Cariocinha is from outside and when you plant the Cariocinha — it grows well, the plant is beautiful but when it flowers, it all burns up. ... and the one that we’ve used here for a long time is doing better in this region. ... I don’t have this [bean seed] at the moment — my Dad used to plant it all the time because it is our tradition...and then arrived this Cariocinha and everyone started planting this and leaving the other one but there are some people here that still have it.

José [M] Sunflower

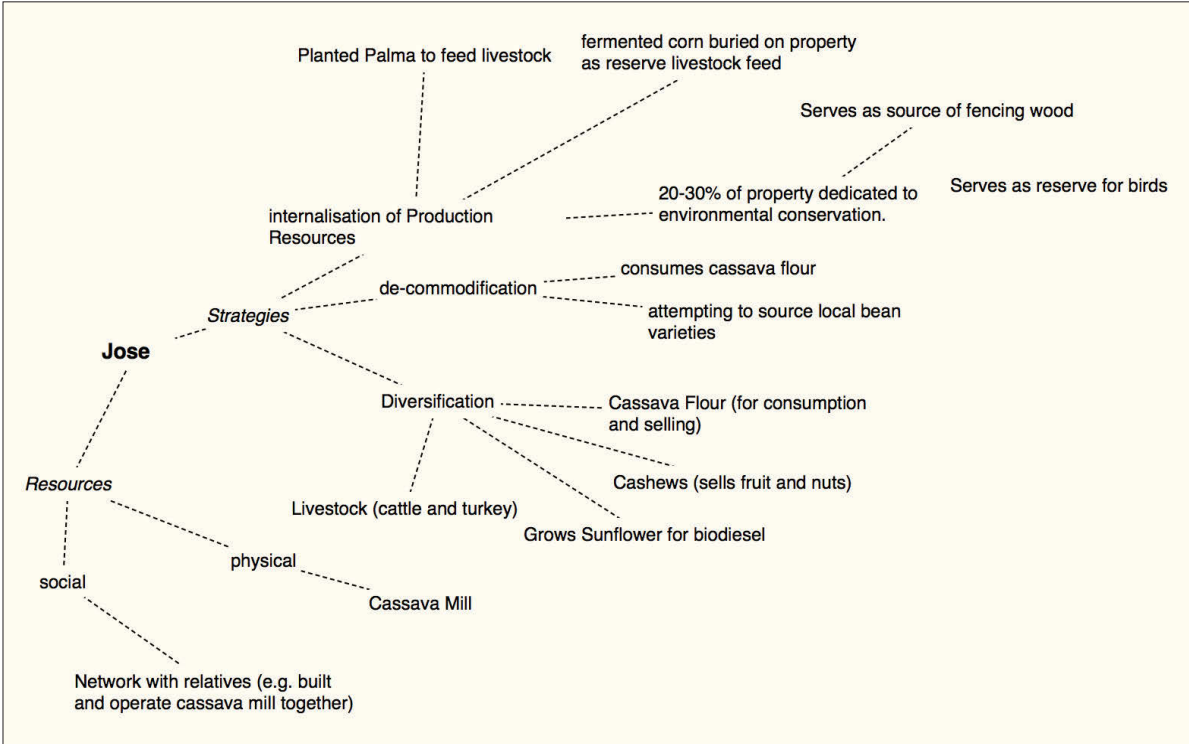


Figure 9 Spider Map of José's activities

Figure 9 Spider Map of José's activities illustrates how we can use the Autonomous Livelihood Framework to map José's livelihood. This map is not a complete representation of José's livelihood strategies or capitals, but rather is presented for illustrative purposes.

José is a good example of a farmer informant exercising autonomy. Participating in the PNPB gave him the opportunity to further diversify his already quite diverse livelihood, secure a credit loan that he admitted was not solely used for biodiesel and to gain income through selling feedstock — even though he did not think that the price was very good. José's case illustrates how smallholder farmers take risks within boundaries. For instance, José simultaneously follows and ignores the technical advice in regards to crop production. He knows what his neighbours are doing and what has been successful in the region. He has sought information about production and co-planting regimes from his network and yet José also operates outside the boundaries of technical advice. José has been seed saving to see for himself whether saved seed will work as well as provided seed, also deciding to plant at different time than recommended and co-plant based on his observations rather than technical advice.

Other farmer informants used similar strategies of internalisation of resources, de-commodification and co-production. Raimundo, whilst growing a successful crop of palm heart as a cash crop, continued to invest in growing pumpkins. He was able to seed save for the next season and fertilised his pumpkins only with animal manure sourced locally. Raimundo used his

pumpkin crop for many purposes. In part it acted as a ‘petty cash’ option and Raimundo recounted taking a portion of his pumpkin crop to the local market so that he could buy his teenage son a new pair of sneakers. In this way, Raimundo was able to access cash at short notice from stockpiled pumpkins. Raimundo was also not dependent on a contract or specific external buyer to access income from his pumpkins as he simply took them to the local market and sold direct to local consumers. The pumpkin served as a crop diversification strategy on several levels. Raimundo was careful to balance perennial and annual crops on this land and in this way, Raimundo also spread his risk and was not dependent solely on palm heart contracts for his livelihood.

Consistent with the literature about the importance of being able to value-add on farm, agri-food processing units were frequently mentioned by farmer informants as either a current resource enabling auto-consumption and income generation — notably cassava flour processing mills — or as a desirable asset. Certainly, farmer informants who did not have access to any agrifood processing units considered them a potentially important source of income and as an incentive for young people to remain in farming. Antônio and Carlos could see the potential possibilities from their settlement, noting that they could develop yoghurt, fruit pulp and cocoa products but lacked the institutional support and incentives to be able to develop agri-food processing units.

Cassava flour is the staple food in Northeast Brazil and is produced by peeling, soaking, grating, grinding and toasting the cassava root to produce a starch. Several farmer informants had access to a cassava flour mill

(Portuguese: *Casa de Farinha*) whereby the work of creating cassava flour was often undertaken in family or community groups.

Edvalice was in a similar position to Antônio and Carlos in relation to some of her crops. Whilst Edvalice had good access to a cassava flour mill and used this to produce cassava flour for consumption, gifting and income, she was also keen to access a cashew processing factory for the fruit and nut trees she had planted

“My property is full of cashews. I have several trees and I plan to plant more. Including because they’ve built a factory, a small factory, here in the town of Olindina, a cashew factory for smallholder farmers and I’ve already registered, only that it has stalled, it should have been functioning by now, I don’t know why, but it’s still stalled.... we are putting our bets with this.”

Edvalice [F] Sunflower

Preto and his extended family, who farmed together, grew a wide variety of crops on their land, both for auto-consumption⁶¹ and crops which the family considered experimental including black pepper and *urucu* (Tupi-Guarani indigenous term) (Latin: *Bixa orellana*). In this sense, the crops did not yet produce any income but still served an important function for the family as the crops represented future potential. Whilst during the formal part of the interview, Preto did not express particular doubts about the PNPB, once

61. Indeed during the day spent with Preto and his family undertaking interviews, we (myself as Researcher, Videographer and the Driver) were served lunch by Preto’s Mother which included beans, eggs, cassava meal and fruit all sourced from the farm.

we started to tour his property he became more open about his personal doubts and the wider conversation in his community. Preto noted that the PNPB representative who had approached his community said that farmers must purchase palm seedlings as the preferred palm was a foreign high yield variety. Preto noted that this meant most farmers would be required to take a bank loan to fund the purchase of the seedlings from the company. Preto and his colleagues were both suspicious of the intent behind this advice — alluding to profit making on behalf of the company — and also felt that local varieties of palm were advantageous for smallholder farmers because many already had palm on their properties and that they were familiar with the cropping needs. Indeed, a close reading of the PNPB suggests that local varieties are indeed the target of the PNPB scheme but there is a gap between the policy intentions and on-ground implementation.

There were cases whereby the PNPB was considered to be enhancing the independent resource base for smallholder farmers by offering them an alternative market and buyer for their feedstock. Ariel noted that prior to the biodiesel scheme commencing that there existed a practical monopoly with the castor bean industry and that farmers had little choice but to sell onto to limited numbers of brokers that serviced a few main companies. Indeed, it was discussed that prior to the PNPB there was only one buyer for castor bean in Bahia but this could not be independently verified.

“... biodiesel in this here region helped a lot on the matter of valuing more the culture of the farmers because here some time ago it [castor bean] was purchased by a single company and the products weren't valued — when products were available the price was very low — when

it was they [the company] elevated the prices and with this the family agriculture was in this oscillation. One year a good price the next a bad price, discouraging the farmers...”

Ariel [M] Rural Extension Worker

In this way, participating in PNPB was one possible way of family farmers diversifying their livelihood and breaking their dependence on the pharmaceutical buyers of castor. The breaking of the ‘broker monopolies’ was considered as positive aspect of the PNPB by Cooperative Representatives.⁶² However, despite the PNPB potential to function as an alternative market for smallholder farmer, other facets of the program could be considered to be eroding the independent resource base of family farmers. This includes contracts that place the smallholder farmer as a dependent at the end of the value chain and move toward (unofficially) encouraging monocultures. Ariel acknowledged these problems with the PNPB and felt that biodiesel production presented a contradiction between wanting to support smallholder farmers but simultaneously eroding a focus on diversified production for consumption.

As has been illustrated, different farmers combine different matrixes of strategies that fit their own personal circumstances, but that ultimately support an independent resource base. For smallholder farmers, having an independent resource base is an important component of autonomy. It allows them to make their own on-farm decisions based on experiential knowledge and supports their ability to develop a livelihood that is largely independent of external development models. This is not to say that smallholder farmers do not want to

62. Personal Communication with Cooperative Representatives during the research.

participate in biodiesel schemes, but rather that such participation is part of a wider matrix of strategies and preferably is designed in such a way that farmers are not left vulnerably dependent on external buyers, markets and value chains.

This section has illustrated the wide mix of strategies that the farmer informants utilised as part of their livelihood matrix. The next section will turn to the five capitals.

7.4 Capitals

As the Sustainable Rural Livelihood Framework informed the initial research questions that were used in the onsite interviews, farmer informants were directly asked questions that aligned with the notions of capitals (Section 5.5). As noted in the Autonomous Livelihood Framework, capitals can perform three functions of being instrumental, hermeneutic and emancipatory. This section primarily reports on capitals as instrumental, I address the hermeneutic and emancipatory functions in the Discussion (Chapter 9).

Social Capital

The farmer informants in this research were engaged in many forms of formal and informal networks, with varying degrees of trust and engagement that fluctuated over time. The most common forms of participation in formal associations was membership of the local agricultural association. Farmer informants tended to report relatively high levels of trust in their local agricultural association, generally because the association was seen as being grounded in the local community.

Several farmer informants were also, in theory at least, members of their local PNPB cooperative that was providing the services of the PNPB.

However, it appeared that trust and engagement in the PNPB cooperative was relatively low and the cooperatives were generally seen as organisations established outside of the local community.

Farmer informants were asked directly in the interviews about the advantages and disadvantages of participating in local associations. Farmer informants reported positive experiences of participating in associations and they were considered to be avenues by which farmers could collectively negotiate and bargain for the advancement of their communities.

“It is easier as an association because, when you go to get something, you are not getting it just for you or for me, let’s say. So, the way we run it, we have a board that runs it for all of us. This board has eleven [members] and at times two or three go and seek the information for all 68 of us. This is much easier than everyone [seeking information individually] because at times, one voice can’t yell very loudly but with many people, the shout is loud and strong....”

Preto [M] Dendê

This idea of valuing the social whole or collective good is not Utopian. In fact, Preto goes on to say that at times working within the association can be difficult and requires negotiation between members to resolve conflicts:

“There are times when, no, nobody has an opinion that is always agrees with everybody else’s opinion... sometimes you’ll be thinking one way and another person thinks another way... We try to understand firstly what is the situation, the problem from each point of view, and then we start to resolve it and this always works.”

Preto [M] Dendê

Reinaldo participated in an association that had purchased a plot of land in order to raise small livestock and crop with irrigation. The association had successfully been able to work with the State Development Agency. In the interview Reinaldo recounted how the association members had been to the state capital of Salvador several times to lobby for development funds for the association's activities. Reinaldo was also spending his own personal energy on the irrigated land project and decided to step away from growing crops for the PNPB.

José participated in several associations and emphasised that it was important that the association work for the benefits of all members

“Today, if you want to realise a project then the only way for it to happen is as a group, as an association. So, there are many benefits, to get a bank loan and the association is a way for us to unite as a group and get these investments.”

José [M] Sunflower

Indeed, the emphasis on community benefits as well as individual benefits was apparent when farmer informants were talking about associations

“It is interesting work because we have managed to obtain other things for our community... the associations... are a way to unite the families, our association works a lot on the question of uniting people for group labour to organise for the community benefit...”

Carla [F] Community Mobilizer

However, like Preto, other farmer informants also reported some of the difficult realities of participating in an association. Edvalice had participated in various associations since 1992 and noted that whilst there were advantages,

sometimes association leadership manipulated funded projects to their own benefit and that sometimes paying the monthly association fee was not worth the benefits.

Both Filomena and her husband Olimpio participated in local agricultural associations. Filomena participated in a polyculture and apiculture association whereas Olimpio participated in a polyculture and local small farmer's association. Filomena noted that membership of the association gave her access to new skills development, material goods such as bee hives and seedlings as well as income generation activities. Olimpio did not see any real disadvantages to participating in the agricultural associations as he pointed out:

“... those that participate in the association aren't forced to be there.”

Olimpio [M] PNPB Non-Participant in Castor growing Region

It is important to note that despite being in the same household and farming together as husband and wife, that Filomena and Olimpio had decided to participate in different associations. This reinforces the notion of the heterogeneity of smallholder farmers, that is, even within the same household that different farmers can have different experiences, needs and wants based on factors like gender. This could also be considered as Filomena and Olimpio pursuing the notion of *negotiating their autonomy* as individuals at times and as a household or community members at other times. This idea of autonomy as being spatially and temporally in flux is discussed more in the Discussion (Chapter 9).

Carla was currently serving as the President of her local association and Raimundo had served as President of his association for four years. Both Carla and Raimundo acknowledged the personal commitment and cost to fulfilling

the role of President, although from very different viewpoints. Raimundo was primarily concerned about the time and effort he spent away from his own farm pursuing association business.

Raimundo's land was part of a larger agrarian reform settlement, that despite being relatively close to a main road and tourist destination region of Bahia, had no utilities connected (electricity, running water, sewage, telephone lines). This meant all association business was done 'in-person' by visiting the various offices and government officials — a time-consuming activity that meant travelling significant distances.

Carla had served in her association as a member and finance officer for several years before being elected as President. Carla was confident in talking about the agricultural challenges facing her community and the workings of the association. Nevertheless, Carla noted that as a woman and especially a young woman, her competence was regularly questioned (see quote in Section 7.2). Carla's experience is important to understand because it provides some insight to that fact that not all social capital is equal and is indeed influenced by the social structure in which it is placed. Carla could be considered on one hand to have 'high social capital', indeed she is a long-term member and now President of an agricultural association that has managed to secure resources for the local community. Being elected as the President should indicate high levels of trust and engagement. However, the criticism that Carla faces because of her gender in a leadership role is telling as to the importance that issues such as gender can play influencing social capital.

Access to Information

Access to information sits at the intersection of physical capital, human capital and social capital. Most of the farmer informants did not have electricity at their residences (physical capital). Television and radio were mentioned as premier sources of information but farmer informants frequently reported that they had low access to these. Further, low levels of literacy and numeracy (human capital) was raised on a number of occasions — it was not cited as a ‘barrier’ to access to information but it did mean that farmer informants prioritised other information pathways. The most common access to information came through direct contact with local agricultural departments, agricultural associations or cooperatives (social capital).

Filomena reported being a member of two agricultural associations — an apiculture (beekeeping) association and polyculture association. Filomena emphasised participation in the agricultural associations was both an important avenue to accessing information and developing practical skills. Filomena noted that she had thought about leaving the association but that the sense of camaraderie, the conversations and the access to information that association membership provided was essential. Indeed, association membership was described as a place to both access information and to discuss with other members their opinions about said information.

Other farmer informants accessed information and knowledge via local social and formal networks. However, this was not always presented in a positive light in the same way that Filomena talked about association. Edvalice noted that at times the associations failed to pass on information either in a timely manner or at all to their membership base. Carlos noted that moving

onto the agrarian reform settlement meant he could no longer access information via the radio and television and that information gleaned from social networks was “*weeks old*”.

Technical assistance (that is, rural extension officers) were considered an important source of information.

Family Support Networks

Social capital, namely extended family networks, were particularly important in times of hardship for several farmer informants. Edvalice’s account describes the social network of families and friends needed to source bean seed after a drought:

“When I had my youngest son, we planted a field of beans, and these beans were the most beautiful thing in the world, they were big, like this, all flowering, and then came the drought we lost everything. We passed the entire year without one kernel of bean, and it couldn’t be bought, right? ... The next year arrived and we started to plant everything again. One relative gave us 10 litres of bean [seed], a neighbour gave 5, whomever had a little left...this is how we survived, one relative, we’ve got lots of relatives around here, one helps another, I borrow this year to pay back another year and so it rolls around.”

Edvalice [F] Sunflower

Carlos, although not currently sharing food with members of the land settlement, was aware that this occurred in previous regions where he had lived.

Interestingly, Antônio and Carlos recounted how in the first year at their settlement, no-one had been able to produce any food due to lack of tools and moving onto the settlement at the wrong time of year for planting and harvesting. In this case, the agrarian reform association took a loan from a local money lender in order to purchase food for all the families on the settlement. In a way, this represents high social capital *between* the settlement families that they were able to cooperatively take on a communal debt in order to purchase food. However, it also illustrates low levels of social capital between the settlement community and the wider farming community in which they were located. Being unable to access food via social networks as the agrarian reform members were new to the area necessitated using a local money lender — typically associated with high interest rates. This case illustrates the different ways that social capital can be exercised and defined within communities and indeed, internal definitions of ‘community’.

Several of the farmer informants had adult children or relatives who lived and worked in urban areas (away from the farmer informants’ household and region). Whilst none of the farmer informants reported receiving *regular* remittances, there was acknowledgement from that family would provide support (either money or food) if they needed. However, this should not be overemphasised as it appeared more common that the farmer informants were supporting their children, particularly those pursuing education in other cities.

The limits of social capital

Throughout the research, there were three farmer informant cases that recounted a story whereby a rural development program dependent on social

capital had essentially failed. Olimpio, Edvalice and Ariel — farmer informants who did not know each other and were interviewed separately — each told of a rural loans scheme whereby accessing loans meant that farmers in the local community were nominated as guarantors for each other's loans. It would appear that this program was centred on the idea of social capital and assuming that guarantors from within the community would reduce the default on such loans. However, as the farmer informants told us, the structure of this program encouraged defaults as people who would not have normally acted as a guarantor were nominated as such by the officials of the rural credit scheme. People decided not to pay their own loans because they could end up in debt anyway if their nominated paired guarantor did not pay.

“... the guilty one is the bank that made this arrangement, allocating guarantors one to another, another to another and so on in a chain and now everyone in debt because of it — because if I paid my debt, and then [the person I was guarantor for] ...did not pay, I was still in debt just the same! With my name blacklisted, that's why nobody paid.”

Olimpio [M] PNPB Non-Participant in Castor growing Region

This case, whilst not directly related to the PNPB, provides some insights into differences between ‘natural’ social capital and ‘structured’ social capital. This is relevant when we consider the role of cooperatives in the PNPB and look at some of the analysis on why cooperatives have or have not worked in the Northeast under the PNPB. This is discussed in the next section.

Cooperativism and Social Capital

The contracting of cooperatives for seed distribution, technical extension and as purchaser of feedstock initially had no official basis in the PNPB but as of 2010 had been widely adopted in Bahia (Garcez & Vianna, 2009). In much analysis of the PNPB, the move toward the use and inclusion of cooperatives operating as an intermediary between the farmer and the biodiesel refinery was perceived as a positive development and a desirable replacement for the local brokers that have traditionally purchased castor bean (Carvalho, Potengy & Kato, 2010; César & Batalha, 2010). Indeed, as mentioned earlier, the surpassing of the brokers of the castor trade was generally considered a positive development. However, this approach fails to consider the strong social capital that exists between farmers and brokers.

Reinaldo reported that he had decided to sell his castor beans to the local broker rather than the PNPB cooperative because the broker was part of his community and that Reinaldo felt strongly for him in terms of making a living. This is not to say that the brokers are necessarily preferable to cooperatives, but rather than the role of the local broker is not a purely economic role and it entangled in relations of social capital with other benefits for the farmer informants. Antônio-Luis emphasised that the local brokers were flexible and would provide cash advances on unharvested crops — in comparison the PNPB cooperatives that could only pay post-harvest and that payment was only to a bank account.

Whilst several farmer informants were supportive of the cooperatives and the *potential* services that the cooperatives could provide — especially in terms of rural extension services — farmer informants spoke about the

cooperatives as an ‘external entity’ to the community. In comparison, the agricultural associations and even local brokers were talked about with a greater sense of ownership and familiarity — even when acknowledging the limitations of these traditional arrangements.

Several farmer informants were unclear about the role and function of the PNPB cooperatives. They were unsure if the cooperatives were government entities or companies and did not know how the cooperatives functioned beyond the initial face-to-face contact with farmers. None of the farmer informants were paid up cooperative members. The combination of limited knowledge of cooperative structure and minimal personal investment in the cooperative suggest low social capital on behalf of the farmer informants in the cooperatives.

Human Capital

Many of the farmer informants in this research study had limited access to formal schooling, education or vocational training. Indeed, low levels of formal education was a common theme amongst the majority of farmer informants. In comparison, their own experiential knowledge and on-farm skills were highly valued by the farmer informants themselves.

Despite limited access to formal education, several farmer informants spoke about pursuing further education on their own. Antônio-Luis had no teacher beyond fifth grade in school and so independently continued his education through text books. Carlos reported being illiterate at 17 years of age and asking his cousin to assist him to learn write his name. Further, Carlos, at

the time in his late 40s, had returned to complete his basic schooling through night school.

“I practically have never studied. I learnt to write my name with one of my cousins, I was working on a farm and I was about 17 years old and then I needed to sign to say that I’d received my pay. So, on my first pay day, from 68 labourers there were only 2 who could sign — that was the manager and his brother-in-law, and of the rest, not one signed.... I had a cousin who lived on the next farm over — he didn’t have a qualification but he knew a few things. So, this cousin came over to teach people to practice writing their names. After about 2 weeks I learnt my name — whether it was correct or incorrect, that was how I signed my name on the paper.”

Carlos [M] Dendê

A lack of formal education was seen as barrier to participation and acceptance in the broader society, as a source of prejudice and as limiting opportunities. Edvalice emphasised that there was “*no place*” in the cities or capitals for those who had limited formal education — that uneducated people stayed in rural areas

Carlos had faced prejudice due to his low literacy in attempting to represent his community and the importance that was placed on literacy over other forms of knowledge and skills by ‘outside others’.

‘Qualities’ — that was the word they used, but they meant because I am illiterate. I waited until it was my turn to speak in that meeting and then I said ‘I nominate myself to be a member of the board because I’ve turned up to every meeting so far, I care what happens here, and for me,

the ones here that lack qualities are you from the government that have never even been to one meeting before this'

Carlos [M] Dendê

The issue of human capital also highlights some of the potential power imbalance between the refineries, PNPB cooperatives and smallholder farmers. Carla noted that smallholder farmers were strongly encouraged to sign biodiesel feedstock production contracts that many farmers could not understand due to low literacy levels and that the contracts were not adequately discussed or explained.

Experiential Knowledge

The centrality of experiential knowledge and skills for smallholder farmers and their on-farm practices have been acknowledged by many authors (Claude Paraponaris & Girard, 2015; Eshuis & Stuiver, 2005; Lassen & Oelofse, 2016). Part of a smallholder farmer's agency is the ability to both enhance and draw upon experiential knowledge. Indeed, many actions of smallholder farmers could be said to pivot on their experiential knowledge. For instance, willingness to take risks on new crops or practices may depend heavily on past experiences.

Farmer informants interviewed in this research valued highly their own experiential knowledge, especially in relation to making decisions about participation in the PNPB, management of new crops and future participation in the PNPB. It was often noted by farmer informants in interviews that the lack of experience and/or knowledge of 'outside others' (such as extension officers or cooperative representatives) meant that farmer informants felt their

own experiential knowledge was more useful and insightful for farm management.

“I had discussion before with technicians and ended up saying ‘ok, you do it your way with your studies and I’ll do it my way with my experience’ and in the end, it was my experience that won out — so we need to test things out because it is not always correct what they’ve studied, in this region my experience can be better than what they’ve studied. I done this a few times and its worked out — so I like to experiment for myself.”

José [M] Sunflower

There was high value placed on the farmer informant’s experiential knowledge by themselves and yet no formal mechanisms within the PNPB to utilise or work with this knowledge. I note ‘formal mechanisms’ as farmer informants did report *informal* ways that PNPB Cooperative staff — in particular, rural extensions officers — were observing the farming practices and outcomes.

The PNPB’s official design is based in the notion of working with established oleaginous crops that are familiar to smallholder farmers. However, sunflower was an introduced crop that the farmer informants did not have experience with. Both José and Edvalice chose to plant sunflower in a second year in a manner not recommended by the PNPB Cooperative.

José initially received a bank loan to grow sunflower in his first year of participation; however, due to an injured hand he could not plant during the recommended planting season. As such, José ‘re-purposed’ his bank loan — that is, used it for an alternative purpose on his farm — and planted sunflower

a few months late to see what would eventuate. Further, José saved seed from his sunflower crop to plant in a second year, despite information from the Cooperative that seed should be newly purchased each growing season. José was also observing and exchanging knowledge with his neighbours about growing sunflower and had decided to co-plant with cassava in the second year. This was notable as the cooperative had recommended co-planting with corn or beans and discouraged co-planting with cassava — however, local experimentation had proven that cassava co-planting seemed to be most successful.

In Edvalice's case, the devastation of the sunflower crop in the first year by migratory birds and lack of solutions from the PNPB cooperative extension officer meant that she had decided to not formally participate in the PNPB again. However, like José, she had saved her own sunflower seed and planted a smaller plot to see if the birds were attracted in the second year.

In this way, both José and Edvalice were drawing upon their experiential knowledge and enhancing it. In this sense, experiential knowledge is closely linked to risk and decision-making.

For several farmer informants, experiential knowledge was a driver for their non-participation in the PNPB — this included Filomena and Olimpio (a married couple), Raimundo, and Reinaldo. Filomena and Olimpio had decided not to participate in the PNPB and gave “*not enough time*” (paraphrased) as the reason. Yet, a closer reading of their explanation reveals more complex decision-making. It seems that they were carefully considering other crops they were already managing, weather (specifically when it was likely to rain in that particular year), their social obligations to visit family during the rainy month

and other sources of income from their properties and pensions. So, there was “*not enough time*” in that participation in the PNPB was a low priority amongst higher priorities.

In addition, Filomena and Olimpio still had access to the castor bean market via their local broker. This approach drew significantly on their experiential knowledge of their farm, their practices and their needs. Their account suggests that profit maximisation or incentives (financial or material) were not high motivators for Filomena and Olimpio, but rather ‘finding a balance’ between income, work, labour, social networks and their particular livelihood needs was a more important consideration.

Technical Assistance

As part of acquiring the Social Fuel Seal, refineries must provide technical assistance (referred to herein as agricultural extension services and rural extension officers) to all smallholder farmers— contributing toward human capital development — but the implementation of this service was reported as less than ideal. Farmer informants felt that the current level of service was superficial with visits centred on registration, seed distribution and feedstock purchase, with at least 2–4 months lapsing between visits. Several farmer informants emphasised that the rural extension officers — required to visit a quota of farmers each day — had little time to do anything but ‘*flip the visor on their motorbike helmet*’ (paraphrased) to take a quick look at the farm before they left for the next property.

Indeed, the PNPB agricultural extension services appears to have barely met the basic transfer of technology model and had no mechanisms for

demand-driven extension or farmer-to-farmer extension approaches — despite evidence that there was strong demand for agricultural extension services and that farmer were observing each other’s practices anyways.

Farmer informants reported that the rural extension officers were learning together with the community, especially about oleaginous crops. As such the advice that could be offered was limited and there are no mechanisms for local knowledge generated between farmer and rural extension officers to inform ‘upwards’ in the PNPB, other than to enhance the knowledge of the individual farmer and rural extension officer.

“Last year they said to plant [sunflower] together with corn or with beans. But some people on their own account decided to plant together with cassava and they [the rural extension officers] saw when they went past, that the sunflower was adapting better to being co-planted with cassava rather than with beans or corn. So this year, they are telling people to plant it together with cassava.”

José [M] Sunflower

Despite the limited experiences of farmer informants interacting with PNPB rural extension officers, the majority of farmer informants reported access to agricultural extension services as a high priority.

Several farmer informants considered access to rural extension officers as a key benefit of potential future participation the PNPB, in part because they believed that they would be able to access agricultural extension services applicable to their whole property, not just the oleaginous crops.

Two of the farmer informants, Marcio and Ariel, were working as rural extension officers (not for the PNPB) and both emphasised the importance of

trust relationships between local farmers and rural extension officers as essential to being able to effectively do their job. They noted that trust relationships took time, effort and social acceptance as a ‘local’ — that being seen as an ‘outsiders’ undermined their ability to work effectively with farmers.

Financial Capital

Financial capital underlies many of the assumptions about how smallholder farmers manage their livelihoods and participate in rural development schemes such as the PNPB.

Credit Schemes and Bank Loans

Many of the farmer informants had accessed rural credit schemes, with both positive and negative experiences.

Carlos had accessed credit schemes in the early 1990s in another region of Bahia and reported that access to rural credit used to be ‘easier’. Carlos felt that some of the difficulties in accessing rural credit were associated with prejudices against smallholder farmers, specifically smallholder farmers that were part of the landless movement and living on an *assentemento* (government allocated agrarian reform land). Carlos had been to a local bank branch with other *assentemento* smallholder farmers and outright refused service by the bank manager. This was not a rejection of Carlo’s *application* for rural credit — this was refusal of service to even allow Carlos and his peers to make an application. This case illustrates the intersection between financial capital and social power structures. Access to rural credit (financial capital) is mediated through both social capital and social differentiation. Carlos did not

have the ‘right’ social networks and he was not from the ‘right’ social background to facilitate his access to this credit.

Farmer informants report that rural credit schemes were often associated with specific crops or infrastructure, and that farmers had limited influence over the use and allocation of the funds, unless they were ‘*resisting, rebelling and breaking the rules*’. Antônio-Luis reported having to plant what the bank dictated in order to access rural credit for his farm.

Indeed, the financial institutions’ influence over farming decisions was a well-known factor for farmer debt in the Northeast. Farmer informants frequently reported this problem and interpreted indebtedness as financial institutions responsibility, rather than being perceived as an individual problem. Olimpio noted that the bank was unlikely to reclaim his land (provided as a guarantee to the debt) as it would be practically unsellable as all farmers in the region were in similar financial situations — that is, everyone had debts with the bank.

Some of the problems with rural credit schemes and guarantors have been discussed earlier in relation to Social Capital. Farmer informants such as Carla were well aware of the impacts of financial institutions influence over the farming decisions — Carla recounted the pressure on her parents to plant monocultures of beans rather than traditional mixed cropping.

Whilst access to credit schemes and bank loans was officially on an individual scale, several farmer informants spoke about access to credit as a ‘family affair’. In large families, such as Preto’s, individuals would take turns in accessing credit to be used on the property.

Access to rural credit and bank loans was seen as an important component of farm development. Farmer informants such as Raimundo and José had relatively positive experiences with bank loans and had been able to diversify their crops and livestock via bank loans. Raimundo had accessed ‘rolling’ bank loans that allowed him to incrementally increase his debt once his initial loan was paid back. This also allowed him to gradually diversify from subsistence food crops to cash crops.

Specific to the PNPB, there were two farmer informants that expressed concerns about the way that rural credit schemes were structured to support participation in the PNPB. Firstly, Edvalice recounted how her son had taken a bank loan in order to purchase sunflower seed so that he could participate in the PNPB. However, as noted earlier, the sunflower crop had failed due to migratory birds and the son was left with a large debt that he was required to payback via off-farm work in another state.

Preto expressed concerns about the structuring of the PNPB that required smallholder farmers to access bank loans in order to purchase seedlings — as noted earlier (Section 7.2) Preto was suspicious that this was simple profit making on behalf of the PNPB associated company that would leave smallholder farmers in debt, invested in a feedstock that took several years before harvest with no guaranteed market.

In both these cases, the financial risk associated with participation in the PNPB was significant for the farmer informants. The financial risk extended beyond the bank loan as the farmer informants would have allocated labour, land, and the feedstock crop displaced another crop, further compounding the financial investment on behalf of the smallholder farmer.

This is significantly different to the experiences of the farmer informants that were farming castor — their participation in the PNPB meant a switch in end purchaser, rather a more widespread influence over their farms.

Liquid Assets

Liquid assets are included in this analysis as it provides some insights into how farmers negotiate times of low income. As discussed earlier under pluriactivity, several farmer informants worked off-farm in order to generate income to support their on-farm activities. Less common was discussion about selling farm land or farm physical assets, although it did occur. Reinaldo noted that he had in the past sold all his farm assets, including a tractor and truck, and worked off-farm in the mining industry. This was a short-term strategy — Reinaldo did not sell his land as he planned to return to farming.

Indeed, land was considered a highly valuable asset by several farmer informants. Whilst some farmer informants had sold land, it was generally with the intention of purchasing a new plot or moving regions. Land is discussed in more detail in the following section on Ecological capital.

Raimundo emphasised that smallholder farmers may not have financial reserves and that during difficult times livestock may be sold as a way to access cash. Raimundo was very alert to what he called “*the current situation*” whereby farm labourers have the legal right to be paid a minimal daily rate. This influenced Raimundo significantly in weighing up whether a crop was financially viable for him and whether he would require to hire external labour.

Most of the farmer informants did not have significant liquid assets that could be sold for cash in times of hardship. For several of the farmer

informants this was because their access to machinery and infrastructure — such as tractors and agrifood processing units — was via their agricultural associations, that is communally owned assets rather than individual owned assets.

Physical Capital

As noted earlier in Chapter 2, limitations of successful PNPB implementation in Bahia have frequently been attributed to lack of physical capital. In particular, the lack of transport infrastructure and the dispersed nature of smallholder farms across the Northeast has been reported as a barrier for refinery corporations meeting the social inclusion obligations of the social fuel stamp, as well as a barrier to obtaining sufficient feedstock.

Farmer informants talked about physical capital often in terms of the lack of physical capital in their region — both as a past and current situation. Several farmer informants reported the lack of physical capital, in particular electricity and water, both as a driver for migration for family members who had left to work elsewhere and as a barrier to their return. Basic physical capital such as electricity and water was identified by several farmer informants as being essential for both supporting current smallholder farmer livelihoods, as well as attracting family members back to a rural livelihood:

“Now my children live and work in the south, in the city, but every time I talk to them on the phone, they say ‘Dad, just tell me when there is electricity and water and I’ll be straight back there’...”

Reinaldo [M] Castor

Further, physical capital was seen as a way to diversify livelihoods.

“I think that if they built a local factory, like that one they are building now for processing fruit, any type of small local industry, employment and income, you would find young people wanting to stay here...”

Filomena [F] Non PNPB-participant

In the castor producing region, several farmer informants lived in the towns and villages, travelling out to their allotments (plots) to tend their crops and animals. The lack of physical capital (electricity, water, roads) near the allotments as well as personal safety concerns were reported as the main consideration for adopting this separation of household to farming plot.

“My farm is just two kilometres up the road, but the girls were starting school and there is no electricity there, I don't mind those little oil lamps, but my girls need electricity for study...”

Antônio-Luis [M] Castor Bean

In order to access basic physical capital, farmer informants reported clandestine activities such as illegal electricity connections. For instance, Edvalice and her community's access to electricity had long been dependent on an illegal connection into the mains electricity line (Portuguese: *gato*).

Access to physical capital was linked strongly with social, human and financial capital. As discussed earlier, several farmer informants had access to land, irrigation, machinery and food processing units (fruit, honey or cassava flour houses) through membership of their local farmer association.

Membership of the farmer associations was reported as a type of ongoing reciprocity and participation. Farmer informants reported exchanging labour and being active members of their association. Further, access to new physical

capital was often reported as something that had to be lobbied, negotiated or fought for:

“Today if it wasn't for the associations or the organised groups then we wouldn't be able to get many benefits for our community... we know there are projects with government funds and that these funds are to be utilised by the community but unless the communities are organised then they can't get access...”

Carla [F] Community Mobilizer

At the time of the interviews, no farmer informants reported increased access to physical capitals as part of the PNPB. Antônio-Luis reported that PNPB cooperative staff had indicated that PNPB farmers would receive access to castor bean de-husking machines, but this had not been realised at the time of the interview. However, farmer informants did mention access to physical capital such as the internet as a risk management strategy for their participation in the PNPB.

“It's at this moment, when they turn up to buy our produce, that we need internet access. We need to be able to look at the stock exchange and see if we are getting a good price for our produce...”

Carlos [M] Dendê

Ecological Capital

Ecological capital was reported primarily in association to land, specifically two main areas being:

- (a) Features of the agricultural land accessed by the smallholder farmers and

(b) State laws governing access and use of land.

Although all farmer informants were located in Bahia, they were situated on vastly different agro-ecological regions being:

(a) Dry inland region (Portuguese: *Sertão*)

(b) Agro-forest of cocoa and rubber (Portuguese: *Cabruças*)

(c) Coastal forest (Portuguese: *Mata Atlântica*)

The historical use of land in these different zones means that farmers reported ecological capital in different ways. The agricultural technicians interviewed were primarily located in the *Sertão* and highly aware of ecological degradation in the region

“...This region already has a huge monoculture problem and with the rain, high temperatures, low productivity we are seeing the degradation of the environment when only one crop is worked...”

Ariel [M] Rural Extension Officer

Several farmer informants reported that part of their agricultural land was required by environmental law to be kept as set-aside ecological reserve. For those farmers living on an agrarian reform settlements (Portuguese: *assentamento*) this was reported as heavily regulated by state officials and influential on their land use decision-making. For instance, for Antônio and Carlos, a certain percentage of their community combined land needed to be set aside and they were prohibited from clearing vegetation above a certain height (~1metre).

In this case, Antônio and Carlos were also very aware about how access and utilisation of ecological resources are linked with social justice issues. In particular, Antônio and Carlos considered use of large land areas for pasture

(livestock) rather than agricultural crops as socially irresponsible as pasture required minimal labour.

Farmer informants on private land did not place a similar emphasis on the environmental laws, although the utility of ‘set aside land’ was mentioned — in particular José spoke of using his bush reserve for accessing fencing materials and maintaining birds for pest management.

All farmer informants were dependent on rain-fed systems for their main agricultural crops and for biodiesel feedstock crops. Several farmer informants had small livestock such as chickens, turkeys, goats and pigs but larger livestock were less common.

In relation to the PNPB, issues pertaining to ecological capital were raised through concerns about biodiversity and introduced species. Farmer informants expressed concern that the local varieties of palm oil were not eligible as biodiesel feedstock, and that it was obligatory to purchase the seedlings of introduced species.

“Our local palm produces well — a grown man can hardly carry two palm kernels, they weigh about 25kg each, that alone should tell you that they produce well. Many people around here wonder why we have to buy the seedlings — is it because they don’t value our local varieties or is it because they just want to make a profit out of the seedlings? ...”

Preto [M] Dendê

In this way, we can see an intersection between ecological capital and agency within the PNPB. Farmer informants expressed concern that decisions about feedstock and on-farm finances were essentially mandated by the PNPB refinery corporations. This was further highlighted by Ariel:

“It is complicated because these projects are tied up with approvals for bank loans, but we know that this region is degraded, that there are compacted soils, little rain and what is happening is that farmers are accustomed to borrowing money based on these projects, then they don't make any profit and can't pay, so they renegotiate the loan, or abandon it and whole communities end up in debt — it's like a snowball that keeps getting worse...”

Ariel [M] Rural Extension Officer

Indeed, there are further intersections between ecological capital and the components of agency and livelihood strategies. José's experiences illustrate how he is adapting his livelihood strategies and his on-farm risk management:

“Yes, at one time here we were all planting beans, beans that the government had distributed the seed, but after a few years, this bean started getting diseases, it's not adapted well to our region...actually, now I am trying to get some of local variety bean seed from my neighbour because I stopped seed saving, but the local bean is hardier and doesn't get these new diseases...”

José [M] Sunflower

7.5 Agency

I have chosen to discuss agency primarily in terms of three main themes that were chosen during the use of Grounded Theory Method in the data analysis. These are (a) decision-making (b) experiential knowledge and (c) resistance. Many of the livelihood strategies and capitals utilised in the farmer

informants exercise of agency have already been mentioned in earlier sections of this chapter. As such, I have attempted to reduce repetition by referring back to earlier sections and highlighting how agency occurred in those narratives.

Decision Making

Farmer informants were asked directly about household and farm decision-making during the interviews, primarily as a way to open discussion around household (specifically gender) divisions of labour. However, decision-making occurred frequently in farmer's broader narratives about their livelihoods, agency and identity.

In particular, managing on-farm risk was prominent. Literature on smallholder farmers has traditionally considered smallholder farmers as risk averse and low participation by smallholder farmers in the PNPB has been attributed to risk aversion due to poverty. However, throughout the interviews farmer informants talked about their decisions and experiences of managing risk more in term of 'imperfect information' — that is, making decisions where some of the variables and probabilities are unknown and under conditions of uncertainty or ambiguity. Several farmer informants expressed that they were open and keen to experiment with new crops, but felt cautious about factors such as land area to plant, accessing loans for seedlings, ability to pay back loans and longer term buying arrangements with cooperatives or corporations.

As noted in the section on ecological capital, farmer informants such as Preto and Raimundo expressed concern over the introduction of 'foreign

species'⁶³ as part of the PNPB. This concern was centred on a lack of familiarity with the new crops, and the associated risks that the farmers may be taking by planting that crop. All farmer informants reported relying on cooperatives or corporations for information about new crops, and on occasion, feeling uncertain about the information provided. When farmer informants were unfamiliar with the crop, it was harder for them to weigh up the associated risks, and farmers reported different strategies for minimising risk.

“There is little sunflower in this region and there is no-one that has taken a full risk with sunflower and stopped with this [crop] for sunflower. People are still looking for more sustainable [crops] and those customs — so it’s just been a few people that planted [sunflower last year].”

José [M] Sunflower

José was not the only farmer who mentioned the need to continue with known crops whilst being willing to experiment with new species introduced via the PNPB. Part of the on-farm decision making appeared to be a balance between making a decision in an atmosphere of uncertainty and being to experiment to slowly adapt to unfamiliar practices and crops.

Raimundo had decided not to participate in the PNPB. He discussed that *if* he decided to plant Dendê Palm on his property, that he would need to continue to plant the cultivars with which he was familiar and had established income and contracts. The risks associated with participation were clearly

63. *Foreign species* here denotes both crops that were unfamiliar to the farmer in their particular local and crops that had origins outside of Brazil.

articulated by Raimundo — Dendê palm would require land, time and external labour without a guaranteed market or return.

In the case of Edvalice's experience with sunflower we can see her decision-making process and her use of experiential knowledge and risk management (see Box 3 Sunflower: Edvalice's Case). Firstly was Edvalice's (and her son's) willingness to decide to participate in the PNPB despite ambiguity and uncertainty. Secondly, after the first failed crop, Edvalice's continued willingness to experiment with sunflower was a calculated risk. There was less financial risk (no bank loan) but building on her experience of the year before by (a) using saved seed and (b) planting a smaller area.

The next section turns to experiential knowledge which was frequently referred to when farmers were discussing their decision making.

Experiential Knowledge

The importance of experiential knowledge has been discussed earlier under the topic of human capital (Section 7.4) and therefore will be addressed only briefly in this section.

A key aspect of decision-making and agency is the ability of farmers to draw on experiential knowledge. As the PNPB was an emerging scheme at the time of the interview, several of the farmer informants drew on their wider knowledge of past government initiated agricultural development schemes and considered the PNPB as 'fitting into the same box'. The farmer informants were using their past experiences of government schemes to construct their present perceptions of risk. Ariel notes:

“...Biodiesel is one project that has everything in order to go right because beside favouring a renewable fuel it something that also supports family farmers, yet we understand that...all projects when it comes to the government have their caveats — they need to be rethought, they have to studied carefully and we know that they are never implemented in the way that they are designed...”

Ariel [M] Rural Extension Officer

Ariel goes to describe the experiences of smallholder farmers in these government schemes:

“There are various projects that have already been sent to the banks to be approved for them [smallholder farmers] to plant castor. Yet we know that this region is degraded, the soils are compacted, there is little rain and what is occurring is that the farmers are very poorly accustomed to getting these projects and not having any returns to be able to pay for the projects and then they [the farmers] end up renegotiating [the loans] and then skipping [payments] or rather, the whole population ends up in debt and it just snowballs...”

Ariel [M] Rural Extension Officer

Decisions made by the farmer informants were reported as being taken either through their own experiential knowledge or through observations of their neighbours' practices. Particularly when the farmer informants were considering planting an unfamiliar crop, such as sunflower, observation of the neighbours' experiences and practices were highly regards.

All farmer informants reported the deliberations and considerations that they had taken in deciding to participate or not participate in the PNPB. Both

decisions — participation and non-participation — were reported as acts of agency. That is, farmer informants reported an active engagement with their decisions.

As noted earlier in the section on Human Capital, Filomena and Olimpio had taken into consideration a wide range of concerns, feelings, social obligations and livelihood needs in deciding not to participate in the PNPB. In the same way, Antônio-Luis had decided to participate. His livelihood needs and decision-making led him to a different outcome but was based on a similar weighing up of a wide range of considerations. Both Filomena, Olimpio and Antônio-Luis's response demonstrates a calculated decision — just with different outcomes.

This emphasis on farmers' experiential knowledge of past agricultural and rural development schemes in the region influence on their decision-making is significant. Showing that smallholder farmers are actively drawing on their experiential knowledge supports the de-bunking of the social inclusion approach whereby smallholder farmers livelihoods are portrayed as determined by external forces.

“I think that this [the PNPB] should be created with the participation of the people, not created in some office of Petrobras, or the government or a cooperative, with the participation of the people with what they think should this program should have, what they think goes well in this region... without farmers participation in the elaboration of this program then it won't work out...”

Carla [F] Community Mobilizer

The next section turns to the notion of agency exercised as *resistance*, *rebellious or breaking the rules*.

Resistance

The earlier sections of this chapter have illustrated the various ways that farmer informants are negotiating their livelihoods through combinations of cash crops, subsistence crops, pluriactivity and on-farm diversification. Several of these actions would fall into van der Ploeg (2008) “...resistance of third way...” (van der Ploeg, 2010b, p.16) — that is, the forging of novel pathways and activities that sit outside the agricultural modernisation paradigm. For example, reciprocal labour practices, internalisation of resources, seed saving and sourcing of traditional regional varieties of seeds, and value-adding locally through agri-food processing units that are dependent and serve local communities.

In addition to these actions, I found the farmer informants *resistance* was often embodied or embedded in other actions that could be considered to be resisting and yet participating simultaneously.

This is illustrated well by the case of José as discussed earlier. José participates in the PNPB but he also *resists* at the same time by repurposing his bank loan and operating outside the boundaries of technical advice.

“The technical extension officers came twice to my farm, I said I wasn’t even going to plant, I planted outside of the correct time, I planted in July which is outside of winter, which here is in May and June, but I had an accident. The financing, the investment [loan] was slow to be released and I couldn’t do anything because I was injured.... I thought

it [the sunflower crop] wasn't going to produce anything but it did produce. It didn't produce enough to cover my investment loan but if I am honest, I didn't use all the loan money on that [sunflower]."

José [M] Sunflower

This *participate yet resist* was also seen in the case in of Reinaldo who participated in the first year yet then withdrew from PNPB on his own terms. Reinaldo hadn't stopped growing castor altogether though, he had just chosen to sell it elsewhere.

Of the farmer informants, Filomena, Olimpio and Raimundo had decided not to participate in the PNPB at all and could be termed as *bystanders*. Their non-participation was an active decision and brings to mind Long's (2015) emphasis on the implications of "bystanders...who remain at the periphery of the formal intervention process" (, p.39).

7.6 Context of Farmer Informants

Whilst the previous section on Context of the Study (Section 7.2) gave the broad Context for the farmer informants, this section addresses more explicitly the personal context of the farmer informants. In part, the context of the farmer informants has been built through the previous discussions on the components of Livelihood Strategies, Capitals and Agency. This section will focus on aspects of context that did not fit within any of the earlier components. Firstly, lived experiences of violence, prejudice and poverty. Secondly, gender as a key point of social differentiation.

Social Values

As discussed earlier (Section 7.2) despite small pockets of land reform, Bahia is one of the most inequitable states in Brazil with a history of failed agricultural development projects that has resulted in disenfranchisement of smallholder farmers to remain on their land and have ongoing access to productive land (Gomes et al., 2011).

Several of the farmer informants' micro-level narratives about their lives and livelihoods fitted within macro-level context. Raimundo, Carlos and Antônio were all living on agrarian reform settlements (Portuguese: *assentamento*) and had been actively involved in landless peasant movements. A part of their narratives involved an emphasis on violence and prejudice as part of rural life. Carlos reported colleagues imprisoned for attempting to secure access to land and Raimundo referred to his historical participation in violent confrontations around land before he was able to secure his current holding.

"...At that time I was a young man, just 18 or 20 years old, so I wasn't afraid of anything...so 25 years ago I was out living this life, confronting pistols, police; there was a time in when I was arrested in Minas, I spent 15 days under arrest because of the landless [peasant] movement. For my luck, God gave me this small piece of land..."

Raimundo [M] PNPB non-participant

José did not report participating in any resistance or landless peasant movements, but he did note that farmers in his region do not live on their farms for fear of violence outside of town centres. José noted that people tend to live in town and travel out to their properties during the day. Being on the farm

overnight left farmers vulnerable to physical attack. In this way, violence was spoken about as a normal part of rural life.

In addition to physical violence, farmer informants reported a consistent prejudice by the wider society and formal institutions towards smallholder farmers, in particular those who were considered landless or from the landless peasant's movement. Farmer informants reported prejudice when trying to access bank loans and rural credit, participation in formal advisory groups and the general 'low social value' placed on smallholder farms and farming

A common experience amongst farmer informants was that of periods of homelessness and food insecurity. Raimundo, Antônio and Edvalice all reported periods of homelessness in their youth and periods of being extremely food insecure. Food insecurity was reported either due to failed crops, lack of equipment and seed to plant in time for harvest and lack of income to buy food staples. The farmer informants had multiple strategies to survive food insecure times that included borrowing food from neighbours, borrowing money from 'loan sharks' to buy food and hunting wild food to sell to tourism industry (restaurants) to buy staples for the family.

Social Differentiation

The difficulty in accessing female farmer informants to be interviewed as part of this research has been discussed earlier in the Research Design (Chapter 6). Despite a limited number of female farmer informants, gender was discussed as part of the interview process and both men's and women's

differing accounts provide insights into the role of gender differentiation in forming a livelihood and specifically with biodiesel production.

Farmer informants' accounts support the assertion that farm and household labour is gendered in Bahia. Women's work was described by some male farmer informants as helping or 'giving a hand' — with the complementary silent assertion that men did the main labour on the farm. Further, in Raimundo's account, he associates women's farm labour as a necessity associated with poverty and being more prosperous as 'freeing' his female partner from manual labour.

“When forced [by circumstance] then she will help break it up, peel the skin from the cassava, do all the processing for selling it the next day.... today we don't have this, today she takes account of the house, looking after the family things, and I'm maintaining the harder work. Today we don't have the pressing need thank God for my wife to work anymore.”

Raimundo [M] PNPB non-participant

Female farmer informants were more explicit about their dual roles of labouring both on the farm and undertaking childcare and household tasks. Filomena and Olimpio had nine children together and Olimpio noted how at the end of day whereby both parents had worked the farm, as a male he went home to rest, whilst Filomena went home to prepare food, wash clothes and undertake other household chores. In addition, Filomena reported that she would often have to take her young children with her — with one “*on the hip*” and the little ones walking — whilst she weeded, planted and harvested. Filomena no longer had to maintain both the house and the farm; however, this

was because the household duties had largely been passed onto other females (adult daughters) living in the household.

Antônio-Luis reported that castor de-husking was primarily women's on-farm labour. As part of the PNPB, the cooperatives were promoting access to mechanisation for de-husking, essentially removing one of the main farm responsibilities for women in the region. Whilst this has been reported by other authors as a positive development for women as castor de-husking can be hazardous (Manzi, 2013) — it was unclear from the interviews whether this change in labour division and on-farm roles would change household dynamics and other livelihoods resources such as access to income. A similar situation was reported in the Dendê palm growing region, whereby due to the estimated size and weight of palm kernels (~40–50kg per head of full grown palm) it was reported that women would not be involved in this activity and were considered 'unfit' for labouring on palm plantations.

7.7 Negotiating autonomy and the PNPB

The previous sections in this chapter have focused on the various ways that the farmer informants reported using strategies and capitals, primarily in an instrumental way. However, a key assertion of thesis is that autonomy is a critical driver for the diverse ways that smallholder farmers construct their livelihoods and those livelihood strategies and capitals have hermeneutic and emancipatory values. Whilst I elaborate on this in later in the Discussion (Chapter 9), there are some pertinent points in relation to the PNPB to examine at this point.

Many farmer informants identified their autonomy as highly valued — and that their autonomy was enhanced by supportive, collaborative associations or collectives. Indeed, individual freedom to farm was contingent on that of the collective — whether through formal or informal arrangements such as a reciprocal labor days or farming associations. Structural forms of dependency, such as to lenders, large buyers, production contracts or the state, were considered cautiously and farmer informants were aware of a balance between risks and benefits in terms of participation in the PNPB.

For some farmer informants who had not yet decided if they would participate in the PNPB or not, maintaining autonomy was intricately linked with both family and their local collective (farming association or farming collective). The decision to participate was framed as a family and community wide concern, an issue that the farming association would need to raise with the PNPB representatives rather than an individualised decision.

Indeed, farmer informants placed an emphasis on negotiating relationships (whether with individuals, associations or PNPB representatives) that enabled to them to practice multi-functionality, maintain and enhance on farm diversity and the pursuit of the management of their farm based on their experiential knowledge and personal values. Securing autonomous livelihoods for the farmer informants did not privilege profit at-all-costs and the farmer informants sought space to form their livelihoods as intimately connected to healthy land and community. The PNPB and its governance mechanisms, which were structured around a profit-driven model, struggled to recruit and retain the farmer informants in the program. The following Table summarises the findings from this Chapter in relation to the PNPB.

Table 4 Key Findings Specific to the Brazilian National Biodiesel Production and Use Policy

Autonomous Livelihood Framework Component	Brazil
Livelihood strategies	<p>The PNPB was not considered the primary strategy of diversification</p> <p>Participation in the PNPB was one activity that could diversify risk and potential income sources.</p> <p>Farmer informants prioritised local relationships, established cash crops or simply decided that the risk was unviable for their farm and did not participate in the PNPB</p> <p>Participating in the PNPB gave farmer informants opportunities to further diversify with an already diversified livelihood</p> <p>Participation is part of a wider matrix of strategies and preferably is designed in such a way that farmer's are not left vulnerably dependent on external buyers, markets and value chains.</p> <p>Local species of palm as feedstock were advantageous for smallholder farmers because many already had palm on their properties and they were familiar with the cropping needs.</p> <p>Foreign species of palm for biodiesel feedstock were disadvantageous for farmer informants as they involved financial risk and debt (bank loan to fund the purchase of the seedlings), were unfamiliar in terms on farm risks, had no established alternative markets and created suspicions from farmer informants that profit making from seedling sales was the primary intent of the PNPB representatives</p> <p>Facets of the PNPB could be considered to be eroding the independent resource base of family farmers. This includes contracts that place the smallholder farmer as a dependent at the end of the value chain and a move toward (unofficially) encouraging monocultures.</p> <p>Biodiesel production presented a contradiction between wanting to support smallholder farmers and simultaneously eroding a focus on diversified production for consumption.</p>
Capitals	<p>There are differences between 'natural' social capital and 'structured' social capital. The PNPB cooperatives were perceived as structured social capital that was imposed from an external program, rather than part of the farmer informants social networks.</p> <p>Limited knowledge of cooperative structure and minimal personal investment in the cooperative suggest low social capital on behalf of the farmer informants in the cooperatives.</p> <p>High value placed on farmer's own experiential knowledge by themselves and the apparent low value placed on their experiential knowledge by the PNPB formal mechanisms, has meant that farmer's are often seen to be 'not obeying the rules' and / or unable to understand their contractual obligations.</p> <p>New crops pose an 'unknown' risk for smallholder farmers that has to be managed if they decide to participate in the PNPB.</p> <p>Profit maximisation or incentives (financial or material) are not high motivators but rather 'finding a balance' between income, work, labor, social networks and their particular livelihood needs was a more important consideration.</p> <p>PNPB is based on a linear model of technology transfer rather than pluralistic demand-driven extension or farmer-to-farmer extension approach</p>

	There was strong demand for agricultural extension services. Farmer informants were informally undertaking a farmer-to-farmer extension approach by observing each other's practices.
	Farmer informants placed high value on being able to access a cash income and cash from biodiesel offers similar risks and benefits to other forms of cash crops.
	Biodiesel and the PNPB form part of a continuum of market-oriented production rather than a disruption or change to the way that smallholder farmers are farming
Agency	The financial risk associated with participation in the PNPB was significant for the farmer informants Farmer's may be ' <i>disobeying the rules</i> ' as part of simultaneously drawing upon and enhancing their experiential knowledge
	When farmer informants were considering planting an unfamiliar oleaginous feedstock, observation of the neighbours experiences and practices were highly regarded.
	All farmer informants reported the conditions and considerations that they had taken in deciding whether to participate in the PNPB.
	Participation and non-participation in the PNPB were reported as acts of agency.
	Farmer informants participated in the PNPB but also <i>resisted</i> at the same time by repurposing bank loans and operating outside the boundaries of technical advice.
Context	The impact of oleaginous crops as part of the PNPB on <i>women as farmers</i> was not part considered as part of the PNPB design
	The gendered division of farm labour and responsibilities contrasts with the PNPB model that treats the household as homogenous and 'acting as one'
	Women and men, as individuals and as <i>farming individuals</i> have different responsibilities, access to resources and income, and social lived experiences.
Autonomy	Participation in the PNPB is part of a wider matrix of livelihood strategies.
	The PNPB and its governance mechanisms, structured around a profit-driven model, struggled to recruit and retain the farmer informants in the program.

7.8 Chapter Summary

This chapter has presented the empirical data from farmer informants in Bahia, Brazil. For consistency, I presented data following the four key components of the Autonomous Livelihood Framework being Livelihood strategies, Capital, Agency and Context. The final section discussed how negotiating for autonomy influenced the farmer informants and their participation in the PNPB.

This chapter commenced by providing succinct overview of the historic social and agrarian links in Brazil and the ongoing policy of shifting from subsistence economies toward an agricultural export model that benefits agro-industrial producers. This context was important to demonstrate the PNPB is part continuum of paradoxical policies that largely exclude smallholder farmers from social and political power, but that are dependent on their participation and agro-ecological agricultural production.

I then turned to presenting how the farmer informants negotiated three particular livelihood strategies; being pluriactivity, diversification and enhancing an independent resource base. I illustrated both how livelihood strategies and being smallholder farmer were part of a wider livelihood in flux — with the farmer informants engaged in both on and off-farm across their lifespan. I showed how participation in the PNPB was one possible diversification strategy for some farmer informants, but that local relationships, established access to cash crop markets and risk of unknown crops and

biodiesel markets influenced whether farmer informants considered biodiesel crops as a viable option for their livelihood.

In the section on Capitals, I focused on the farmer informants reports of capital as instrumental — that is, how different capital were utilised to make a living. Importantly, I demonstrated — with the case of Filomena and Olimpio — that even within the same household, the farmer informants had different experiences, needs and wants and that this influences how they negotiate for autonomy. In particular, at times social capital was used individually and at other times as part of a household or community.

In addition, the farmer informants narratives in this section illustrated the hermeneutic action of capitals and livelihood strategies in that they were strongly linked to how farmer informants reported on themselves and their identity. This was an unexpected finding and is elaborated on the Discussion (Chapter 9).

In the section on agency, I focused on decision-making and resistance. The farmer informants' narratives here debunk many of the previous studies on the PNPB that report non-participation as part of smallholder farmer ignorance. I asserted that the farmer informants made decisions under conditions of 'imperfect information' — specifically the PNPB had high levels of uncertainty and ambiguity. To counter-balance this uncertainty and ambiguity, farmer informants were undertaking acts of resistance — ignoring technical advice that did align with their experiential knowledge and repurposing bank loans to benefit their whole farm and livelihood activities, rather than PNPB specific activities.

In the latter section on Context of the farmer informants, I showed how there was alignment between the micro-level personal narratives with macro-level social and political issues. In particular, violence as part of rural life was reported by several farmer informants and as part of securing access to land for smallholder farmers. I also touched briefly on social differentiation and the influence of gender on how smallholder farmers were able to negotiate their autonomy and construct their livelihood.

Finally, I turned to place autonomy as a critical driver for how the farmer informants engaged with the PNPB. I emphasised that the farmer informants valued a range of relationships with their family, community and land and that negotiating for autonomy meant that profit maximisation was not a key motivator for participating in the PNPB. This created a gap between the formal mechanisms of the PNPB, that considered profit making as the key point of engagement with smallholder farmers, and the actual engagement of smallholder farmers who drew on a wider understanding of their livelihood before deciding the if, when and how of their participation in the PNPB.

This chapter has provided a rich and detailed account of the farmer informant's narratives. A summary of these findings can be seen in Annex 13: Brazil: Summary of Key Findings as a complement to this chapter.

Chapter 8: Timor-Leste: Empirical Findings

8.1 Introduction

In this chapter, I present empirical data from farmer informants located in Timor-Leste. As with the empirical material from Brazil, the quotes and cases used to illustrate each component do not represent the full responses across all farmer informants. Rather, they are used to emphasise the data analysis and illustrate individual experiences. This chapter is structured in a similar way to the Brazilian Empirical chapter; however, the sub-sections differ as they reflect the use of Grounded Theory Method.

As with the previous empirical chapter, the same reliance on verbatim quotes, paraphrasing and thick description is employed.

Farmer informants' quotes are presented in italics with the farmer informants name, gender and district in which they lived. There was only one biodiesel feedstock in Timor-Leste — *Jatropha* (Latin: *Jatropha Curcas*) (Tetum: *ai-oan mutin*) — and differences in farmer informants' experiences with the Agro-Energy Program were based on social differentiation and regional agricultural livelihood practices, making listing their District of residence more relevant than the biodiesel feedstock. As noted in the Research Design (Chapter 6), all farmer informants agreed to be identified and as such, I have not used alias for their names.

Component	Sub-Component	Timor-Leste Specific
Livelihood Strategies		
	Pluriactivity	
	Diversification	
	Enhancing an independent resource base	Auto-consumption De-commodification Internalisation of Productive Resources
Capitals		
	Social Capital	Access to Information Family Support Networks The limits of Social Capital
	Human Capital	Experiential Knowledge Technical Assistance
	Financial Capital	Credit Schemes and Bank Loans Liquid Assets
	Physical Capital	
	Ecological Capital	
Agency		
	Resistance Identity	Decision-Making Experiential Knowledge
Context		
	Social Values Social Differentiation	

Table 5 Timor-Leste Specific Sections of the Autonomous Livelihood Framework

This chapter is organised as follows:

Section 8.2 provides a brief background to rural livelihoods in Timor-Leste and the policy context of the Agro-Energy Program

Section 8.3 reports on the livelihood strategies being pluriactivity, diversification, internalisation, and auto-consumption.

Section 8.4 explores how the five capitals (Social-Human-Financial-Physical-Ecological) serve both as a resource and heuristic tool for the farmer informants.

Section 8.5 discusses agency in terms of decision-making and resistance.

Section 8.6 briefly covers the specific aspects of context of the farmer informants that were not captured in any earlier components.

Section 8.7 explores how the expression of negotiating for autonomy and the Agro-Energy Program. In particular, differences with the Brazilian case are highlighted.

8.2 Timor-Leste: Context of the Study

Timor-Leste is an emerging state with a tumultuous history of colonisation, occupation and violent conflict defined by 25 years of an active resistance struggle. Configurations of national identity and rural livelihoods are heavily influenced by the different development discourses of the state, aid agencies and national politics. The post-independence era has been defined by shifts in development approaches as well as wrangling over the "...hierarchy of memories of colonial experiences..." (Bexley, 2007, p.71). The politics of history in Timor-Leste has significant impacts on rural livelihoods and mediates access to resources, government funding and land. Indeed, the Timor-

Leste Agro-Energy Program needs to be considered in light of broader discourses about what types of 'appropriate' agricultural and rural developments occur in Timor-Leste and the ways in which smallholder farmers participate, reproduce and alter these developments.

Timor-Leste (formerly East Timor) was established as a nation in 2002 after a period of UN administration following a referendum for independence in 1999. Prior to the referendum, Timor-Leste had been a colony of Portugal from 1702 to 1974 and occupied by Indonesian from 1975 to 1999. Following the referendum in 1999, it is estimated that approximately 1500 people died in the subsequent violence and 300,000 people, or a third of the population, was forcibly displaced to West Timor (Rimmer & Tomaras, 2007). Notably, most of the physical infrastructure of the entire country was burnt or destroyed with the retreating Indonesian military and militia. This included water, power, school and government buildings, public infrastructure, transport and private housing (Ingram, Kent & McWilliam, 2015). Around 50% of all livestock was lost, having a significant impact on agriculture (Lundahl & Sjöholm, 2013).

“[Timor-Leste] was left with environmental degradation, the flight of professional classes, virtually no effective governmental institutions, and a variety of international agencies and experts with their own ideas on development.” (Anderson, 2012, p.1)

Since 2002, as a newly formed nation-state, Timor-Leste's path post-independence has been no less tumultuous with political riots (2002, 2006) (Ingram et al., 2015), open armed conflict between the police and the armed

forces (2006) (Kammen, 2012), food riots & looting (2008 (Kammen, 2012), deserting military officers (2007) (Leach, 2009) and assassination attempts on both the President and the Prime Minister (2008) (Butcher, Bastian, Beck, d'Arbon & Taouk, 2015). Timor-Leste has stabilised in recent years but political tensions remain high and clashes between anti-government rebels and the government continue⁶⁴ (Nygaard-Christensen, 2016).

Against this background of a tumultuous political history, Timor-Leste faces many development challenges. Timor-Leste is ranked 133 out of 188 countries on the Human Development Index (UNDP, 2015). Around 75% of the population reside in rural areas and subsist from rain-fed agriculture. Of the population 60% are aged under 25 years of age and low skill levels and high unemployment are a problem amongst youth. To compound the challenge of a post-conflict nation with high poverty rates, Timor-Leste faces the momentous task of developing sufficient human capital, institutions, policies and administrative systems to address the development needs of its population.

In recent years, Timor-Leste has achieved lower middle-income status due to high international oil prices (World Bank, 2016). Its oil profits are placed in a Petroleum Fund which the GoTL has been drawing down to invest in human development and large infrastructure projects (Drysdale, 2012). The Petroleum Fund represents around 90% of state revenue making Timor-Leste highly petroleum-dependent (Lundahl & Sjöholm, 2013). The increased inflow of funds from oil revenues has created opportunities for corruption and administrative malpractice (Drysdale, 2012) and there are number of high

64. For instance, the death of rebel leader *Mauk Moruk* in an armed clash with Timorese security forces.

profile corruption cases before the courts as of 2015 (Transparency International, 2015).

It is against this backdrop that rural livelihoods and smallholder farmers needs to be considered, and in particular how the Agro-Energy Program forms part of the post-independence discourse about community expectations of entitlements in the form of access to goods, services and cash transfers from the government. The development discourse brought by international aid encouraged Timorese people to see themselves as under-developed and in need of external intervention (de Carvalho & Palmer, 2012). Indeed, "... an essential part of nation- state building in the post-conflict context was to manage people's expectations." (Magalhaes, 2015, p.35). The management of expectations combined with the modernist development discourse has led to a push for quick-fix big development infrastructure with little social or environmental oversight (de Carvalho & Palmer, 2012; Nygaard-Christensen, 2016).

Compounding this has been a concentration of government spending on veteran pension schemes — in part controversial due its focus on male combatants and politicised versions of who counts as a worthy veteran (Feijó, 2015). In comparison, the expenditure on rural development and agriculture has been described as 'modest' at best and destructive at worst, with certain policies such as discounted imported rice undermining the local production sector (Ingram et al., 2015).

Outside of the petroleum sector, agriculture is the most important socioeconomic sector in Timor-Leste, accounting for approximately 85% of employment. There are conflicting accounts about the contribution of

agriculture to non-oil GDP. At one end is the claim that it generates 80–90% of non-oil GDP, primarily via agricultural exports in the coffee sector (Khamis, 2015). In contrast, after adjusting for global inflation it is claimed that the agricultural sector actually shrank from 2007–2013 (Scheiner, 2015).

Nevertheless, in 2007 nearly 95% of villages reported that farming was their main source of income (Barnett, Dessai & Jones, 2007). Further, smallholder agriculture in Timor-Leste is responsible for feeding around 80% of the population. For households engaged in subsistence farming, there is minimal surplus for income generation and usually no off-farm income (Shepherd & McWilliam, 2011, p194). Indeed, part of the modernist development discourse is centred on subsistence farming as insufficient, backward and in need of external intervention. “Given East Timor’s pronounced economic development drive, these statistics have acquired meaning as part of an overarching assessment of the insufficiencies of traditional farming...” (Shepherd & McWilliam, 2011, p.194)

As of 2015, the significant impact of veterans’ pensions and overseas remittances on rural livelihoods has been noted (McWilliam, 2015) — indeed, much rural development and individual well-being is associated with being able to tap into social and political networks to direct goods, services and cash flows toward farming families. Timorese farmers have traditionally practised slash and burn shifting subsistence agriculture divided between staple crops (maize, rice, cassava), vegetable gardens and animal husbandry (Kammen, 2012). In many areas, this is substituted with wild foods from hunting and gathering such as fish, shellfish, game meat, eggs and wild plants. Agricultural labour is generally unpaid family and communal labour, working small plots of

rain-fed land with basic tools and a few non-farm inputs (Shepherd & McWilliam, 2011).

Many rural households rely primarily on subsistence production, supplemented with some cash income from picking coffee or selling surplus rice. In recent years, food insecurity has been most pronounced in coffee growing areas. (Barnett et al., 2007, p.377)

Rice imports became central to the process of political stabilisation since the international food crisis of 2008 overlapped with the internal political crisis of 2006–2008. Timorese farmers have shifted from being producers to consumers as food imports have increased coupled with changing diets with a preference for rice, noodles, oil, sugar (Kammen, 2012; Scheiner, 2015).

Agricultural and rural development has been disjointed, poorly resourced and without a clear policy direction since independence. The UN administered period (1999–2002) represents a mix of influences from bilateral donors, international finance corporations such as the World Bank, international non-government organisations (INGOs) and an emerging civil society. The approaches and priorities of these different donors and institutions were at best at odds and at worst in direct contradiction. The World Bank and the Australian Aid Agency advised against providing aid money to develop publicly supported grain silos and rehabilitation for the rice sector. In contrast, the United Nations Food and Agriculture Organisation (FAO) and Japanese International Cooperation Agency (JICA) saw these as a priority and funded support to the Government of Timor-Leste (GoTL) Ministry of Agriculture, Forestry and Fisheries (MAFF).

The post-independence era can be divided into two marked periods. First was the initial period of 2002–2007 whereby Timor-Leste was heavily aid-dependent and took a state-managed cautious approach to spending. In terms of agricultural policy during this period, the focus on was a modest food security policy that focused support to smallholder farmers and avoided a market economy approach to agribusiness development (Akmeemana & Porter, 2015; Anderson, 2012). However, few of the even modest policies were realised and this contributed to growing grievances from the population about lack of on-the-ground development.

The second period started in 2007 when petroleum revenues sharply increased and the newly elected government tripled public spending and emphasised economic development (Anderson, 2012). The GoTL slogan “Goodbye Conflict, Hello Development” (Shah, 2012, p.31) was mirrored in the launch of the Timor-Leste Strategic Development Plan (SDP) 2011–2030 (Government of Timor-Leste, 2011). Whilst the SDP has a strong emphasis on the need to “... modernize and diversify the economy ...” (Lopes, 2013, slide 4), analysis by some scholars has shown that agriculture is the most obvious sector for livelihood improvement in the short term.

... for the foreseeable future... is it clear that the possibility of moving people out of agriculture so as to increase average productivity and income is limited. The only booming industry is oil production, which provides few jobs. There are no signs of an emerging manufacturing industry... In the short run... improvements in agriculture

constitute the only way of improving livelihoods in

Timor-Leste. (Lundahl & Sjöholm, 2013, p.73)

Nevertheless, as of 2015 agricultural spending remains at a low of less than 3% of the state budget.

8.3 Livelihood Strategies

The main livelihood strategies that I present for Timor-Leste are:

- (a) Pluriactivity
- (b) Diversification
- (c) Internalisation, and
- (d) Auto-consumption.

Pluriactivity

As noted in the Autonomous Livelihood Framework, I have adopted a definition of pluriactivity that includes both agricultural and non-agricultural income. In Timor-Leste, six of 11 farmer informants reported past or present formal off-farm work including working in a non-government organisation, working as a community leader and running a small business. Off-farm work was reported as temporally dependent and linked with specific recent historical events such as projects available in Indonesian times, contracts or work opportunities during the early years of the UN administration.

Pluriactivity was often reported as desirable but not always possible.

“Men’s responsibility is this — go and earn money to give to their kids — but only a few have work, and then others don’t. Those that don’t, they farm, but they don’t make any money from farming. But look here — this fence is broken, and then the animals get in. And rain is difficult,

so we are never producing much. If you don't have work in Timor, then you've got to live off your farm, but if your farm doesn't produce much, then life is just like this..."

Maria [F] Dili

Tomas very specifically placed the option to be pluriactive within a political and historical context. In part, Tomas frames being pluriactive as a necessity for farmers who can't access land for productive farming.

"... there are some [people] that like working as public servants and some that don't. They prefer to work together with civil society to educate our people...so that people know and understand their rights and so that they don't become slaves to other people... as we are already independent those with farm land can produce, this land can support the livelihoods of our community to build up this nation. If for instance, the people were not producing [agricultural crops], it would just be because they don't have the land to do so..."

Tomas [M] Ermera District

The empirical data here represents the accounts of individual farmer informants participating in the Agro-Energy Program. Yet there were no farmer informants who were 'farming individually' in the Agro-Energy Program — indeed, all farmer informants were participating as part of a larger group of extended family or local villagers. This has implications for both how pluriactivity is reported and whether individuals have the opportunity to be pluriactive.

Agustino did not reside in Los Palos but rather in the capital Dili⁶⁵. Agustino's position in his family and land ownership meant that he was the individual who negotiated with SEPE over participation in the Agro-Energy Program. However, it was Agustino's relatives who lived nearby the fields and undertook the daily labour associated with growing feedstock. This freed Agustino to be able to engage with his business activities and participate in the Agro-Energy Program.

This was a similar situation with the case of Domingas. Domingas and her husband were both employed full-time off-farm, and as such considered themselves pluriactive. They were reliant on an extended network of relatives to undertake the physical labour tasks associated with the Agro-Energy Program, but Domingas and her husband were considered the participating individuals and Agro-Energy Program Cooperative leaders by SEPE.

In this way, social capital, in the form of mutual family obligations, has a significant impact on the individual's ability to be pluriactive. That is, those farmers with extended networks were able to work off farm because they could rely on family labour for agricultural productivity — specifically to grow biodiesel feedstock.

Indeed, for some farmer informants, it could be possible to argue that they were 'part-time farmers in that their primary income was off-farm. However, these cases highlight some of the issues around identity and being socially embedded. The farmer informants that were pluriactive continued to

65. Approximate 200km and 6 hours' drive away.

identify with 'being a farmer'. This discussion around identity, social embeddedness and pluriactivity is returned to in the Discussion (Chapter 9).

Diversification

Diversification in Timor-Leste can be considered in two main areas, being diversification for consumption and diversification for income (cash crops).

Firstly, the diversifying of crops for consumption: this practice of a diversified crop base was common across all farmer informants and in part, this would be a reasonable expectation given that most Timorese farmers are subsistence farmers.

The variety of crops that farmer informants were growing depended heavily on their location and relative wealth. Farmers residing on government transmigrant land close to the ocean, such as Isaias and Maria, reported low capacity to grow a variety of vegetables due to salty water, dry weather and poor soils. These farmer informants also typically reported less small livestock and limited large livestock. In comparison, farmer informants residing in more fertile areas were able to grow a wider variety of vegetables. Only one farmer informant, Agustino, reported owning several types of large livestock (buffalo, horse, cattle).

Diversification was considered an essential livelihood strategy, in particular for food security and ensuring a staggering range of food availability across the year. Diversity of crops was linked temporally with harvest intervals to ensure ongoing access to food.

“If for instance they plant just one crop then they’ll have to die, because once it is finished... where (sic) are they going to go to eat? It’s because of this that they have to plant like this [diversified]”

Tomas [M] Ermera District

Jatropha was the feedstock of choice for the Agro-Energy Program and all the farmer informants were familiar with Jatropha as a traditional crop grown as a part of a diversified system. Jatropha was traditionally grown as a living fence or for use in making candles. However, prior to the Agro-Energy Program, Jatropha was considered a low value, partly wild crop and as such, although farmer informants were familiar with it, they did not have knowledge on how to address agronomic issues it.

The second type of diversification is closely aligned with pluriactivity. Typically reported as cash crops, farmer informants reported participation (past and present) in agricultural development programs that included fish farming, seaweed farming and raising livestock.

Harvesting and selling coffee for cash income was also an income generation strategy for farmer informants located in coffee growing regions. However, there was a marked difference in the way this was reported by farmer informants depending on whether coffee was a predominant part of their livelihoods or additional income. Armindo noted that collecting coffee was hard work, but overall coffee harvesting was just ‘extra cash’ — it was a part of his overall livelihood strategy but not central to his livelihood.

“It’s hard, really hard because when we go harvest, we have to pull it all off, harvest it, collect it, leave it, and then get the next [branch] ...it’s

finished by the afternoon but then we've got to gather it and then find a horse to cart it; it's hard work."

Armando [M] Aileu District

In comparison, Tomas (located in a region dominated by coffee production) reported coffee income as *insufficient* for meeting food security and livelihood needs. Tomas considered coffee plantations reducing the amount of productive land that farmers could access to grow food crops.

"...The people aren't really satisfied, the people will protest [struggle], protest for real reform so that it can't be that just one person has a really big piece of land, a big piece of land that doesn't produce [anything] because this land doesn't give anything of worth back to the people until they die, it must be divided for the people to produce ..."

Tomas [M] Ermera District

Selling vegetables at the local market, notably chilli, carrots and potatoes, was also a source of cash income. Raising small livestock (goats) was seen as a good livelihood strategy for those farmer informants whose land was considered of poor quality for growing food or cash crops.

'Many people are farming and many people are raising animals, now some of my older relatives, rather, the majority of them — because we are located on rocky soil — if we depend just on crops then we wouldn't survive, or perhaps we would survive but we would eat just one plate a day per person, so we can't depend on agriculture, we need to focus more on livestock...'

Domingos [M] Baucau District

Domingos' case is an interesting one as it highlights the circular nature and multigenerational impacts of diversification and pluriactivity. Domingos' parents diversified into livestock rearing (goats) and shifted away from being dependent on crops for both subsistence and income. Whilst some of the income appears to be used as a livelihood strategy during food insecure times, Domingos notes that it was the income from livestock that allowed his parents to pay for higher education for himself and two siblings. This higher education has in turn, allowed Domingos to source off-farm income both through formal employment and on-farm diversification strategies. At the time of the interview, Domingos worked at a local non-government organisation, grew crops for consumption and sale, tended small livestock (goats) and participated in the Agro-Energy Program.

There was a gender aspect to diversification into cash crops. Selling vegetables at market was reported primarily as 'women's work'. Armindo reported that income from market sales would be used on the same day (by women) to buy other household necessities and then any 'extra cash' given to the husband for the general household afterwards. Tomas emphasised that income was likely to be sufficient for the household if managed by a woman (Tetum: *feto fen* literally wife) but unlikely to be sufficient if managed by a man. Tomas noted that men "*enjoyed drinking, smoking and gambling*" and that men could easily 'blow' the household income in a day.

These accounts draw attention to the need to understand not only how pluriactivity and diversification occur, but how social differentiation and cultural norms transform livelihood strategies. This is addressed in the Discussion (Chapter 9).

Enhancing an independent resource base

Internalisation

The internalisation of productive resources was not a strong feature of the interviews in Timor-Leste, in part because there was an underlying assumption throughout the interview process that internalisation of resources was a common farming practice and that farmer informants had limited access to external resources. As such, the importance of internalisation of productive resources is likely to be under-represented in the farmer informant narratives.

Nevertheless, farmer informants did report on the use of fertiliser — in particular noting industrially produced fertiliser had widely available in Indonesian times and most farmers were now attempting to use local fertiliser due to access issues.

Domingas talks about the community experiences with commercial fertiliser:

“Before in Indonesian times fertiliser was used, manufactured fertiliser that was really useful but it had a big impact and it was said that you had to use it constantly, and if you didn’t use it constantly that it ruined your soil.”

Domingas [F] Baucau

Domingas went on to note that several people had switched to organic fertilisers (animal manure) but that there was a dearth of information and contact with agricultural extension officers in order for people to make informed decisions or learn new practices for their farmers.

Three of the farmer informants discussed using organic fertilisers sourced locally from organic materials such as manure or green waste materials. Armino reported using organic fertiliser made from animal manure on his farm. He noted that the manure was collected and distributed by hand, and that collecting sufficient manure on this farm was difficult due to the environmental conditions that meant the manure disintegrated and dispersed quickly.

Domingos talked about the use of local organic fertiliser (manure, grass and ashes) and how in his family's move toward farming a set plot, rather than shifting plots, had meant that fertiliser was essential to ensure a successful harvest.

“Compared with when we were little, with our parents in their time, definitely they would plant a field and then it would rain and then they'd shift and make new [field] next to it — shifting... but now, well other families I don't know, but my family now we just farm a set field but we have to use fertiliser and always be tending it.”

Domingos [M] Baucau District

Isaias discussed using the skin of the *Jatropha* bean as an organic fertiliser but noted whilst he was aware that was possible, he did not have practical experience in doing this. Isaias mentioned commercial fertiliser in the context of *Jatropha* for the Agro-Energy Program and the low numbers and small size of fruit produced on the *Jatropha* plants. Isaias felt that fertiliser was needed to enhance the crop, but without input and information in the form of agricultural extension services, the farmers were at a loss as to how to improve the crop.

“At the moment it’s summer so it [the Jatropha] is not fruiting much... if we consider manufactured fertiliser, there is a lot of it available now but we haven’t yet practically reached that level.”

Isaias [M] Dili

Auto-consumption

All the farmer informants were eating food produced on their farms with the staples being corn, cassava, arrowroot, banana, beans and green leafy vegetables. However, the majority of farmer informants mentioned food insecure times, in particular in relation to the ‘hungry season’. The ‘hungry season’ generally refers to when all seed has been planted out but the next harvest is not ready. It can also be used in relation to adverse weather conditions that prevent planting and harvesting in line with normal agricultural and cultural practices.

Farmer informants had different strategies to deal with the hungry season. Strategies included activities that could be considered diversification and pluriactivity — raising small livestock for sale and working off-farm. Food storage was reported as a limited strategy as current storage practices meant that food could only be stored for a period of 3–5 months.

Domingos noted that as he had access to off-farm work and a herd of goats, that he did not consider himself as food insecure. Tomas’s comment provides an interesting insight into what is considered food insecurity in Timor-Leste. Tomas frames his comment within the wider interview suggesting that ‘real food’ was considered having access to rice, and that having to eat

cassava, arrowroot or traditional vegetables was seen as a negative outcome and associated with hunger.

“Sometimes the community lacks rice, the people just eat cassava, the people just eat arrowroot, people just eat potatoes and sometimes when none of these gives a good harvest, then the people are hungry.”

Tomas [M] Ermera District

Whilst food insecurity and the hungry season are real phenomena in Timor-Leste, this idea of rice being ‘real food’ and traditional root vegetables signifying hunger illustrates shifts in cultural food practices in Timor-Leste and is well-documented in literature on food security in Timor-Leste (Lopes & Nesbitt, 2012; Noltze, Schwarze & Qaim, 2013)

The items mentioned by most farmer informants as being purchased for consumption include rice, sugar, tea, and cooking oil. Non-edible staples were primarily soap, clothes and school books. One farmer informant mentioned betel nut as a staple purchase.

Farmer informants with off-farm income noted that much of their household consumption was purchased at the shops rather than from their farm. This included Domingos, Domingas, Tomas, Maria and Agustino.

“Mostly we try to get money and buy our food from the store or market. We buy rice, oil, also vegetables because there is not much rain here to grow vegetables — we mostly buy because there is no rain and no water because of the electricity. We have to borrow water from neighbours that have a generator, but even then they don’t want to give water because the fuel for the generator [to pump water] is expensive.”

Maria [F] Dili District

For some farmer informants, the ‘shift’ in food consumption habits was due to a livelihood change. For farmer informants with office jobs their consumption patterns had shifted to store bought products. Further, it was noted that their on-farm decisions had shifted with their consumption patterns, and that now planting decisions for the farm involved trying enhance their long-term livelihoods rather than daily subsistence needs.

Domingas mentioned the intersection between gender and auto-consumption.

“...Because there are many women who work but they are slow to ask questions about their independence, that is, they work hard but only just get enough to eat. But to produce export [exportable goods] where is the path to that?”

Domingos [M] Baucau District

Domingas’ account here is revealing as it shows how auto-consumption is viewed in a negative light and producing exportable crops for income is seen as a positive activity. It also shows how Domingas perceives limited opportunities for women wishing to develop their agricultural entrepreneurial skills.

It is important to note that it should not be assumed that increased income would reduce food insecurity due to purchasing power. In fact, food insecurity was an issue for those farmer informants cultivating cash crops, specifically coffee. The connection between food insecurity and the coffee growing regions in Timor-Leste is relatively well-documented. Tomas’s case highlights that income does not necessarily increase food security.

“For example, with coffee we can buy food, like rice which we have to buy, cooking oil we have to buy, soap we have to buy, Rinso [washing powder] we have to buy, clothes we have to buy, so we’ve got lots of outgoings, so many outgoings that the cash from three months [is insufficient] and ... we suffer.”

Tomas [M] Ermera District

8.4 Capitals

This section will discuss the five capitals of Social, Human, Financial, Physical and Ecological Capital.

Importantly, there were two striking issues when considering how Timorese farmer informants spoke about capitals. Firstly, the wide influence of social capital on mediating access and utility of other capitals and strategies. Secondly, the influence of gender as an aspect of social differentiation that had significant influence on access and utilisation of other capitals.

Social Capital

Social capital was a dominant theme in Timor-Leste and appeared to permeate all aspects of farming life. Social capital, as discussed earlier in the Autonomous Livelihood Framework is taken broadly to refer to social networks, mutual obligation, trust, and sense of community.

Consistent across all individuals was the centrality of social capital, although this was manifested in different ways. Social capital in the form of extended family networks of mutual obligation were essential for farmer informants engaged in pluriactivity (see Section 8.3). Other farmer informants had social and cultural links directly with the Secretary of State for Rural

Energy (SEPE) staff. These personal relationships were leveraged for attracting development projects to their region and village.

Indeed, several farmer informants telephoned directly to the SEPE Office to check my credentials as a researcher and to ensure that the interview was an approved activity. This is significant because the Secretary of State and his office were perceived and treated as being within the direct social networks of the Agro-Energy Program participants. At least four of the farmer informants referred to the Secretary of State for Energy Policy on a first-name basis throughout their interviews.

Social capital was a key channel for accessing information. Farmer informants reported obtaining information either directly from contacts in their social networks or by having access to televisions and radios of extended family, neighbours and friends. This access to information via social capital influenced how the farmer informants could negotiate their livelihoods. For example, José was not an *official* participant in the Agro-Energy Program. José observed his neighbours' participation in the Agro-Energy Program and had utilised his social networks to gain information, and inform his own on-farm experimentation with *Jatropha*.

Farmer informants talked about mutual obligation to their immediate and extended social networks as a part of their livelihoods in flux. The political and security crisis of 2006 meant that several thousand⁶⁶ internally displaced people (IDPs) moved to Isaias' village. Isaias noted that the village residents were considered responsible for providing vegetables to the IDP's as the

66. Around 9,000 IDPs lived in Metinaro from 2006–2009.

government rations only covered rice. During this time, Isaias had approximately 25 buffalo and 60 goats — most of this livestock was slaughtered to feed IDPs. At the time of the interview in 2010, Isaias's livestock was four young buffalo (newly purchased) and nine goats. Isaias's social obligations to the IDPs had a significant impact on his livelihood.

In the next section, I will turn to discussing social capital specifically in relation to the Agro-Energy Program.

Social Capital and the Agro-Energy Program

As described in Chapter 2, the Agro-Energy Program in Timor-Leste was based on the model of farmer participation via cooperatives. Of the farmer informants interviewed, all 'cooperatives' were explicitly formed in order to secure access and 'participation rights' in the Agro-Energy Program, and membership of the Agro-Energy Program Cooperatives was primarily of extended family members. I noted cooperatives in parentheses as it was reported that none of the cooperatives were formally registered, nor met the definition of cooperative according to the Cooperative Law of Timor-Leste that requires an onerous registration and document keeping process.

“In our structure, I’m the President, my younger sibling the Vice-President, my neighbour is the Treasurer, and I’ve got two friends who live up there that are the members.”

Armando [M] Aileu District

Indeed, one farmer informant, Agustino, explained that they were simply 'a cooperative' in order to be able to participate in the Agro-Energy Program as that was the requirement from the Secretary of State for Energy

Policy (SEPE). Agustino went on to explain that the Ministry of Agriculture (MAF) in comparison, only works with ‘associations’ and as such, they considered themselves an ‘association’ for MAF but a cooperative for SEPE. Agustino emphasised that the conditions and criteria were not the same across different government Ministries but each required separately established entities at community level to access goods and services.

Domingas noted that there are good reasons for ensuring that the cooperative consisted only of family members, even though outsiders could perceive of this as nepotism. This included the fact that the *Jatropha* feedstock was being grown on private land and as such, the cooperative leadership needed to be sure that members could be *supportive* and *trustworthy*. Domingas emphasised that there were no specific exclusion criteria but felt that unless they limited cooperative membership to family members, other community members might be attracted to joining the cooperative because of its access to funds without being accountable for the cooperative’s finances and success.

“When relatives, just family members are included then they can support each other... there are many people who work and just are interested in the money and they don’t consider whether this work will bring benefits in the future... so we are not brave enough to include other people because if they start demanding how would we pay them?”

Domingas [F] Baucau District

Tomas emphasised the strong link between the Agro-Energy Program Cooperatives and the GoTL / SEPE:

“People have hopes, because if the cooperative was formed independently then it would collapse. But this cooperative has a link with the State ... The State must watch over it, [The State must] watch over the processing factory until its active, until it can produce biodiesel, only then can the State let go of control.”

Tomas [M] Ermera District

The necessity of forming a cooperative for the Agro-Energy Program raised important themes around ownership and participation. Tomas noted that not everyone in the community was a member of the cooperative, but that the cooperative was *“owned by the whole community”*. Tomas strongly emphasised that the cooperative and the work of growing feedstock was community based and *“not the government’s work”*. Yet, in part he contradicts his earlier statement about the State needing to watching over the Cooperatives.

In Tomas’s case the cooperative members were paid wages from their grant from SEPE for labour involved in feedstock production including building the greenhouse, raising seedlings and planting out seedlings. Labourers were provided a free lunch by an employed cook. All building materials were provided for by SEPE. As such, cooperative members had minimal personal financial risk involved in their participation. In this sense, the cooperative appears to be a means to an end. That is, Tomas and his cooperative were using their networks (social capital) with SEPE to ensure that their village received a development project that directed benefits to members of the community.

In few cases were women reported as cooperative members. In Domingas’ cooperative, women were *“allowed to volunteer”* in the cooperative

but not to be considered full members — other than Domingas herself as the Cooperative Leader’s wife. It appears that this means women were able to provide (free) labour for the feedstock but denied the benefits of influence or decision-making under the justification of “*just family because only family can be trusted*” (Domingas paraphrased)⁶⁷.

Domingos’ cooperative had all male membership and in Tomas’ Cooperative, women were excluded from joining because of the work was considered “*too heavy*”. The one exception was for the female cook. The interaction between social capital and gender are returned to later.

Human Capital

Human capital is taken as referring to the skills, knowledge, experience, formal and informal education of individuals and communities. In considering human capital within the case of Timor-Leste experiential knowledge was a reoccurring overarching theme. I have grouped discussions of experiential knowledge around two main areas being:

- (a) Knowledge related to growing *Jatropha* as a feedstock
- (b) Differing values of traditional knowledge and formalised knowledge (education)

Knowledge related to growing Jatropha as a feedstock

In Timor-Leste, *Jatropha* is a common plant that was known to all farmer informants prior to commencing participation in the Agro-Energy

67. It should be noted that elsewhere in the interview, Domingas said that the cooperative purchased manure from women for the feedstock, so there were some financial benefits extended to women in the community.

Program. As noted earlier, farmer informants referred to using *Jatropha* as a living fence, planted close together to prevent animals accessing valuable food crops or using the waxy *Jatropha* fruit to make candles. Agustino, although having not undertaken the process himself, was aware that *Jatropha* could be used to make soap.

Whilst *Jatropha* was a familiar crop to all farmer informants this did not necessarily equate with high levels of knowledge and skills about *Jatropha* production. Most farmer informants had only used *Jatropha* as living fence propagated by cuttings rather than from seed. Further, as *Jatropha* had previously been considered a low value plant as it is not edible by humans or animals, farmers were unsure about how to tend *Jatropha* with the intention of gaining a high oil yield. The agronomic knowledge (human capital) for addressing disease, non-thriving seedlings, poor growing conditions and yield for *Jatropha* appeared low.

“At the time that this came up, everyone was surprised, as before this [Jatropha] was just planted to make fences, to make fences to keep the animals out... then we heard that it [Jatropha] was worth something and now it’s not used just for fences but it now it’s in our fields.”

Isaias [M] Dili District

Despite low levels of agronomic knowledge related to growing *Jatropha* as a biodiesel feedstock, several farmer informants were pursuing their own on-farm experiments and using traditional methods, such as growing *Jatropha* from root stock rather than from seed. This is returned to in the section on agency (Section 8.5) .

***Differing values of traditional knowledge and formalised knowledge
(education)***

The second common context in which knowledge was discussed was the low value placed ‘traditional’ knowledge, skills and experience, specifically as it related to agriculture and farming. ‘Traditional’ methods were frequently reported in contrast to ‘modern’ methods and several farmer informants used negative language to discuss ‘uneducated’ farming methods. This was often framed as a generational difference

“...before there was no education about agriculture to understand how to plant with a variety of methods, just now we’ve started to educate the population about how to plant systemically.”

Tomas [M] Ermera District

In Tomas’s account, there is an intersection between traditional methods of farming and shifts away from subsistence agriculture:

“... before they planted, they each went individually to clear their land, burnt, planted, sprouted, cleared the grass, ripened, harvested and ate. They just ate [crops] because nothing had a price.”

Tomas [M] Ermera District

Tomas goes on about the changing access and use of land:

“Now they can’t, now they together just have one plot because the plots aren’t that big as the land is occupied, occupied by coffee, so there aren’t farming plots, it’s occupied by coffee and there are just a few farming areas.”

Tomas [M] Ermera District

Tomas's account shows some internal contradictions. It appears on one hand that he values the new agrarian knowledge and modern methods of farming as he is quite dismissive about old methods as being 'uneducated'. Yet Tomas is also expressing concern that people are unable to farm as they did previously, as they are unable to access sufficient land.

Agustino also talks about the generational difference and notes that his parents' generation formed their farming knowledge through a lifelong experience, whereas their children formed farming knowledge through study at agricultural high school. Agustino goes on to say that the 'formal knowledge' of the younger generation is often dismissed by the older generation

"... there is a contradiction between the older generation and their children, there is a contradiction because [the parents say] you get educated and clever just to come back and dig holes, so there is no need to be educated. And they must think like this, because they are thinking, if you didn't go to school before then you'd be working digging holes."

Agustino [M] Lautem District

Agustino goes on to explain that many young people have high aspirations for continuing their education beyond high school but this is often limited by the family economic situation. It is also limited by how younger generations and older generations place value on formal education and the idea of 'being a farmer'.

"Now young people can say... I can be highly educated, I could be an engineer, an agricultural engineer, I could also be digging holes, digging holes like my grandparents generation ... but not in the same

way, my grandparents generation before were a bit uneducated [literal translation: dumb]... but I could be a big farmer, I could be a professional farmer, I could orientate them to agribusiness, this could become a tourist destination... [we] can no longer be labourers on other people's land but labourers on our own land... [our grandparents generation] were very primitive and conservative ...now the younger generation... want to be farmers, modern farmers, professional farmers... rich farmers — why shouldn't they?"

Agustino [M] Lautem District

Agustino's account demonstrates the complexities around valuing 'traditional' and 'modern' versions of knowledge. Agustino's framing of the knowledge and experience of 'older generations' was similar to that of other farmer informants, that is, modern methods of agricultural farming were preferable and older methods were inadequate. This negative framing of traditional agricultural knowledge was extended not only to 'traditional' farming methods but to farming in general.

Armindo notes how working as a farmer makes him feel 'left behind':

"I like it [farming], when we don't work then we don't eat, when we work, we eat...[but] I feel sad inside because many of friends went onto be educated, and I'm left behind because thinking about going wasn't possible, because our financial situation couldn't support it... I'm not that happy, I work hard on the farm, but I'm not happy seeing my colleagues advance, going forward and I'm left in the same place."

Armindo [M] Aileu District

Financial Capital

At the time of the interviews, there were no banks in Timor-Leste outside of the capital Dili. However, there were micro-credit schemes that were primarily aimed at women. Several of the farmer informants had previously participated in the microcredit schemes but left because they found the weekly deposit too demanding. None of the farmer informants reported currently participating in a microcredit cooperatives or schemes.

“There is access to credit — each week they have to make a deposit. For instance, Tuba Rai and Moris Rasik⁶⁸ — they have to pay back each week and people feel like they can't do that — so many people stopped and just a few people continued. A week is a short time — it is too short and there is no money, nothing at home, so people left. Each Sunday, you just trying to find a little bit for the household or for the kids, it is too much to find extra to make a deposit... I was part of this but I felt like the weekly payments were too much, I didn't have the strength to do it so I left.”

Maria [F] Dili District

Agustino was aware of a credit scheme that extended credit to farmers for rearing large livestock. He reported the credit scheme as being supported by an NGO and bilateral aid, rather than a government program. It was unclear from the interview material if Agustino himself had taken a credit loan through this scheme but he did report many people in the region as accessing credit for

⁶⁸ *Tuba Rai* and *Moris Rasik* are the names of micro-credit schemes

livestock farming. Further, Agustino noted that only those individuals who had “*come of age*” and weren’t “*too old*” could access the credit.

“Old people can’t [access the microcredit scheme], such as old people who are elderly and can receive government money [aged pension], they can’t [access the microcredit scheme] because physically they can’t do it anymore.”

Agustino [M] Lautem District

As discussed earlier on pluriactivity (Section 8.3), several of the farmer informants had off-farm sources of income including wages, small business profits, income from selling livestock and income from selling coffee. In this way, each farmer informant had a unique mix of his or her sources of financial capital. Interestingly, proximity to the capital of Dili did not seem to correlate with financial capital resources.

Indeed, one farmer informant⁶⁹ living the close to Dili and a main road appeared to be in an extremely financially insecure situation, unable to send his children to school and living in a one bedroom tin shack with immediate and extended family. This is significant because proximity to Dili and its markets and waged labour are assumed to be related to financial opportunities.

Cash income was valued for purchasing several necessities. Necessities included household items such as soap, washing powder, rice, cooking oil, sugar, tea, coffee and school supplies (books, pens, uniforms). Social and cultural ceremonies (Tetum: *Adat*) and Bride Price (Tetum: *barlaki*) as well as

69. I have chosen not to name the farmer informant in this case as this was my judgement of their living conditions, rather than directly reported by the farmer informant.

stimulants (betel nut, cigarettes, alcohol and gambling) were also noted as requiring cash income.

All farmer informants valued the possibility of increasing their financial capital via participation in the Agro-Energy Program. This included indirectly via the funds provided for establishing the feedstock greenhouses or directly by (potentially) selling their feedstock. Only one farmer informant, Domingos,⁷⁰ had sold any biodiesel feedstock. Domingos reported selling 200kg of Jatropha bean at US\$0.25/kilo dehusked or USD\$0.15c/kilo with the husk on. The transport was provided and paid for by SEPE. The 200kg was sourced from 25 cooperative members. It was not explicitly stated during the interview how the USD\$50 (200kg x USD\$0.25) was shared between the cooperative members.

Although none of the farmer informants explicitly discussed it, it became clear through the interviews that official participation in the Agro-Energy Program meant that the Cooperative received some form of financial support from SEPE. José was not an official participant, so was unlikely to have received funds and expressed some disgruntlement in his negotiations with SEPE. However, other farmer informants such as Tomas spoke of paying day labour from SEPE funds.

Farmer informants were not explicitly questioned about receiving pensions or remittances and no farmer informants voluntarily reported this information.

70. Domingos' production of Jatropha in this instance was not directly linked to the Agro-energy Program, but rather was a crop from an earlier private biodiesel pilot scheme in which he had participated.

Physical Capital

As noted at the beginning of this chapter, the majority of physical infrastructure was destroyed in Timor-Leste in 1999. As such, the physical infrastructure represents what has been re-built from 1999–2010 (time of the interviews). In addition, the GoTL struggles to undertake adequate maintenance of infrastructure across the country, meaning that road blockages, landslides and electricity brown-outs and black-outs are common.

All of the farmer informants in Timor-Leste could be considered to have poor and limited access to physical capital. No farmer informants had piped water to their house, and access to electricity was intermittent. In the case of Maria, a lack of electricity also meant a lack of water as water was primarily sourced from deep wells requiring the use of an electrical pump. Maria's neighbours had a generator but the cost of fuel was prohibitively expensive to run the generator to supply water to the extended social network

“We get electricity intermittently only — it will go for 2 weeks, if there is a landslide or something happens, then we get no electricity — it can up to a month with no electricity if a tree falls on the line. Sometimes there is no physical disaster, but we just don't get electricity — when we get it — usually just 3–4 hours a night. Life is hard without electricity because it also means no water. We can't really just buy candles and kerosene — it is no good for our kids to study by.”

Maria [F] Dili District

For other farmer informants, collecting water from springs or rivers was considered normal and primarily the work of women and children.

Roads were generally reported as being poor condition, both within town centres and in rural areas:

“About the roads you don’t need to go, inside the town there are poor roads but we could say they are good enough, because when I work I go out to rural areas where I have to walk because there are no roads, there just aren’t any and when I have a client that has a problem in the middle of the night, I can’t go because there is no electricity and no roads.”

Domingas [F] Baucau District

In terms of physical capital in relation to the Agro-Energy Program, farmer informants who were formal participants had received basic materials for building a greenhouse, polybags for planting seedlings as well as gardening tools such as watering cans, hose and shovels. José was not a formal participant in the Agro-Energy Program. As noted earlier, he had decided to plant *Jatropha* after observing his neighbours’ participation. However, José had put forward a request to SEPE for some materials or funding for his small plantation, which was rejected.

In addition, Agustino noted that there existed trade and import monopolies, with particular companies controlling the importation and distribution of agricultural machinery, tools and inputs. Shortages of supply were reported as common place, both due to logistical challenges but also due to withholding of particular commodities for political ends. For example, it was possible to undermine government programs by manipulating shortages of supply of essential material controlled by elite businessmen in opposition to the

elected government. In this way, physical capital was not just instrumental but became a tool by which other social and political endeavours were met.

Ecological Capital

Ecological capital was reported in association with climate change, farming seasons and access to land. Climate change was frequently mentioned in terms of shifting weather patterns that were no longer predictable and created uncertainty around traditional planting and harvesting patterns.

Armindo noted that the rainy season appeared to be shifting and that strong winds in this year's seasons did not correlate with last year's seasons.

Domingos reported that long dry spells had resulted in food shortages across the nation. Tomas felt that before the soil was fertile but now, crops were struggling to flourish. In this context, farmer informants reported feeling confused about their farm activities, e.g., should they weed again or wait for the rain?

Now we don't understand, where's the rainy season or where the dry season —before we understood because when it was rainy reason — it rained without stopping, and when it was dry season there was no rain, the rain stopped, the plants received sunshine, so it was like, the weather was thinking of us, so that we could prepare ourselves...

José [M] Aileu District

For farmer informants, such as Maria, Lucinda, and Isaias, living close to coastal areas with low rainfall meant particularly precarious growing conditions.

“When there is rain we get a bit of corn, a bit of cassava — the same with vegetables — if there is rain, they survive, but if there is no water, none of our vegetables survive.”

Maria [F] Dili District

Farmer informants frequently mentioned water as an important ecological asset, although mostly in the context of not having enough water or access to water, whether for crops or for personal consumption. As noted earlier, all agricultural activities were undertaken with rain-fed measures and accessing water for household consumption was primarily done by manual collection.

Land

Although land can be considered a type of ecological capital, the ways in which land was discussed in the Timor-Leste was primary about *access* to land, rather than land’s instrumental function of ‘making a living’. Access to land was mediated through formal regulatory processes as well as cultural and social norms. Given the limited number of farmer informants in this research project, there was a wide heterogeneity to land ownership and access. The ways that land was talked about can be grouped into three main areas, being transmigrant land, land with unclear status and ancestral land. Further, gender was reported as an influence to access to land.

Transmigrant Land

Isaias, Lucinda and Maria all lived on transmigrant land ⁷¹. Their property consisted of a house and approximately 50 metre x 50 metre farming plot. Isaias noted that he farmed some distance away from the house on “*abandoned land*” as the small plot was insufficient for self-sufficiency.

Maria noted that access land outside their allocated plot was subject to negotiation with the Village Chief and the traditional land owners to gain access. Isaias stated that he was deliberately farming *Jatropha* for the Agro-Energy Program on abandoned land that was located far from his household. As *Jatropha* was not attractive to animals and would not be eaten, it required little maintenance but allowed Isaias to claim the land as productive and have a degree of an ownership claim over the land. Isaias recounted this story alluding to the recent government appropriations and payment of compensation for land claimed for development purposes. Whilst this information formed a small part of the interview, it provided great insight into alternative drivers for participation in the Agro-Energy Program. I elaborate on this in the Discussion (Chapter 9).

Land with Unclear Status

Land with unclear status refers to land whose ownership is contested — either as a result of Portuguese colonisation, Indonesian occupation, as part of resettlement of communities or a combination of all three of these factors. This was particularly reported in the coffee growing region of Ermera. Tomas

71. Transmigrant land was generally land that during Indonesian times was allocated for migrants from across Indonesia to occupy. It usually consisted of small plots with standard government housing. Transmigrant land is known for housing together people that do not necessarily have common language or cultural ties.

reported that people in the community *occupied* land that had previously been large estates controlled by colonial governments or elite land owners. The occupied land status was problematic as Tomas reported some people were reluctant to farm non-coffee crops due to insecure tenure. Tomas mentioned the need for land reform as a necessary step for the general population being able to form a livelihood and grow sufficient crops for meeting their food needs. In Tomas's account, there was both reference to land as instrumental (necessary to making a living) but also to land as hermeneutic and emancipatory.

Ancestral Land

Several farmer informants were farming land that had previously been farmed by parents, grandparents or the more generic 'ancestors'. This included Armindo, Agustino, José and Domingos. Armindo reported that the boundaries of this land were not static but part of community knowledge and farming plot location was negotiated with neighbours and other community members.

An interesting point to note is the language that farmers located on family land tended to use when discussing land tenure. Even those farmers who were married, had children and considered themselves as the head of household often referred to the land they farmed as "*my grandparents land*" (Tetum: *avo nian*) or "*my parents land*" (Tetum: *ama sira nian*). No farmer informants referred to land as solely their own land. This is important to note as it possibly represents not only how land is talked about, but also how land is conceptualised in Timor-Leste. That is, there are strong communal and ancestral notions tied closely to land ownership. Other farmer informants noted that some land is considered *private* and some land is considered *communal*. The farmer informant emphasised that communal land could be not used for

private purposes, and in their particular case, they would not plant *Jatropha* for the Agro-Energy Program on the communal land as then the extended family and community would be able to claim a portion of any future revenue.

Gendered Access to Land

All farmer informants agreed that gender was a major factor in access to land. How access to land was negotiated for women varied by location and personal circumstance. In general, it was reported that women were primarily expected to access land via their husband and upon marriage forfeited any claim to family ‘ancestral’ land. Unmarried or widowed women were ‘permitted’ continued access to their familial land, but through family negotiation and goodwill rather than as a legal or cultural right.

“When there is a right, when it is said that it we should give, we give it, we consider that we have a younger sibling that will get married and if they don’t have land, we would give a little to them to work.”

Armando [M] Aileu District

Domingas married a man from a different district and had access to her husband’s family land but her marriage voided her right to claim land in her home district. However, this is not a hard and fast rule per se. Farmer informants discussed that access to land also depended on other factors such as if the husband had ‘sufficient’ land for supporting a livelihood and that the woman is able access and use her husband’s land for her livelihoods. In the case of (a) separation, (b) death or (c) husband’s land was insufficient for a sufficient livelihood — then there it was reported that cultural protocol would hold that the woman should be allowed access to her family land.

Farmer informants discussed these two options in conceptually different terms. For a couple farming the husband's parent's land after marriage, they were considered to be farming family land, that is, with permanent access. In contrast, farming the wife's parents land after marriage was considered to be renting land. That is, temporal access dependent on goodwill of the male family members.

“In Aileu, when a man marries a woman from another district, then she must come and work the husbands land. [But] When a man goes and marries a woman in another district and decides to farm there, then this is not private [land]...it is rented.”

Armando [M] Aileu District

Another farmer informant stated explicitly that women have no rights over land. In this farmer informants' district, women are able to continue farming their parents land but are not able culturally to make a formal claim to ownership rights over the land. Whether or not this is part of the formal legal system, it is important to consider how land access plays out in practical terms.

8.5 Agency

I have chosen to discuss agency primarily in terms of two main themes that were chosen during the use of Grounded Theory Method in the data analysis. These are (a) decision-making and (b) resistance.

A recurrent theme in the interviews was how agency was supported by experiential knowledge. Farmer informants' internal sense of their experiential knowledge facilitated their agential activities — that is, it enabled them to plan,

choose and imagine future possibilities. This has been discussed briefly in the Section on Human Capital (Section 8.4) but is returned to in this section.

Decision Making

As part of the interviews, farmer informants were asked directly about decision-making at a household and farm level. Analysis of the interviews showed that decision-making was often tied with experiential knowledge, and bounded by cultural and social context.

Farmer informants acknowledged different decision making powers within the household influenced by gender, age and relate hierarchy within the family. Most farmer informants reported that men have more power in terms of decision-making within the household. Domingos felt that men have more decision-making power within the household because they have had to pay a bride price (Tetum: *barlaki*) or compensation to the women's family.

“In most households it is the men who make the decisions, it is possible that women can but you could count those [households] on your fingers...”

Domingos [M] Baucau District

Although Armindo emphasises the equal role between the genders in his household, he is talking about his parents as Armindo is unmarried and lives in his parent’s household. The decision-making occurs between them and they inform the rest of the family about the decisions. The cultural restrictions around women making decisions and speaking publicly were reported as closely tied

“Men are the ones that can make decisions...but women are starting to understand that they can too, that they can take a decision, some of them can — its not just the men...but we all know that if men are in their own place and they follow the culture — then women are in the kitchen and they can't speak up”

Domingas [F] Baucau

However, the female farmer informants emphasised the importance of women's agrarian knowledge in terms of making farm level decisions.

However, this was not reported significantly by male farmer informants despite some informants such as Armindo acknowledging that certain farm work was 'women's work' — in particular seed saving and planting decisions.

“Men make the decisions within the household because they are the household head- but he will listen to his wife. When I was little we just accompanied our parents and did what they did but when we grow up and get our own families — we have to understand ourselves how to farm, when to plant, to clear, when to plant out seedlings.”

Lucinda [F] Dili District

Domingas emphasised that women have a deep and broad experiential agrarian knowledge, in part due to the long hours that they spend farming. This informs women's farm-level decisions.

“It is men who decide about when to clean the field, and do fencing this is all men. Then it is women who decide when to plant. Harvest — either one can decide that. Men are stronger — they are the ones who do the physical labour. Women just do the watering, or the safe work Women know seeds because they have a long knowledge based within

the household. Women have to think about what crops to plant, what rain will come”

Maria [F] Dili District

In the Agro-Energy Program, despite the low levels of agronomic knowledge of *Jatropha* as a feedstock, several farmer informants joined the Agro-Energy Program and were increasing their knowledge of *Jatropha* outside of the project boundaries. José, Armindo, Agustino and Isaias had grown *Jatropha* from cuttings rather than seed provided by SEPE. Agustino had grown both and planted them in different plots in order to observe the different yields. Essentially Agustino was creating his own 'demo plot' scenario. Here there are strong links between experiential knowledge and decision-making as the farmer informants sought to increase their knowledge as part of on-farm decision-making processes.

“This is my plan, there will be part — a hectare or half a hectare that I will use for [planting] seedlings and on the other side I will plant from cuttings and the [far] side for planting from seed.....I want this to be an example and in the future we can see the difference in oil production — I mean the seedlings compared with the cuttings compared with seeds to see which is most productive...”

Agustino [M] Lautem District

Farmer informants had also thought through risks of participation in the Agro-Energy Program based on their own and their social networks experiences. For instance, Agustino mused about the cost of transport for the feedstock and how pressure might be applied to SEPE to ensure that the government covered transport costs. Agustino had also considered how he

would access an alternative market for selling his feedstock if SEPE failed to buy it at harvest time.

Domingas emphasised that people in her community were reluctant to plant *Jatropha* based on their experiences in past agricultural projects

“This is the challenge that I referred to before, that people are scared, people are scared to plant lots of this [Jatropha] because of what happened during Indonesian times, there was a company...that asked people to plant Jatropha and there was hectares of it all planted out...but then company just abandoned it all”

Domingas [F] Baucau District

Resistance

Everyday resistance was spoken about in interactions with extended families or communities of the farmer informants. Both Domingas and Agustino noted the reluctance of their relatives and communities to either be involved specifically in the Agro-Energy Program, or more generally in ‘innovative’ agricultural projects.

Domingas stated that her community were wary and unconvinced that *Jatropha* could be sold as a commodity. This wariness manifested as non-participation in the Agro-Energy Program — a form of everyday resistance. Domingas thought that this could be resolved via a strong public awareness campaign (Tetum: *sosialiasi*).

“[They] don't understand to this day and there are many people that don't trust to this day as well; we have tried for two years but the people don't have any trust and say “Is this real or not? Someone needs

Jatropha — what if we plant it and then no-one needs it? What will we do then?” So they don’t trust even though they know that there is now a [processing] factory.”

Domingas [F] Baucau District

Agustino felt more worn down by his community’s resistance to participation.

“I told them, “You could plant a field here why don’t you want to?”

Oh, this this and many excuses, “So with this land rather than abandon it you want to go and make your fields far away, correct? So why don’t you utilise this land”. This is exactly what I said and they said, “Well we could plant but it eats up a lot of time ... firstly... we must plant what we can eat, because with that [Jatropha] you can’t eat it right?”.

This is what interrupts their thoughts most of the time. Sometimes I get down; I get mentally down but it doesn’t matter.”

Agustino [M] Lautem District

In José's case, he appears to be situated in the grey area between everyday resistance and third way alternative resistance. José is participating in the Agro-Energy Program (third way resistance) but very much so on his own terms (everyday resistance). As noted earlier, José is not part of the official Agro-Energy Program — he did not form a cooperative or receive materials or funds to establish a greenhouse. José had tried to convince his neighbours to plant *Jatropha* and join in an agricultural group with him but he notes — people want to get an income their own way and decide for themselves when and what they farm.

“... some of those people farm, but some of them prefer to work, um, like each one has their life and how they are accustomed to working, they like to work just in an office... or if they like it to work as a tradesman, they are best accustomed to that. That is better than them working on a farm, because this is a difficult life, it’s very difficult... before when we started planting [Jatropha] we explained to them, we said, it’s like this, why don’t you try to plant, but they didn’t want to come and plant with us. They didn’t want to until finally, it appeared that they may be heard some information, someone saying that this too is beneficial, so some of them starting to plant but they didn’t want to do it together [with us].”

José [M] Aileu District

José's case highlights that participation and non-participation can fluidly shift between being acts of resistance.

Armindo’s description of his initial participation in the Agro-Energy Program is interesting. Armindo is not resisting but he presents his participation as something that he is doing on advice from a colleague, a favour, fulfilling his social obligations.

“A colleague came from Dili to counsel me, he brought seeds, and he also brought netting, and... [interruption by relative: watering cans] two watering cans, a 4-metre length of hose and they left these things with me with seedlings.”

Armindo [M] Aileu District

Tomas discusses the use of everyday resistance in relation to coffee plantations. Tomas notes how the current coffee plantations are meant to be

renovated but that it will take at least five years for new coffee trees to produce a harvest ⁷². Tomas said that no-one has bothered with doing this because they have no alternative income or food sources for the five-year gap. This ‘non-action’ represents the idea of everyday resistance — there is no outright ‘anti-coffee-tree-renovation’ movement, rather no-one bothers to follow the external advice due to lack of livelihood alternatives.

There are other instances in the empirical data that could be considered everyday resistance. For instance, farmer informants’ superficially forming cooperatives to secure access to participation in the Agro-Energy Program. As noted earlier, Agro-Energy Program cooperatives were not actual official cooperatives but rather family groups. This can be considered everyday resistance because the farmers were giving the *impression* of obeying the rules, whilst actually ensuring access to opportunities on their own terms. Indeed, whilst SEPE formally assumes that the benefit of the Agro-Energy Program for smallholder farmers is the potential future income from biodiesel feedstock, the true benefit may be in securing SEPE funds in the first place and undertaking the minimal actions required to access those funds.

The next section turns to the localised context of the farmer informants.

8.6 Context of Farmer Informants

This section addresses the context of the farmer informants. In part, the context of the farmer informants has been built through the previous discussions on the components of Strategies, Capitals and Agency. This section

72. Declining productivity is associated with older trees that should be replaced by new seedlings .

will on aspects of Context that did not fit within any of the earlier components. There are two main areas that emerged during the use of Grounded Theory Method, being (a) social values (b) social differentiation.

Social Values

The social values of society toward farmers and farming was a recurrent theme throughout the interviews with farmer informants in Timor-Leste. This was evident in how the farmer informants talked about their own selves and occupations, and also how they framed discussion about farming practices in general.

Firstly, farming in the traditional way was mostly seen as backward and for uneducated farmers. Some farmer informants' views aligned with the 'modernisation of agriculture' paradigm — whereby traditional agriculture practices and the peasantry are seen as primitive and on a path to inevitable development. Several farmer informants aligned with official government or NGO rhetoric about 'bad' farming practices. In particular, slash and burn, and shifting cultivation were often discussed in negative ways.

Agustino was negative about past farming practices and lamented the lack of enthusiasm on behalf of his relatives for being more entrepreneurial, innovative and willing to take risks in their farming practices. Agustino also inserted himself into his narrative about attitudes towards farmers and farming.

“Our ancestors were a little dumb [uneducated] — they dug, planted, harvested, ate and then did nothing. Not me, now I will plant, I will make a field, to be a big one, I will be a big farmer, I will be a professional farmer, I will orientate them to agribusiness, this could be

a tourist destination, because when we dream big, make it happen, produce hard, we create a new style of producing much, then we like land owners not like labourers to the land.”

Agustino [M] Lautem District

Tomas framed his discussion about farming practices in a long historical context associated with colonisation. He was careful to give the history of Timor-Leste at the beginning of his interview, pointing out the ways in an historical context that Timorese smallholder farmers affected their current livelihoods with the ongoing use of *fazendas* (landed estates) common in this region.

“At the time of Portuguese colonisation for four hundred and fifty years, many people lost their rights and their dignity because they were unable farm their fields as they had lost their land... the foreigners had taken their land to make landed estates [fazendas].”

Tomas [M] Ermera District

Tomas discussed independence and the need for civic education to ensure that people understood their rights in the newly independent nation. In particular, smallholder farmer’s right to work land and produce food. Yet, Tomas also talked about traditional agricultural practices in a negative way.

“Here the majority of us just use the same system, as before there was no education about agriculture and how to prepare the land with modern methods. Just recently have the people started to be educated about how to prepare the land with a system; so in the past when they farmed, they each went and hoed their plot, burnt, planted, cleared the grass, waited for ripening, harvest and ate; they just ate [their produce]

because nothing was worth anything [financially]. But now, just recently there has started to be this system, a system whereby they say that we mustn't burn the land."

Tomas [M] Ermera District

Tomas was particularly concerned with the need for land reform in his region and in this way, was able to insert himself and his choices within this wider historical dialogue.

In a way, both Tomas and Agustino see themselves as simultaneously a 'common farmer' and 'better than' the common farmer. Agustino in particular emphasised agri-business as a positive move away from being 'just' a subsistence farmers. Armindo talks about farming due to a lack of other economically viable decisions.

"I didn't want to continue going to school because we had a poor financial situation, well I wanted to go but our financial situation couldn't support it, so I needed to support myself and work as a farmer, many youth with poor financial situations have to work just as farmers."

Armindo [M] Aileu District

Armindo talked about farming in diminutive terms as though it had low social worth. For example, the use of the diminutive term 'just':

"I just work in the fields"

Armindo [M] Aileu District

He also compared himself to his colleagues who no longer farmed.

“Inside I feel not that happy, because I am working hard in my fields, and I’m not happy because I see my colleagues going forward, moving ahead, and I’m just in the same place.”

Armindo [M] Aileu District

Several farmer informants placed emphasis on so-called real employment as an office job and talked about farming as something that you do when you cannot get a real job. This is reflected in Lucinda statement:

“Around 1996–1997 we got into private business because there was no employment.”

Lucinda [F] Dili District

In contrast, Domingas saw the past and agricultural livelihoods through ‘rose-coloured glasses’ —that is, with a romanticisation of the past remembered in a positive light.

“When I look to the past, in the past when I was little I accompanied my grandparents, my father, my mother, we all lived from farming, it wasn’t just that my father didn’t work or that my mother didn’t work but everyone’s livelihood was agriculture, all my ancestors... I see that yields were much better in the past than now because everyone loved the land, loved their fields and they were independent and gave everything to carefully consider how to produce the best food.”

Domingas [F] Baucau District

Domingas linked farming livelihoods with a sense of greater social equality in the past. That is, the majority were one of the farming masses and only royal (Tetum: *Liurai*) families had access to education or formal employment. Domingas emphasised modern dominance of cash for food

purchases and imported foods — noting that in the past “*food was better and more plentiful*”. Domingas went to explain she thought it impossible to encourage people working to want to return to farming as a livelihood as it was expected that food would be purchased.

“Now everyone purchases [food] so to return to farming is difficult, what could we do to make people want to return to farming — this is impossible for us.”

Domingas [F] Baucau District

Domingas worked for an NGO for a wage and farming was currently a minimal part of her livelihood — it was still highly valued by her.

These examples are significant because they illustrate the ways that the farmer informants internalised discourses about farming and smallholder farmers, and that at times this created internal conflict around their identity and how they saw their role within society.

Social Differentiation

Gender formed part of the direct interview question in Timor-Leste. Farmer informants reported differently about gender in the household and on the farm. Male farmer informants tended to firstly describe women’s responsibilities as primarily located within the ‘inner household’ (cooking, cleaning and childrearing). Male farmer informants also acknowledged gendered differences in on-farm labour and decisions. Male farmer informants tended to describe women’s roles in diminutive forms or frequently as “*assisting*”, “*helping*”, “*supporting*” men in their farm work.

Across all farmer informants, certain on-farm tasks and decisions were frequently cited as being either men's or women's — although this was often clarified with the point that a spouse could help their partner even if particular tasks or decisions were normally assigned to the other gender. A recurring theme in the interviews about gendered labour was that women can participate with certain activities on the farm “*if they want*” because women's participation means that farm tasks are completed “*quickly*” (Tetum: *hotu lalais*).

However, after more direct questioning, farmer informants discussed how certain realms of farm work and on-farm management decisions were *primarily* the responsibility of women. This included seed sorting and saving, planting, weeding, land preparation and livestock raising ⁷³. Further, women were often considered the primarily marketer of any crops sold for income. That is, women were responsible for the transport of goods to market, calculating if transport could be paid from potential earning or otherwise physically carrying goods to market and responsible for selling the goods in the market.

Throughout the interviews, one interesting case was Tomas's report on how his cooperative established under the Agro-Energy Program specifically excluded women's participation, except for the woman who had been hired to cook lunch for the male labourers. Tomas spoke about “*a choice not to involve women*” rather than women choosing not to participate. The female cook was paid approximately 40% less for her labour than the male labourers in the

73. Note: different responsibilities were reported for different regions.

cooperative. Tomas justified excluding women's participation by stating that the work was "*too heavy*" and the Cooperative leadership ran the risk of being reported to a local Women's Advocacy NGO if they involved women in "*heavy work*".

Yet, Tomas also commented that women must cook, run the household, look after the children and farm whilst the husband comes home to sit, drink coffee and socialise. Tomas recounted this point in a humorous manner — his approach acknowledged the iniquitous but social fate of this division of labour. Tomas's account represents a good example of the dualism of men's accounts of women's roles on the farm and in the household. There appears to be a gap between his rationalisation for not involving women ('work is too heavy') and how he explains women's current roles and responsibilities (heavy work across multiple spheres).

When women talked about women's roles in the household and on the farm, they noted outright that women's work was hard. Examples given included women walking long distances to collect water (often with children also being carried or in tow); walking long distances (10–20 kilometres) carrying goods for market; being primarily responsible for planting, choosing the timing of planting, seed selection and storage, weeding and crop maintenance; as well as the childrearing and inner household maintenance. Yet, despite these responsibilities, as noted in the earlier section on agency (Section 8.5), women are strongly bound by social and cultural norms. Domingas highlights:

"They [women] don't understand that they have independence, that is to say women also have rights to do things."

Domingas [F] Baucau District

The Discussion (Chapter 9) returns to the importance of gender as an aspect of social differentiation.

8.7 Negotiating Autonomy and the Agro-Energy Program

The ways that the Timorese farmer informants articulated the concept of autonomy differed significantly from the farmer informants in Brazil. In particular, the role of the state as being obliged to provide and increase opportunities for agricultural innovation was seen as an important aspect of autonomy.

In this way, the participation in the Agro-Energy Program (as a government led program) was not seen as a structural form of dependency but as an exercising of social capital to attract benefits that increased autonomy, whether on an individual, household or community level. In so far as the Agro-Energy program offered an opportunity to increase self-reliance and a more secure livelihood — it was seen as making a contribution to an autonomous livelihood, rather than as an outside imposed program. However, it is important to remember that this was the version articulated by the farmer informants that had the resources (whether through land, familial ties or income from pluriactivity) to be able to participate without risking their livelihood. These farmer informants did report that part of their wider social networks chose not to participate. The reasons for non-participation were not attributed to ‘resistance to Empire’ but rather skepticism, risk management and ignorance.

In Timor-Leste, the practices that farmers informants view as contributing to autonomy align with the idea of rights to ethno-cultural

practices and decision-making power which is tied to land. Indeed, access and utilisation of land was a key factor in articulation of autonomy — and in this way, non-access to land was seen to erode autonomy and the ability to create an autonomous livelihood. Whilst the important link between land and autonomy may seem self-evident when considering subsistence farmers in Timor-Leste, the heterogeneity of access and utilization of land is more complex than it initially appears. At first glance communities, in particular single villages, may appear cohesive and homogenous — but it the underlying political alliances, different agricultural practices and varied territorial claims strongly influence whether and how autonomy can be practiced.

Importantly for scholarship examining how and why smallholder farmers in Timor-Leste accept or reject government initiated agricultural programs is the issue of identity and the modern agricultural view of subsistence farmers and farming as sites of stagnation and backwardness. Despite farmer informants narratives including critiques of traditional farming as ‘uneducated practices’ — this appeared to be largely rhetoric and there was stronger evidence of traditional agricultural knowledge being intricately linked with identity, resistance, and autonomy. As such, traditional agricultural practices reinforce autonomy in a myriad of ways that may be invisible and thus offer some explanation toward why smallholder farmers in Timor-Leste don’t always adhere to logic of adopting new agricultural technologies or practices.

Table 6 Key Findings Specific to the Timor-Leste Agro-Energy Program

Autonomous Livelihood Framework component	Timor-Leste
Livelihood strategies	Participation in the Agro-Energy Program was a strategy to secure SEPE funds and undertaking the minim actions required to access those funds.
Capitals	<p>Jatropha was considered a low value, partly wild crop and as such, although farmer informants were familiar with it—they did not have knowledge on how to address agronomic issues it. That is, familiarly does not equal all the knowledge that farmers need to grow successful feedstock because biodiesel feedstock requires different types of use, harvesting and growing than traditional uses.</p> <p>Low levels of experiential knowledge of Jatropha as a feedstock</p> <p>Cooperative members had minimal personal financial risk involved in their participation.</p> <p>Networks (social capital) with SEPE to ensure that their village received a development project that directed benefits to members of the community.</p> <p>In some cases, female farmers were able to provide labour as part of biodiesel Cooperatives but were denied the benefits of influence or decision-making</p>
Agency	<p>In the Agro-Energy Program, decision-making was informed by experimenting with crop production on farm</p> <p>Farmer informants had thought through risks of participation in the Agro-Energy Program based on their own and their social networks experiences in other agricultural projects</p> <p>Non-participants in the Agro-Energy Program were reported as reluctant to plant Jatropha based on experiences in past agricultural projects</p> <p>This wariness manifested as non-participation in the Agro-Energy Program</p>
Context	<p>Farmers were giving the <i>impression of obeying the rules</i>, whilst actually ensuring access to opportunities on their own terms.</p> <p>Farming in the traditional way was reported as backward and for uneducated farmers</p> <p>Farming practices in a long historical context associated with colonisation</p>
Autonomy	<p>The State was seen as obliged to provide and increase opportunities for agricultural innovation was seen as an important aspect of autonomy.</p> <p>Participation in the Agro-Energy Program was an exercising of social capital to attract benefits that increased autonomy</p>

Non-participation in the Agro-Energy Program was attributed to skepticism, risk management and ignorance.

Access and utilisation of land was a key factor in articulation of autonomy and the Agro-Energy Program was used a device to support access to land, rather than an end-unto-itself

Underlying political alliances, different agricultural practices and varied territorial claims strongly influence whether and how autonomy can be practiced.

Traditional agricultural knowledge being intricately linked with identity, resistance, and autonomy.

8.8 Chapter Summary

In this chapter, I have demonstrated how the farmer informants from Timor-Leste negotiate their livelihoods through differing combinations of livelihood strategies, capitals, agency and context.

I began the chapter by providing a broad historical context for Timor-Leste, in particular noting the impact of social and political upheaval on agricultural practices and capitals. I emphasised that post-independence agricultural and rural development has been disjointed despite its importance to both the non-oil economy and potential for livelihood importance in the short term.

In the section on Livelihood Strategies (Section 8.3), I reported the high incidence of pluriactivity amongst farmer informants, possibly offering them leeway to participate in the Agro-Energy Program. Farmer informants reported diversification as an essential livelihood strategy, though the ability to practice broad crop diversification was heavily dependent on location and relative wealth.

Internalisation of resources and auto-consumption were common practices amongst the Timorese Farmer Informants — but the farmer informants were primarily interested in expanding their agricultural practices toward long-term livelihood enhancement rather than short-term subsistence needs.

Turning to Capitals (Section 8.4), social capital and social differentiation largely mediated access to other capitals. Farmer informants emphasised the importance of mutual obligation to their immediate and extended social networks as part of an autonomous livelihood in flux. Social capital and social differentiation mediated access to land (ecological capital), as well as financial capital. In particular, this finding has ramifications for agricultural and rural development programs in Timor-Leste — a point I elaborate on in the Discussion (Chapter 9).

Farmer informant's reports about traditional agricultural knowledge were often contradictory; at times reported as poor practices based on low education of 'backward' farmers and yet simultaneously highly valued in terms of links to identity and culture.

Two aspects of Agency were addressed — decision-making and resistance. All farmer informant's narratives reiterated the significant of gender on decision-making in the household and on the farm. In particular, female farmers were reported as having a deep and broad understanding of their farms and agricultural practices and as the key decision-makers on particular farm management issues.

Farmer's experiential knowledge facilitated their agential activities. In relation to *Jatropha*, farmers drew on their experience of other agricultural or rural development programs, and their knowledge of traditional uses of *Jatropha* to decide how they would participate in the Agro-Energy Program. In absence of sufficient rural extension services, farmer informant's used this knowledge to manage their *Jatropha* greenhouses.

Resistance to the Agro-Energy Program was evident through farmer informant's reports of their extended family and community being reluctant or unwilling to participate in a program with no clear market. The farmer informants were frustrated with this resistance — but did not recognise the higher risks involved for farmers with less stable or diverse livelihood resources.

In terms of the Context of the farmer informants, there was a clear differentiation between the concept of traditional farming — backward, uneducated yet abundant — and modern farming which was described in terms of opportunity and future thinking. Shifts toward waged income were reported as changing people's culinary preferences (shop bought food as opposed to home grown food) and creating reluctance for individuals to consider farming as sustainable or desirable livelihood.

Gender was a clear aspect of social differentiation and the Agro-Energy Program had largely failed to address female farmer participation.

Finally, the Agro-Energy Program did support the farmer informants negotiating for autonomy but not in the ways that the program was designed to — that is, via increasing financial capital. Rather it was the networks of social and political obligations that were reinforced by the Agro-Energy Program through a centre-periphery form of mutual support.

Annex 14: Timor-Leste: Summary of Key Findings has been included to complement this chapter:

The next chapter turns to the Discussion.

Chapter 9: Negotiating for Autonomy, Livelihoods and Biodiesel Schemes

9.1 Introduction

This doctoral research started with an academic curiosity about social sustainability and livelihood implications for smallholder farmers participating in biodiesel schemes that explicitly included social inclusion and rural development outcomes as part of their model. In this context, there are interlinked tensions and complexities about both:

- (a) How smallholder farmer livelihoods are constructed and interpreted, and
- (b) How participation in biodiesel schemes is part of those livelihoods.

A central premise of this thesis is that the ways in which smallholder farmers negotiate their participation in biodiesel schemes as part of a wider livelihood is currently under-theorised and based on limited empirical research (Hodobod & Tomei, 2013). There is a significant knowledge gap about the main reasons why smallholder farmers do or do not participate in biodiesel schemes; indeed in Brazil "...roughly eight years after the beginning of the biodiesel program in Brazil little is known about how this policy impacts different farming systems ...[and] ...uncertainty exists regarding constraints faced by different farmers..."(Dal Belo Leite et al., 2013, p.196). This study aims to contribute toward developing a nuanced interpretation of the smallholder farmers' participation in biodiesel schemes and has done so through a farmer centred approach.

The multiple ways of theorising about rural livelihoods as a combination of strategies, capitals, agency and context has been introduced via two approaches being the Sustainable Rural Livelihood Framework and van der Ploeg's (2008) peasant principle (Chapter 4). Both these approaches represent seminal texts in the ways that rural development and smallholder farmers livelihoods have been interpreted. The Sustainable Rural Livelihood Framework attempted in a holistic and integrated way to explain how both micro and macro factors across a range of areas affected the formation of different livelihoods (Section 4.2). The peasant principle introduced the idea of striving for autonomy as being central to how smallholder farmers construct their livelihoods in resistance to Empire (Section 4.3).

Through this thesis, I have developed an integrated approach that draws partly from both these approaches but in doing so, creates a novel way of thinking about smallholder farmer livelihoods. Through the development and application of the Autonomous Livelihood Framework, I propose the notion of negotiating for autonomy as a critical element of how livelihoods are constructed, and as a way to interpret the farmer informant narratives in this study.

The biodiesel schemes examined in this study specifically targeted smallholder farmers as primary beneficiaries and with the case of Brazil, the large scale of the PNPB has sparked interest in the rural development and social inclusion outcomes of the program.

In this chapter I discuss the novel contributions this doctoral study offers by using the Autonomous Livelihood Framework to interpret smallholder farmer informants' narratives to illustrate that the ways that

biodiesel schemes are incorporated into their livelihoods. I argue that the notion of negotiating for autonomy assists in explaining the contradiction and counter-discourse in the farmer informants' narratives about livelihoods and participation in biodiesel schemes. I assert that smallholder farmers' perspectives (as local knowledge) are legitimate sources of information to provide a (re)-solution to the wicked problem of biodiesel schemes for rural development.

Further, I assert that the dominant discourses on both how and why biodiesel schemes are incorporated into smallholder farmer livelihoods is largely misplaced and leads to misinterpretation of policy outcomes. The approach that I take here challenges exogenous notions of success or failure of the biodiesel schemes and highlights the farmer informants' alternative drivers for participation.

This chapter is structured as follows:

Section 9.2 addresses the research question of *How can we explain smallholder farmers' participation in biodiesel schemes as part of a rural livelihood in Brazil and Timor-Leste?* I draw on the empirical work to discuss how the farmer informants incorporated, adapted and disobeyed the rules of the biodiesel schemes as part of their wider livelihoods.

Section 9.3 discusses the key findings related to agency and experiential knowledge, and introduces an unexpected finding on the concept of identity as a key aspect of negotiating for autonomy.

Section 9.4 turns to *How do smallholder farmer's perspectives help explain and interpret the rural development outcomes from biodiesel schemes in Brazil and Timor-Leste?* The position that I advance here is that smallholder

farmer perspectives can re-structure interpretation and analysis of policy outcomes. I specifically examine social inclusion as a rural development goal and use the farmer informant narratives to illustrate the ways that smallholder farmers define social inclusion.

Section 9.5 returns to challenge the concept of social inclusion. Specifically, I assert that neither of the biodiesel schemes examined changed the social inclusion / exclusion status of the smallholder farmers, because the biodiesel schemes were part of an ongoing reinforcement of the socio-economic norm.

Section 9.6 highlights the importance of social capital and the ways that social capital can be conceptualised differently by smallholder farmers and government bodies — creating a gap between how the biodiesel schemes were theoretically meant to function and how functioned in practice.

Section 9.7 discusses the evidence for capitals as possessing hermeneutic and emancipatory powers in the farmer narratives. Here I extend this notion to livelihood strategies and illustrate how perceptions of ‘good farming / good farmer’ are linked to wider social values and farmers’ identity.

Section 9.8 reviews gender as an aspect of social differentiation and how this influenced the ways that smallholder farmers participated in the biodiesel schemes.

9.2 Interpreting Smallholder Farmers' Participation in Biodiesel Schemes

To address the primary research question of *How can we explain smallholder farmers' participation in biodiesel schemes as part of a rural livelihood in Brazil and Timor-Leste?* I assert that smallholder farmers' participation in biodiesel schemes can be understood as part of broader livelihoods in flux that are constructed and constantly re-constructed through the process of negotiating for autonomy. Negotiating for autonomy is a process that is informed by internal factors, such as identity and shifting notions of self (Friedman, 2003), interactions with external structural and social context, and epistemological factors such as what smallholder farmers consider as the choices available to them. This view of livelihoods as constructed through negotiating for autonomy aligns with Nelson and Stock's (2016) assertion that "...both social psychological and structural contexts matter in terms of encouraging or dissuading farmers from experimenting with or transitioning to more sustainable practices..." (p.1). That is, livelihood strategies and practices are not static or solely externally driven.

One of the key findings from this research is that smallholder farmers incorporate biodiesel schemes into their livelihoods largely on their own terms, which are both spatially and temporally dependent. This finding aligns with Creutzig, Corbera, Bolwig and Hunsberger's (2013) assertion that "... place-specific and global dynamics influence both aggregate and distributional outcomes across... livelihood dimensions" (p.1).

The farmer informants were not beholden to the biodiesel schemes structures, and used acts of resistance to manoeuvre within the schemes — specifically drawing on their own experiential knowledge to inform how the scheme could best contribute toward their livelihood. The high value placed on experiential knowledge by the farmer informants themselves led to actions such as breaking contracts and disregarding technical advice — actions that have been elsewhere misinterpreted in the literature as farmers ignorance or lack of understanding the benefits of such arrangements (Santos & Rathmann, 2009; Stattman & Mol, 2014; Xavier & Vianna, 2009). This study challenges these assertions and argues that smallholder farmers’ participation in biodiesel schemes cannot be reduced to the characteristics of crops, technologies, income or assuming that smallholder farmers will obey the structural expectations of biodiesel schemes.

Rather, the farmer informant narratives illustrated that constructing livelihoods involved compromise, negotiation and risk mitigation across a range of livelihood strategies with varying access and use of capitals. In Timor-Leste, the biodiesel scheme represented opportunity to enhance social and political capital, and (future potential) access to ecological capital (land). In Brazil, the biodiesel scheme was considered a potential opportunity to diversify — but this potential was superseded by concerns with social capital, existing farming practices and strategies and how the biodiesel scheme would fit within existing livelihood matrixes. As such, only some farmer informants saw it as an appropriate risk and/or relevant to the ways that they were constructing their livelihoods.

Challenging the Dominant Discourse

Earlier, I have argued that the two dominant discourses that are used to interpret smallholder farmers' participation in biodiesel schemes are flawed (Chapters 2 and 3), largely as they do not provide room for incorporating the messiness of smallholder farmers' lived experiences. The environmental narratives that critique biodiesel expansion as a conventional agro-industrial modernisation process that goes against the social and economic interests of smallholder farmers for the benefit of transnational capital and agri-corporations (Castellanos-Navarrete & Jansen, 2015; Leopold, 2010) and the biodiesel-for-rural-development narrative that proposes biodiesel expansion contributes positively utilising idle production capacity (Gasparatos, Stromberg & Takeuchi, 2011) are over-simplifications. As identified by Hospes, Kroeze, Oosterveer, Schouten and Slingerland (2017) in their specific work on palm oil production, these contrasting frames are presented as dichotomous: sustainable / unsustainable, problem / opportunity, threat / benefit.

Both these dominant narratives overlook smallholder farmers as morally autonomous beings capable of acting within and simultaneously changing the socio-political-economic context in which they are located. As noted by Burton and Wilson (2006), agency-related factors accompany agrarian change but are (mistakenly) rarely considered as a driving force "... the farming community has often been viewed as responding almost entirely to *outside* forces, with little acknowledgement of possible changes from *within*..." (p.96) (italics in the original).

The empirical findings in this research indicate that these *inside forces* — specifically in this study articulated as agency, experiential knowledge and

identity — have a significant influence on the how and why of smallholder farmers' participation in biodiesel schemes. The farmer informants' narratives in this study neither directly support nor contradict either of dominant discourses about whether biodiesel schemes are beneficial for smallholder farmers' livelihoods. Rather the narratives illustrate the various ways that smallholder farmers perceive and consider whether the biodiesel schemes fit within their existing livelihood matrix that is socially embedded.

9.3 Agency and Experiential Knowledge

The empirical findings in this study show that part of the reason why the biodiesel schemes are not meeting the stated social outcomes is because they are framed on assumptions about smallholder farmers decision-making and actions based on an agricultural modernisation approach that prioritises the idea of development by external drivers, rather than on considering how smallholder farmers, as morally autonomous beings with agency, may choose to participate or not participate in the schemes. In this way, the government-led-biodiesel-schemes-for-rural-development can be considered as promoting a particular discourse that reinforces societal power relations, in particular, the idea that the state knows best and that smallholder farmers are agent-less actors.

In contrast to this approach, these findings support the assertion that farmer informants in both locations had a strong sense of valuing their independent decision-making and this resulted in several instances of the farmer informants disobeying the rules of the biodiesel schemes. This reinforces the findings of Newberry (2014) who notes that biodiesel refinery administrators and other outsiders misrecognise acts of risk, mitigation and everyday resistance as “ ... backwardness...[and]...cultural traditionalism ...” (p.310).

Recognising disobeying the rules as positive exercise of agency and as a legitimate choice in the smallholder farmer contexts appears to be a significant blind spot in some analysis of biodiesel schemes. Disobeying the rules — through actions such as breaking contracts — is associated with low education, lack of trust between the smallholder farmer and biodiesel refineries

(Stattman & Mol, 2014) and negative moral characteristics on behalf of smallholder.

In contrast to this view, my research shows that disobeying the rules made sense in the farmer informants' contexts. In the biodiesel schemes examined, smallholder farmer had limited formal avenues for utilising their knowledge and minimal options for on-farm value adding, due to a relatively low position within value chain — disobeying the rules can be interpreted as an act of agency to use their own knowledge and judgement when no formal mechanisms exist. Indeed, there is limited empirical research about the challenges of the biodiesel schemes for smallholder farmer and the factors that lead to disobeying the rules are poorly explored in the literature.

I agree with the view from Dal Belo Leite et al (2013) that “Uncertainty exists regarding constraints faced by different farmers’ who try to access biodiesel markets” (p.196) and argue that the farmer informants who reported disobeying the rules did so when alternative choices were better suited to their needs, context and livelihood strategies. Indeed, this assertion mirrors Wolford’s (2010) work on agrarian reform in Brazil that found it is necessary to operate outside the “...margins of acceptable (and legal) behaviour...” (p.91) for those who want agrarian reform because of the weakness, variability and lack of technical and logistical resources on behalf of the federal government.

Exercising agency based on experiential knowledge

The PNPB, as an emerging policy, struggled with adequate technical, logistical and human resources to implement the policy as designed. From

2006–2016 there were multiple policy changes, in part to close the gap between idealistic policy goals and the reality of implementation. This included an enhanced role for agricultural cooperatives in order to access smallholder farmers and a reduction in the minimum purchasing quotas required for refineries to receive the Social Fuel Stamp, due to extensive reports of difficulties in accessing the required quota of feedstock from smallholder farmers (Stattman & Mol, 2014). The farmer informants' report of cooperative agricultural extension staff lacking sufficient knowledge and experience with the feedstock crops aligns with wider research into the deficiencies of technical assistance in the PNPB (Marcossi & Moreno-Pérez, 2017). In light of this uncertainty, the farmer informants report about valuing their own knowledge, experience and exercising their agency in ways that contradicted the PNPB advice can be reinterpreted as choices that make sense in the context.

In Brazil, the farmer informants spoke about making on-farm crop production decisions that were often in direct contradiction to the advice given by rural extension officers. Edvalice, José and Reinaldo had all made on-farm feedstock management decisions that did not fit in accordance with the technical advice (Section 8.4). These decisions can be framed as exercising agency based on their own experiential knowledge. The decisions and livelihood strategies are based on and in an experiential understanding of those individuals' livelihoods from their own perspective, rather than top-down idealistic criteria. Even when the farmer informants decisions did not result in the outcomes they anticipated — for instance when Edvalice's second attempt at sunflower production fails — nevertheless, as noted earlier in the discussion on agency (Section 8.5), the decision was still hers as “We give special weight

to our own present and past decisions... because (all other things being equal) we made them.” (Christman, 2015, Section 2.1 para.5).

Given the lack of formal mechanisms for bottom-up knowledge and information sharing, the farmer informants incorporated their own knowledge through alternative pathways such as resistance (Section 7.5) and through the use of social networks to access, observe and share information about the biodiesel scheme. In Brazil, farmer informants reported the use of social networks as a source of knowledge, but also emphasised the importance of access to formal knowledge, such as global commodity prices, via the internet, radio or television in order to be able to participate in the biodiesel schemes on reasonable terms. This debunks notions of smallholder farmers as ignorant to the workings of the PNPB when choosing to disobey the rules. I assert that smallholder farmers chose not to follow planting guidelines or honour contracts because their knowledge indicated that these were preferable legitimate decisions.

Valuing Local Knowledge

The framework of knowledge and decision-making that the farmer informants were operating under also contributed toward decisions that initially seemed illogical as an outsider. In Timor-Leste, Isaias’s biodiesel cooperative was growing *Jatropha* far from the main house on land that was difficult for them to access and tend the crop. When viewed through the ‘normal’ framework of assuming that participation in the Agro-Energy Program and feedstock production was to obtain a good yield and thus income, the planting of feedstock in this manner appears nonsensical. However, broadening the

decision-making framework to take into consideration the wider social structure of Isaias and his peers lends greater creditability to their decision. Isaias was less concerned about profit from the feedstock than about having a state-sanctioned crop that would support to legitimise land claims.

Specifically, Isaias and the biodiesel cooperative were using the feedstock as a way to ‘stake a claim’ on a parcel of land, without having to invest funds or divert activities away from their daily livelihoods. At the time that this research was conducted in Timor-Leste (2010), government appropriation of land for development projects was a dominant and controversial theme in the media and civil society. There had been several high-profile cases where compensation was paid to villagers when their land was appropriated and cases where villagers had refused to leave believing the compensation offered was inadequate (Almeida & Wassel, 2016; Thu, 2012).

The history of dispossession, forced migration and displacement from customary land is common in Timor-Leste and social relations shape access to land and livelihoods (Thu, 2012). In attempting to formalise the land registration and titling and account for the history of dispossession and displacement there have been special principles built into the Transitional Land Law “The special adverse possession principle enables claimants to obtain land and property title either through long-term and peaceful occupation of land” (Thu, 2012, p.202).

Isaias was an internal migrant and lived on a 50m² parcel of state allocated land. Isaias’s access to farming land was complicated and involved negotiation with customary landowners. By utilising this wider framework and taking into consideration the importance of access to land as a livelihood

resource, the reasoning of Isaias and the biodiesel cooperatives to plant *Jatropha* is justified.

Unexpected Findings: Identity as a Key Part of Negotiating for Autonomy

In forming the Autonomous Livelihood Framework, identity was not initially incorporated explicitly as a component or sub-component. However, final analysis of the empirical data led to the conclusion that identity forms a key part of negotiating of autonomy. Smallholder farmers' identity plays a role in terms of their participation in biodiesel schemes because identity guides and informs behaviour and decision-making (Burton & Wilson, 2006).

Identity was a reoccurring theme in the farmer informant narratives and an emotional topic for some informants. Farmer informants discussed issues of pride, shame, and the link between their own identity and societies perceptions and (de)valuing of smallholder farmers. In Timor-Leste, the Agro-Energy Program symbolised opportunity and innovation. It both attracted farmer informants who considered themselves as innovative (my label) and reinforced this self-identity. Several of the farmer informants in Timor-Leste had experience in previous agricultural development projects and their participation in the Agro-Energy Program contributed toward their self-identity as an agricultural innovator.

Agustino portrayed himself as a modern farmer willing to take risks and extend his knowledge and farming practices into new crops and production — but his relatives are less keen to takes these risks and Agustino reports feeling depressed at their 'backwardness' and lack of enthusiasm (see Section

8.4). Here we can see in part that the notion of self (as innovator) and notions of ‘other’ rely on each other — Agustino defines his relatives as traditional and non-innovators and in doing so, reinforces his self-identity as modern, innovative and entrepreneurial. Agustino’s case also illustrates a structuration approach as Agustino cannot just act on his agency — he is bounded by the social structures, identities and willingness of those around him.

Burton and Wilson (2006) argue that notions of other are important in forming farming identities and that non-farming identities such as family-oriented identities can influence the decisions of farmers — even when the farmers personal agricultural preference may lie elsewhere. This notion could in part explain why certain farmer informants in Timor-Leste participated in the Agro-Energy Program. That is, to reinforce their identity as community leader, innovator, or political ally — despite its apparent unprofitability.

In Brazil, the notion of identity influenced farmer informants decisions associated with participation in the PNPB (see Section 7.3). Reinaldo decided not to sell his castor feedstock to the PNPB cooperative but to continue to sell to the local broker, with whom he had an established relationship and identified as a fellow community member. For Reinaldo, his identity and role in his local community took priority over a small profit margin of selling via the PNPB. With minimal price difference, identity and social obligation were foregrounded against financial gain. This interpretation of smallholder farmers opting to continue with broker in the castor industry differs significantly from other interpretations that consider the continued use of broker as due to exploitative labour power relations. Indeed, this would concur with Manzi’s (2013) work that highlights that the PNPB discourse has attempted to

demonize the broker in order to support a portrayal of the PNPB as a farmer friendly economically fair alternative “The agrodiesel discourse on past exploitative practices [by brokers] is used to make ... the PNPB appear as a social service when it in fact merely offers to pay farmers at market value” (p.213).

In Brazil, José is a good example of a farmer informant possessing simultaneously multiple identities. José self-identifies as a conservationist as he preserves 15–20% of his land uncleared, a traditionalist as he continues farming practices taught by his father, an innovator and on-farm diversifier who has accessed rural credit multiple times for different investments including cashew trees, cattle and sunflower feedstock for biofuel, as well as an off-farm entrepreneur as he owns a small home business with his wife. These multiple-identities influence how José utilises his livelihoods strategies and capitals as he negotiates for autonomy.

Acknowledging that smallholder farmers may hold multiple farming and non-farming identities simultaneously supports debunking a social inclusion approach that categorises smallholder farmers as socially excluded based on the notion of a static, niche social identity. This is important as recognised by Hospes and Clancy (2011), as the issue of identity ties with issues of social inclusion: “The... assumption is that social inclusion... refers to a (permanent) condition or even a status quo and can be used as a label to categorise individuals... such categorisation can be used in a moral, judgemental way...” (p.25). This interpretation of the interweaving of both farming and non-farming identities, agency and decision-making is significant

because it contributes toward debunking the lineal ideas of externally driven rural development.

9.4 Smallholder Farmers' Perspectives and Implications for Policy

The two biodiesel schemes examined in this study are based on the treatment of smallholder farmers as a relatively homogenous group that is largely uneducated, in need of state intervention in order to modernise and develop farming practices that link them to global commodity chains with the primary objective of economic maximisation (César & Batalha, 2010; César & Batalha, 2013; Rathmann & Padula, 2011; Rico & Sauer, 2015; Silva et al., 2014a). In the PNPB structure there is an emphasis on economic incentives at farm, cooperative and refinery level through the provision of state subsidies and tax concessions. The normative assumption in the PNPB is that the 'desirable' condition is an urban capitalist ideal, that smallholder farmers (peasant) will be inevitably transformed into urban workers or capitalist farmers (Lehtonen, 2012) and the PNPB offered structured support to this end. This is evident in the PNPB through the use of the language of social exclusion and social inclusion whereby smallholder farmers are *eo ipso* defined as socially excluded from the desirable capitalist mainstream (Gonçalves, Favareto & Abramovay, 2013; Hospes & Clancy, 2011).

In contrast to this emphasis on economic maximisation as a driving force of participation and determinant of social inclusion, the farmer informant narratives challenge this view with a focus on how participation in the biodiesel schemes could contribute to their livelihoods— weighing the

associated participation costs (social, personal, financial). Whilst potential future income from the biodiesel feedstock was certainly a factor that farmer informants considered in deciding whether to participate or not, economic maximisation alone could not be considered a primary motivator.

The farmer informants choice to participate (or not) was based a more intertwined decision as they considered how the biodiesel schemes would fit with their broader livelihood strategies, sense of identity, agency and access to capitals. For instance, the accounts from farmer informants such as Filomena and Olimpio illustrate how, with existing stable income (i.e. retirement pensions), they were more interested in livelihood activities based through their local agricultural cooperatives, such bee-keeping and local agri-food production, and familial obligations than in being enticed by profit oriented cash crops (Section 7.4). In this way, the farmer informants' narratives challenge the logic of privileging financial maximisation and income production as livelihood drivers and align with Nelson and Stock's (2016) assertion that "... Farmer practices are influenced by their room to manoeuvre, that is, what choices they have available to them physically, materially and financially, but also epistemologically ..." (p.8).

In Timor-Leste, the Agro-Energy Program was not structured to be economically feasible or provide ongoing financial benefits to participants (S. Mulyani, SEPE, Personal Communication, October 2010). Yet smallholder farmers continued to participate in the Agro-Energy Program despite clear indicators that the farmer informants understood the weak financial return from the Agro-Energy Program — raising the question, that if economic maximisation was not a driving force, then what alternative explanations are

evident in the farmer informant narratives? One of ways that smallholder farmer ‘participation without clear financial benefit’ has been interpreted is to attribute such participation to ignorance on behalf of the smallholder farmers (Newberry, 2014; Rathmann & Padula, 2011) or to the idea of false consciousness (Castellanos-Navarrete & Jansen, 2015; Cornwall, 2003; Wolford, 2006). I have argued against these approaches earlier (Chapter 3). A key finding from this study is that participation in the Agro-Energy Program was a strategy used by the farmer informants in Timor-Leste to reinforce their autonomy and an autonomous livelihood across different spheres — in particular social capital (political and kinship networks) and ecological capital (land). These aspects were not necessarily targeted by the biodiesel schemes but were the driving forces for participation for the farmer informants.

The Timor-Leste Agro-Energy Program: Success or Failure?

Viewed through the economic maximisation lens, the case of the Agro-Energy Program in Timor-Leste could be considered as a ‘failure’ — it generated practically⁷⁴ no income for any of the farmer informants and lacked adequate human and financial resources to establish a functioning value chain and distillery. Yet as noted by Shepherd and McWilliam (2011) in their anthropological study on rice development in Timor-Leste, conceptualisations of success or failure in relation to agricultural development projects are

⁷⁴ . Domingos and his cooperative did receive payment for their *Jatropha* feedstock that was planted under a different pilot project and thus ready for harvesting (see Section 8.3).

complex, layered and multi-dimensional — much more so than the standard markers of success or failure attributed by the external agencies.

The Agro-Energy Program in Timor-Leste could be considered a failure both by applying the lens of an agricultural modernisation approach and by an environmental narrative approach. The Agro-Energy Program did not provide economic maximisation or social inclusion (i.e. employment and income) for the farmer informants. The Agro-Energy Program encouraged smallholder farmers to plant a non-edible cash crop dependent on structured demand in a country with high food insecurity and complex, contentious land tenure issues. Yet, as noted by Castellanos-Navarrete and Jansen (2015), whilst biofuel projects appear to go against the social and economic interest of smallholder farmers — they continue to engage and even drive the expansions of biofuel projects in some regions. This was the case in Timor-Leste, where at face value the Agro-Energy Program was poorly conceived and designed yet in practical terms it received strong support from farmer informants.

The Agro-Energy Program could be considered a normal, perhaps even typical, example of how political affiliation, access to capitals and livelihoods are negotiated within a particular context and how smallholder farmer participation represents ongoing negotiations for autonomy. The Agro-Energy Program was successful in terms of meeting its non-explicit role and function as it fulfilled other niches of the smallholder farmer livelihoods. To this end, I consider the alternative explanations for the farmer informants' participation in the Agro-Energy Programs.

Farmer informants' participation in the Agro-Energy Program can be understood as a strategy to secure access to material benefits. Although the

farmer informants largely did not receive direct income from sale of feedstock through the Agro-Energy Program, participation still gave the farmer informants access to material benefits such as funds, seeds, basic farming equipment and construction material. Some cooperatives used the funds to pay for labour in the greenhouses.

Beyond the material assets, participation in the Agro-Energy Program also fulfilled social capital needs at two primary levels. Firstly, it was way of transferring resources from the government (centre) to political affiliates and the social network of SEPE staff (periphery). Several of the farmer informants had direct links either politically (e.g. members of the same political party) or socially (e.g. originating from the same village or extended family) with SEPE staff. In Timor-Leste, there are strong cultural obligations of the centre to periphery. This can be understood in terms of a “ ... cultural code of reciprocity ... ” (Silva, 2012, p.164) whereby suffering and sacrifice must be compensated for by those in power.

Thus, the Agro-Energy Program is a coherent response of SEPE as it allowed the directly channelling of resources from those who would to be considered to be in power and prospering (political power or government employees with access to wage income living in the capital) to those who were suffering and sacrificing (smallholder subsistence farmers’ living in rural areas with irregular access to financial or physical capital).

Secondly, the Agro-Energy Program also reinforced the local power base for particular farmer informants. Bringing the Agro-Energy Program to the village allowed individuals to meet familial obligations and reinforce their local legitimacy and power by demonstrating that they were able to secure

resources, funding and projects for their specific village. Indeed, in the case of Agustino, Tomas and Domingas, whilst all were nominally head of their biodiesel Cooperative, it was their extended family that laboured on the biodiesel feedstock (see Section 8.3). Agustino, Tomas and Domingas' social role was to access and secure the Agro-Energy Program in their village. In this way, we can see the reciprocal strengthening between extended family. This is reminiscent of Silva's (2012) work on reciprocity, recognition and suffering as political tool: "The local leaders, upon presenting themselves to the populations of the villages as responsible for the structuring of these events, strengthened themselves before their bases." (p.171). The importance of the Agro-Energy Program for symbolically and visibly⁷⁵ representing the ideas of alliance and reciprocity should not be underestimated as these remain key features of social structure in Timor-Leste (ibid).

The smallholder farmer informant decisions make sense when considered as acts of exercising agency located within the farmer's context and that the very act of decision-making contributes toward negotiating for autonomy. I purposefully use the term *make sense* in this context rather than *rational choices*. Wolford (2006) notes the problem with describing informants counter-discourse as a rational choice

... rational choice ... attempts to understand
consciousness assume an intentionality (people do

⁷⁵ . I noted 'visibly' because each Cooperative was required to have a billboard with details of their project located by the roadside and the greenhouses were identifiable as biodiesel feedstock greenhouses in the villages.

things because they mean to) that is common of social movement theories in general... these positions assume a market-place of ideas and decision-making that invokes Liberal economic theory: believing in agency has come to mean believing in intentionality. (p.338)

Indeed, the narratives of the farmer informants in this study do not conform to the idea of intentionality or rationality. Indeed, using a rational-choice-economic-maximisation lens would render some of the farmer informants' narratives and choices as nonsense.

It is careful to note here that challenging the market logic of the Agro-Energy Program does not necessarily mean that the farmer informants were practising or privileging subsistence production; indeed in Timor-Leste, subsistence production in the form of auto-consumption was reported in a negative light as it represented poverty and lack of choice (Section 8.3). In this way, auto-consumption can be considered as a practice that is value-bound — this contrasts with the ways that auto-consumption is portrayed in a positive light in the peasant principle (Schneider & Niederle, 2010; van der Ploeg, 2008).

9.5 Challenging the rhetoric of Social Inclusion in Biodiesel

Schemes

The two biodiesel schemes examined in this study include social inclusion as a primary rural development goal. As outlined earlier (Chapter 2) neither scheme has a specific definition of social inclusion but in practice both have focused on the linking of smallholder farmers with a market-oriented agricultural program and increased income as the mechanisms by which social inclusion is meant to occur. In contrast to this approach, I assert that in both Brazil and Timor-Leste, smallholder farmers as being either socially included or excluded was not changed by the mechanisms of the biodiesel schemes. Indeed, I assert that the biodiesel schemes examined in this study represent part of an *ongoing process* of reproducing the normative social, political and economic structures present in Brazil and Timor-Leste.

Brazil

In Brazil there is strong evidence that the social inclusion goals of the PNPB are not being met (Silva et al., 2014a) and criticism about the conceptual underpinnings of social inclusion (Hospes & Clancy, 2011). The current play of the PNPB leaves structural exclusion issues — such as unequal land distribution— largely untouched. The role created for smallholder farmers in the PNPB as a feedstock provider dependent on external seed or seedlings, bank loans and contracts dictated by refineries and government policy

replicates many of the same structural power imbalances that inform the notion of smallholder farmer as excluded in the first place.

The empirical work in this study strongly refutes claims by authors such as da Silva Júnior et al. (2012) who claim that in Brazil the PNPB social inclusion goals are being met through increased income for smallholder farmers in Northeast Brazil. Da Silva Júnior et al.(2012) analysis cites a 400% increase in household income of smallholder farmers participating in the PNPB as evidence of increased social inclusion. I disagree on three main fronts, being that:

- (a) Da Silva Júnior et al. (2012) fails to account for alternative factors that may have increased the household income
- (b) Income does not necessarily equal social inclusion, and
- (c) There is a lack of analysis on the wider frames of social inclusion such as the frequency and quality of the rural extension services (technical assistance) that are meant to be provided to smallholder farmers as part of the PNPB.

In terms of income, farmer informants in this study growing castor bean feedstock did report improvement in the per kilo price that they were receiving for the unprocessed bean as opposed to selling to brokers who sold to the pharmaceutical industry. One farmer informant emphasised the benefit of receiving free hessian sacks for packing the bean. However, the higher price castor bean price during the 2010 harvest seems to be due to government subsidies and the sudden competitiveness of a previously monopolised market. The income received via the PNPB was not reported by farmer informants as

significant and this aligns with the work of Schaffel et al. (2012) that shows limited impact of feedstock production on household income.

Whilst income from farming was important for the farmer informants, their notions of social inclusion were broader and grounded in issues related to vibrant rural communities and the social value placed on farming and smallholder farmers. In discussing social inclusion, farmers went beyond the basics of income and employment to speak about experiences of being excluded from decision-making processes, discrimination based on their illiteracy and the difficulty of having a legitimate voice in the way that the PNPB was being implemented (Section 7.4). As elaborated earlier (Section 7.5), farmer informants' agency, specifically decision-making and experiential knowledge about their farms, was highly valued by themselves but poorly recognised in the PNPB. Farmer informants made decisions based on their knowledge that was in conflict with the PNPB guidelines because they prioritise their experiences and knowledge above that of an externally formulated program. Indeed, Carla articulates strong opinions about the PNPB as an externally designed program that fails to consider smallholder farmer's viewpoints (Section 7.5).

In this way, the farmer informants' narratives align with a broader reading of social inclusion that incorporates participation in decision making and farmers' perspectives in policy formulation. Shortall (2008) in her work on rural development argues that participation in decision making is the key to social inclusion, regardless if such decisions or choices result in greater connection with mainstream society or not.

Timor-Leste

The Timor-Leste Agro-Energy Program is modelled on the Brazilian PNPB — in particular the emphasis on social inclusion as a rural development goal. Yet, there are a myriad of problems in transferring development program models between different contexts and countries. The notions of what constitutes social inclusion in Timor-Leste is radically different from that used in the context of Brazil. In particular, being a smallholder farmer in Timor-Leste does not equate with being socially excluded — rather it is the norm.

In Timor-Leste, social inclusion and exclusion are negotiated in the domains of rural-urban divides, political alliances, and generational differences (Bexley, 2007; Silva, 2012). The historical colonial (Portuguese) and neo-colonial (Indonesian) experiences are key ways through which identity and notions of inclusion and exclusion are both imagined and articulated in Timor-Leste: “The past is also a mechanism for legitimacy. Indeed, the past plays a more important role in deciding current positions of power than any other form of legitimacy.” (Bexley, 2007, p.82).

As discussed previously smallholder farmers’ do not necessarily have one static identity or associate themselves with a particular social niche. In this way, identities relating to past roles in the resistance to Indonesian occupation or to the rhetoric of suffering and sacrifice (Silva, 2012) take precedence to identities as smallholder farmers. As such, the Agro-Energy Program’s emphasis on social inclusion was misplaced because it focused on aspects that whilst relevant to smallholder farmer *livelihoods* (income, markets, cash crops)— were largely not areas in which social inclusion or exclusion have been negotiated.

The Agro-Energy Program's focus on social inclusion via increased incomes was also misplaced because it largely targeted what Hospes and Clancy (2011) identify as "...privileged insiders ..." (p.35). The farmer informants participating in the Agro-Energy Program had combinations of:

- (a) High levels of pluriactivity often with alternative sources of income
- (b) Direct links with SEPE staff and
- (c) Adequate capitals (in terms of land, time, labour) enabling their participation in the first place.

In this way, the Agro-Energy Program could be considered to reinforce local power relations and existing social hierarchies (Sutherland & Burton, 2011) by providing structured opportunities for the privileged insiders whilst limiting access for smallholder farmers without land, capital or connections.

This is particularly relevant when a gender lens is applied to the Agro-Energy Program and the ways that it failed to consider gendered notions of social inclusion and exclusion. In the academic literature on agriculture in Timor-Leste, gender is rarely noted or explored within the empirical context of understanding livelihoods or farm management. Several studies fail to include gender disaggregated data, even when discussing household level education, age of the head of household and decision-making (Moore, Dormody, VanLeeuwen & Harder, 2013; Noltze, Schwarze & Qaim, 2012). Other studies claim that gender is not a significant factor when considering yield of crops (see Williams et al., 2012). In contrast to these views, the empirical data from this research suggest that gender is an important factor on-farm — both in terms of gender disaggregated farm labour and decision-making.

The significance of this is that provides empirical evidence to show how transferring biodiesel scheme models between countries and contexts is problematic. At an implementation level, there were no increased social inclusion outcomes from the implementation of the Agro-Energy Program because social inclusion / social exclusion based on farming incomes were not relevant. Secondly, at a theoretical level a conventional social inclusion lens to analyse the Agro-Energy Program offers little further insight about how and why smallholder farmers incorporated the Agro-Energy Program into their livelihoods.

9.6 Conceptualisations of Social Capital

The incorporation of cooperatives as part of the biodiesel schemes in both Brazil and Timor-Leste illustrate the ways that social capital can be defined differently by the state and by smallholder farmers. In Brazil, the farmer informants were highly aware that outside structured approaches to utilising social capital held limitations and risks (as noted in Chapter 7). The experience of banks nominating random guarantors from within the same community had led to widespread debt defaults. In the same way, the contracting of biodiesel cooperatives in the PNPB — a strategy that was meant to ensure smallholder farmer integration into the PNPB through emphasising social capital networks — is increasingly recognised as a limited and misplaced approach (Manzi, 2013; Stattman & Mol, 2014).

Compared with those in the south and central west, cooperatives in the north and northeast often have low organizational capacity, social capital and trust

(Watanabe et al., 2012; Kilham et al., 2010) and, more than incidentally, have a negative reputation among farmers' because of corruption and their (government-related) roles in the political control of farmers... (Stattman & Mol, 2014, p.284)

The biodiesel cooperatives did not have formal mechanisms for knowledge sharing between the rural extension officers and smallholder farmers and whilst in theory the biodiesel cooperatives are based upon the collective voice and wants of its members, in practice the cooperatives essentially functioned as corporate extensions of the refineries and government. The Brazilian farmer informants held significant wariness about the biodiesel cooperatives and their lack of ownership and financial contribution, illustrating the low levels of social capital (trust, informed networks, mutual obligation). This is especially notable when compared the high levels of trust (even when reporting dissatisfaction with price monopolies) with the local broker and the contrasting government attitudes to brokers as exploitative.

In Timor-Leste, the farmer informant narratives also indicate different conceptualisations of social capital between the government and smallholder farmers. In Timor-Leste, the difference was centred on attempts by SEPE for official models of social capital via the formation of biodiesel cooperatives and farmer informant's actual use of social capital with extended family to superficially fulfil this requirement. As noted in the Timor-Leste Empirical Findings (Chapter 8), the biodiesel cooperatives in Timor-Leste were predominantly family groupings simply labelling themselves as cooperatives

for SEPE — and indeed, labelling themselves as association for other government departments in order to secure access to resources.

The significance of this is that it indicates a need to understand the norms of social capital and the institutional structures or practices already in place in a location-context specific way, before attempting to implement generic rural development models that unwittingly may be culturally inappropriate.

9.7 Hermeneutic and Emancipatory Uses of Capitals and Strategies

Since the notion of capitals as possessing hermeneutic and emancipatory powers was first articulated by Bebbington (1999), authors have explored the ways that capitals (i.e. soils as an ecological capital) inform farming identities and give meaning to farmers' lives and practices (Wahlhütter, Vogl & Eberhart, 2016). In Timor-Leste the notions of land (as ecological capital) being intricately tied to identity, lifestyle, notions of self and other are well established (McWilliam & Traube, 2011).

In the farmer narratives, the most significant evidence of capitals having hermeneutic and emancipatory utility was in Timor-Leste. Re-enforcing and utilising social capital was a key driver for participation in the Agro-Energy Program and at the same time formed part of both how the farmer informants imagined themselves, and themselves in relation to their community. That is — as discussed later in the section on the Unexpected Findings relating to identity — as innovators, community leaders, and political allies.

Similarly, through the Agro-Energy Program, Isaias imagines that he will be able to secure more permanent access to land (ecological capital) — or at least be financially compensated if the state appropriates the land. Isaias’ use of participation in the Agro-Energy Program in this way can be considered emancipatory — he is imagining and acting toward an alternative future pathway through his actions now. Wahlhütter et al. (2016) argues that

Agricultural land can be seen as a “*display of the farmer's knowledge*” and value system (Rogge et al., 2007). As soil and farmland activities are very visible to other members of the community, all visible activities and features that are not indicative of “*good farming*” “*may restrict the generation of cultural capital, damage the reputation or status of the farmer and consequently, lower their access to social capital*” ... (p.41)(italics in original)

In this way, it is not only the capitals that carry meaning but farming and livelihood strategies as well. The farmer informant narratives from Brazil would align with this view — especially the reports from farmers such as Carlos and Antônio on agrarian reform settlements, who reported social judgement and negative views about agrarian reform farmers as poorly skilled farmers through the social discrimination they faced.

Edvalice’s account about food storage as a livelihood strategy also fulfils function beyond the instrumental — food storage is important to

Edvalice in terms of ‘being prepared’ and being a good farmer. It gives her freedom from risk, and represents future potential choice and safety.

9.8 Gender as a Structural Issue

In this section, I canvas the ways that a gender lens is relevant when discussing social inclusion in biodiesel schemes. Specifically, as the structure of the two biodiesel schemes examined failed to consider the ways that female smallholder farmers roles, knowledge and experiences would not be analogous with male smallholder farmers. Gender is a structural issue that continues to receive minimal attention and treatment in rural sociology and policy (Bock, 2014; Little & Jones, 2000). Indeed as noted earlier, Sprague (2005) asserts that gender is always present in social phenomena and the lack of a gender lens renders interpretations as partial and incomplete. As women comprise a large percentage of smallholder farmers in both Bahia and Timor-Leste, there is an undeniable gender aspect to biodiesel production.

The biodiesel schemes are not ‘gender neutral’ when they treat smallholder farmers as a homogeneous group and fail to recognise that strong influences that gender will have on the experiences, impacts and outcomes of biodiesel production for smallholder farmers. Rather, the biodiesel schemes reinforce the continuous reproduction of hegemonic gender inequality.

Both the biodiesel schemes examined here did not consider the ways that women’s labour is utilised on-farm and the effects of participation in the PNPB would have on changing household dynamics, farm labour divisions and rights to claim income within the household. For instance, in Brazil, the PNPB aimed to mechanise the de-husking of the castor bean process. However, castor

de-husking is largely women's on-farm labour and the mechanisation of this process is likely to exclude women from this process. Whilst authors such as Manzi (2013) claim "women... are likely to benefit more from the mechanization of mamona [castor] seed extraction" (p.320) she fails to acknowledge that labour is often linked with the right to claim income within the household and independence. This would align with work by Sarin and Agarwal (quoted in Cornwall, 2003) who emphasise that women are often denied a voice in rural policy formulation processes but must continue to meet their gendered responsibilities under new rules that change their access and rights to resources and capitals.

The biodiesel schemes have not accounted for the ways that women may be excluded from income producing labour and simultaneously required to undertake increased non-wage labour on the farm due to changing farm management practices through biodiesel feedstock production. In this way, the biodiesel schemes represent an opportunity cost particularly for women as their labour is diverted into or excluded from the schemes depending on their local context. This makes women's labour as an externalised cost to the biodiesel schemes examined.

The biodiesel schemes have assumed that income generated from cash crops is beneficial, without considering how the income is claimed and distributed within the household. In Timor-Leste, there is evidence that large influxes of cash income, for instance at the time of coffee harvest, are associated with increases in intimate partner violence due to increased male alcohol consumption (Groves, Resurreccion & Doneys, 2009; Khamis, 2015). Further, in Timor-Leste due to cultural, spiritual and kin obligations, cash

income is often spent in entirety in a short period leaving smallholder farmers without income for the remainder of the year. More traditional methods of production and harvesting, whereby produce is sold ad hoc throughout the year as income is required, to allow for the staggered management of cash for household needs.

As the Agro-Energy Program of Timor-Leste failed to generate feedstock income for the farmer informants, this is a largely theoretical debate but it does speak to the lack of gender insight at the pilot project formulation stage. Further, the farmer informants did report gender differences in other aspects of the program. For instance, women were excluded from formally joining some biodiesel cooperatives as the work was *too heavy* (Section 8.5) but simultaneously hired them at lower-than-male wages to undertake tasks required for the cooperative to function. In this way, the control of the cooperatives by male smallholder farmers served to reinforce patriarchal notions of labour, farm management and women's roles.

Despite female smallholder farmers essential role on farms and in farm management decisions, services such as a rural extensions services continue to be targeted toward male smallholder farmers with assumptions of 'male-ness' as the norm. In Timor-Leste, Domingas noted that she had suggested that agricultural extension services be targeted to women. Domingas emphasised that if only men attend workshops or training via agricultural extension services, then when men recount the information to their (farming) wives, they might not include all the information, or may have missed or not listened certain information. Domingas stated that these situations left women "*feeling dumb*" as they could not attend agricultural extension training and ask the

questions that they wanted to ask and instead were reliant on their husbands. She said that this is further compounded by the fact that many rural women are uneducated and in the traditional household unable to question their husband's decisions.

These insights about the gendered nature of biodiesel schemes are relevant to the broader understandings about smallholder farmers' livelihoods in these schemes.

9.9 Chapter Summary

In summary, this chapter has illustrated the ways that using smallholder farmer are participating in biodiesel schemes as part of a diversified livelihood strategy and that a true shift toward social inclusion would require systemic, structural change of the systems in which smallholder farmers are located.

I started the Chapter by introducing the idea of smallholder farmer narratives as counter-discourse as a way to acknowledge the messiness and internal contradictions that occur when farmers attempt to reflect and talk about their livelihoods. I then moved to show the myriad of reasons and ways that smallholder farmers chose to participate or not participated in biodiesel schemes and how the schemes were utilised by the farmer informants to maximise their autonomy and livelihood needs.

I showed how smallholder farmer narratives legitimately restructure policy analysis and offer insights into the question of social inclusion as a rural development outcome in biodiesel schemes. I introduced a gender lens to

highlight the ways that social differentiation is largely overlooked in the schemes with significant ramifications for how the schemes work in practice.

Chapter 10: Conclusion

10.1 Introduction

I started this thesis by outlining my personal interest and academic curiosity with social sustainability and rural livelihood outcomes for smallholder farmers participating in biodiesel schemes. Throughout this thesis I have provided a detailed analysis of how farmer informants in Brazil and Timor-Leste incorporated biodiesel schemes into their existing livelihoods and I argued that the Autonomous Livelihood Framework provided a novel, unique approach to interpret their narratives.

In this conclusion chapter, I will consolidate and reflect on the study. This chapter is structured as follows:

Section 10.2 reviews and summarises the individual chapters

Section 10.3 briefly re-states the research questions and the key findings.

I discuss the significance of the findings, particularly in relation to future biodiesel policy development.

Section 10.4 reviews the limitations of the research.

Section 10.5 is a reflective section focused on the use of Autonomous Livelihood Framework with suggestions for adaptations of the framework

Section 10.6 –10.7 provides suggestions for future research in the problem space of smallholder farmers and biodiesel and concludes with some personal remarks.

10.2 Review of the Chapters

In Chapter 1, I started the thesis with my personal story about how living and working in Timor-Leste led me to question the rural development outcomes from biofuel schemes being proposed by private companies at the time. Drawing on this premise, I set out to understand the process of smallholder farmer participation and the emerging rural development outcomes of biodiesel schemes through a transdisciplinary lens. I specifically took a farmer-centred approach that promotes the idea of smallholder farmers as active agents in agricultural and rural development and highlights the importance of smallholder farmer knowledge to biodiesel schemes. The locations chosen for this research were Brazil and Timor-Leste. Early in this chapter, I asserted that the ways in which smallholder farmers' negotiate their participation in biodiesel schemes, as part of their broader livelihoods is currently under-theorised, misinterpreted and based on limited empirical research.

In Chapter 2, I canvassed the Brazilian National Production and Use of Biodiesel Policy and the Timor-Leste Agro-Energy Program. Although these two biodiesel schemes are not comparable as such, the Timor-Leste scheme drew on significant elements of the Brazilian scheme. Most importantly, both biodiesel schemes have a common objective of achieving social inclusion and a common focus on rural development outcomes for smallholder farmers. In

addition, in both locations smallholder farmers are central to national food production and food security, and as such smallholder farmers' participation in biodiesel schemes could have significant national implications.

Given the global rise of biodiesel schemes for rural development — this thesis makes a unique contribution to understanding the current state of play in two existing schemes that could be used to theorise about the models, policies and structuring of biodiesel schemes in other nation-states.

In Chapter 3, I outlined the key arguments substantiating the research gap to which this study contributes. I canvassed the emergence of biofuel production as a wicked problem and the ways in which the social sustainability of biodiesel schemes has been examined to date. In particular, I emphasised the centrality of social inclusion to the biodiesel schemes in Brazil and Timor-Leste, and challenged the conceptual underpinnings of this approach that framed smallholder farmers as being backward, underdeveloped and unable to fully understand what's best for them (César & Batalha, 2010; Finco & Doppler, 2010b; Hall & Matos, 2010; Hall et al., 2009). I also illustrated that the low levels of empirical data have resulted in a data vacuum for interpreting the actual experiences and outcomes for smallholder farmers in biodiesel schemes and it is in this research space that this thesis makes a unique contribution.

In Chapters 4 and 5 I developed the important conceptual contribution of the Autonomous Livelihood Framework. The Autonomous Livelihood Framework is an analytical tool that draws on the Sustainable Rural Livelihood Framework (Scoones, 1998, 2009, 2015) and the peasant principle (van der Ploeg, 2008) to re-centre interpretation of the ways that smallholder farmers

construct their livelihoods on the process of negotiating for autonomy. Given the centrality of the Autonomous Livelihood Framework to this study, I reflect further on its use and application later in this Chapter (Section 10.5).

In Chapter 6, I provided details of the Research Design. I emphasised my use of a transdisciplinary approach that was problem-focused, collaborative and sufficiently flexible for evolving methodology. In particular, I sought out in-country collaborators and co-researchers in Brazil and Timor-Leste, and adjusted the research tools (i.e. interview tool, farm survey tool) based on their input, insights and local knowledge. The research was designed to be farmer focused.

I used Grounded Theory Method to undertake iterative data analysis in several cycles in both during fieldwork and post-fieldwork. In documenting the data analysis, I recognised the interview data as co-created between the farmer informants, the collaborators and myself as researcher. I noted that the farmer informants had agency over what information they shared in the interviews. In this way, I acknowledged that the empirical data was created in a spatially and temporally dependent manner that reflects a particular version of the farmer informant's interactions with myself as researcher.

In Chapters 8 and 9, I provided an enhanced understanding of the farmer informant's livelihoods in Brazil and Timor-Leste, and the different ways that they incorporated the biodiesel schemes into their existing livelihoods. The empirical data were presented in accordance with the Autonomous Livelihood Framework and a Table of Key Findings in relation to the biodiesel schemes was provided at the end of each chapter.

The key findings challenge several of the dominant discourse's interpretations about how and why smallholder farmers' participate in biodiesel schemes. For instance, that financial-profit-making is not a major incentive as smallholder farmers weigh up a wide variety of farm and livelihood strategies when considering if and how biodiesel production may fit into their livelihood.

A major finding from this research is that the farmer informants' narratives about livelihoods and participation in biodiesel schemes — which are at times contradictory and difficult to justify under externally determined notions of success — make sense when interpreted through the notion of negotiating for autonomy.

10.3 Findings and their Significance

In order to address the research findings and their significance, I will return to the research questions that focused on three aspects of the problem space. Namely, smallholder farmer's livelihoods (Research Question 1), policy outcomes when re-interpreted through a smallholder farmer perspective (Research Question 2) and the centrality of negotiating for autonomy (Research Question 3). Whilst the key findings are discussed at length in the Discussion (Chapter 9) and available as a summary in Annex 13: Brazil: Summary of Key Findings and Annex 14: Timor-Leste: Summary of Key Findings: here I provide a succinct summary of each.

Research question 1:

How can we explain smallholder farmers' participation in biodiesel schemes as part of a rural livelihood in Brazil and Timor-Leste?

This research question was addressed by finding that smallholder farmers' did not simply respond and react to biodiesel schemes as external economic and agricultural policies: they actively managed their participation (or non-participation) in such schemes. If smallholder farmers' participated in biodiesel schemes, they often did so on their own terms by resisting, rebelling and disobeying the formal rules and structures of such schemes.

These actions were not undertaken in ignorance, but rather reflect the ongoing negotiation for autonomy and construction of livelihoods in flux. That is, smallholder farmers' participation in biodiesel schemes can be explained as one of many strategies that farmers' use to construct their livelihoods. When the biodiesel schemes do not meet the farmer's broad livelihood requirements then 'resisting, rebelling and disobeying' are evidence of how smallholder farmers' attempt to maximize the schemes to fulfill other livelihood niches and needs. For example, repurposing biodiesel bank loans to other crops or using biodiesel crops to secure access to land.

Smallholder farmer's socio-economic-cultural-political context informs the ways that they can access and use capitals — but also epistemologically influences what smallholder farmers' consider as their available choices. In this way, smallholder farmer's participation in biodiesel schemes must be considered not only at an instrumental level (i.e. what does the biodiesel scheme materially contribute to their livelihood) but also at a hermeneutic and epistemological level.

That is, explaining the participation (or non-participation) of smallholder farmers in the biodiesel scheme also involves identifying what does that participation or non-participation mean and signify for the

smallholder farmer? In this research, it was found that the biodiesel schemes signified opportunity (for cash crops, for entrepreneurial farming), enhancement of social networks, fulfilment of reciprocal social obligations and yet the schemes also signified risk and the failure of government led programs to adequately integrate farmer's local knowledge.

In addition to the findings that addressed the key research questions, this study also generated unexpected findings. Notably the importance of:

- (a) smallholder farmer *identity* as a guide to decision-making about livelihood strategies and participation in biodiesel schemes (Section 9.3) and
- (b) gender as an aspect of social differentiation that mediated access and participation in the biodiesel schemes (Section 9.7).

Significance

At several points in this thesis I have noted that negotiating for autonomy is central to the ways that smallholder farmers construct their livelihoods. The significance of this for scholars examining biodiesel schemes is that negotiating for autonomy does not fall neatly into either the environmental narrative — that argues biofuel projects go against the social and economic interest of smallholder farmers' — or agricultural modernisation narratives premised on the notion of profit-making and externally driven rural development models (Selbmann & Ide, 2015).

Examining the rural development outcomes for smallholder farmers through an autonomy lens and the Autonomous Livelihood Framework will not

result in a binary solution (i.e. good / bad, beneficial / detrimental) to the complex problem area of rural livelihoods and biodiesel production.

Smallholder farmers can participate and not-participate, break the rules and adapt their participation patterns all under the umbrella of negotiating for autonomy.

These findings are significant because it means that the smallholder farmer's perspectives did not align directly with any of the main biofuel discourses. Selbmann and Ide (2015) identified five main transnational Brazilian biofuel discourses that sit along a continuum from strong supporters to critical opponents. The farmer informant's narratives in this study tend to sit outside all of these discourses as the narratives consider biodiesel production as part of integrated livelihoods rather than a stand-alone pursuit.

Smallholder farmers' themselves may ultimately resolve the debate about biodiesel schemes and rural development outcomes. Through the application of negotiating for autonomy and a starting point that considers smallholder farmers as morally autonomous beings, then their actions should be read as purposeful action. If smallholder farmers' choose to participate, not to participate, or to create their own terms of participation in biodiesel schemes, then the findings of this research suggest that closer attention should be paid to these actions as legitimate choices and strategies guided by *internal forces* (agency, identity, knowledge), rather than simple outcomes resulting from external programs.

Research Question 2

How do smallholder farmer's perspectives help explain and interpret the rural development outcomes from biodiesel schemes in Brazil and Timor-Leste?

This research question was addressed by firstly challenging the social inclusion premises of the two biodiesel schemes examined (Section 9.5) and illustrating how adaptations of the schemes, particularly the PNPB, have been premised on misinterpretations of smallholder farmer's decisions.

Firstly, I illustrated how smallholder farmers own definitions and understanding of social inclusion or exclusion diverge from the simple economic-oriented version of the biodiesel schemes. In this study, the farmer informants' definitions of social inclusion did not align with their respective government's definition of social inclusion (that is, increased income from cash crops and participation in commodity chains). As such, the question as to whether the biodiesel schemes were creating social inclusion is redundant because there was not a shared definition of social inclusion between the program target recipients (smallholder farmers') and the government.

Secondly, I moved to show how exogenous notions of success or failure of the biodiesel schemes have been misplaced. Through the application of the Autonomous Livelihood Framework, the farmer informants' narratives reframe the interpretations about the biodiesel schemes. Non-participation and non-adherence to the structural mechanisms of the schemes indicate processes of compromise, negotiation and risk mitigation (Section 9.4) rather than ignorance.

Significance

The significance of these findings for government-led-biodiesel-for-rural-development schemes is that they offer a unique insight into the policy outcomes. Rather than considering the smallholder farmer's participation along the lines of success or failure — this research offers a glimpse into the complexity of how smallholder livelihoods are constructed and moves away from oversimplified external economic driven policies. These findings offer the opportunity to consider a conceptual shift when examining the outcomes of biodiesel schemes that have struggled to recruit and retain smallholder farmer's participation.

In particular, these research findings illustrate that technological fixes that focus on financial incentives and ways to 'make' smallholder farmers obey the formal structures of such schemes are unlikely to succeed. A shift in perspective to consider smallholder farmer's as actors with agency that are negotiating their autonomy are more likely to result in solutions for the social questions of government-led-biodiesel-for-rural-development schemes that are acceptable, adoptable and durable.

In addition, the centrality and importance of experiential knowledge to smallholder farmers indicates that government-led-biodiesel-for-rural-development schemes should consider formal mechanisms to ensure the incorporation of this local knowledge. As smallholder farmers are likely to privilege their own experiential local knowledge over external knowledge — the ongoing exclusion of local knowledge simply creates sites of divergence rather than convergence between the biodiesel schemes and smallholder farmers as participants.

Research Question 3

In what ways does smallholder farmers' participation (or non- participation) in biodiesel schemes reflect their negotiating for autonomy?

Early in the thesis (Chapters 4, 5 and 6), I noted that the farmer informant's narratives contained contradictions about their livelihoods and biodiesel schemes (Section 6.2) and at times, the farmer informant's narratives appeared nonsensical when viewed through a dominant lens. For instance, in Timor-Leste it was clear that the Agro-Energy Program was financially unviable and yet the schemes still attracted and retained participants.

To address this, I asserted that adopting an autonomy lens and the concept of negotiating for autonomy opened possibilities and allowed the development of coherent narratives to explain how smallholder farmer's in similar context made different decisions but that both decisions reflected an active livelihood strategy.

In this way, the entire thesis has been dedicated to illustrating that negotiating for autonomy underlies the farmer informant's participation and non-participation in biodiesel schemes.

Significance

This finding is significant because it contributes empirical evidence toward the incremental development of van der Ploeg's (2008) peasant principle, specifically his notion of autonomy. Whilst the peasant principle has not been used in its original form in this study, its adoption and adaption is

significant for rural development scholars seeking a way to take forward farmer-centred approaches to rural development studies that acknowledge the autonomy and agency of farmers, as well as the external influences on how livelihoods are constructed. Further, the move away from van der Ploeg's (2008) use of Empire and his implicit assertion that peasants must (always) be in resistance to hegemony, toward a conceptualisation that is more flexible in interpreting smallholder farmers' actions, allows for nuanced applications of the notion of an autonomous rural livelihood.

10.4 Limitations

This thesis documents one interpretation of smallholder farmers and biodiesel schemes based upon intensive fieldwork practices conducted using a transdisciplinary approach to qualitative research methods (i.e., in-depth interviews, farm visits) suited to cross-cultural research with smallholder farmers. As noted earlier, as with all qualitative research, it is a partial explanation and just one possible interpretation of the farmer informative narratives (Section 6.2) — and I cannot claim that the farmer informants themselves would align with my interpretations.

The selection process for farmer informants was based on social networks and self-selection. The farmer informants do not represent a 'sample' and in particular, the voices of non-biodiesel-scheme-participants is largely outweighed by the narratives of farmer informants who had opted into their respective biodiesel scheme. Given that the number of farmer informants that both participated in the biodiesel schemes and this research study is very limited — it would be fair to conclude that there is a large number of unknown

unknown's beyond the sphere of this study both about smallholder farmer livelihoods in general and specifically how biodiesel schemes are incorporated into those livelihoods. This limitation does not diminish the significance of this study — it merely points to further areas of investigation.

The next limitation arises from the lack of a gendered analysis. Agriculture and rural spaces are highly gendered (Liepins, 1998, 2000) and preliminary analysis based on the limited data in this thesis hint at gendered impacts and outcomes from biodiesel schemes.

The final limitations relates to myself as researcher. I carry cultural, linguistic and socio-economic bias both implicitly and explicitly as a researcher — some of which fall into my sphere of self-knowledge and some that are beyond my sphere of self-knowledge. Whilst I used reflexive practice and partnering with in-country collaborators and co-researchers to mediate my biases; nevertheless the research was conducted through the lens of a white researcher from the Global North (who does not farm) interviewing smallholder farmers in the Global South. Along this vein, I must recognise that the Autonomous Livelihood Framework is thus a theory developed in the Global North to explain livelihoods in the Global South. This pattern of research can be considered problematic — not least because it can be said to be a type of "... intellectual colonization..." (Chatterjee, 2014, p.137) and reinforces western-centric worldviews. However, I draw on Chatterjee's (2014) assertion that "... good theories are spontaneous conceptual frameworks produced in the moments/spaces-places of analysis ... [it is possible to make them] global as possible by (re)producing and (re)informing them in more diverse moments and places than their making." (p.136–137). Thus, whilst

this study and the Autonomous Livelihood Framework contain entanglements of myself as researcher — I assert that this does not diminish the significance of the findings as all research is produced in a temporal-spatial- worldview context. Further, this research study creates a space for further scholarly discussions about theorisations on rural development, autonomy and biodiesel schemes — and how the divide of Global North / Global South is relevant to this space is part of a larger scholarly dialogue.

10.5 Reflection on the Autonomous Livelihood Framework

In this section, I will reflect on using the Autonomous Livelihood Framework. The Autonomous Livelihood Framework is key contribution to knowledge from this study. It was developed through the use of Grounded Theory Method during the data analysis stage of the study, and the conceptual underpinnings (Chapter 4), framework (Chapter 5), and process of development (Chapter 6) has formed a major part of this thesis.

As a product of a transdisciplinary research approach the Autonomous Livelihood Framework represents a situated, reflexive construction. Whilst embedded in this specific research context of biodiesel schemes in Brazil and Timor-Leste, and as a product of doctoral research/er, the Autonomous Livelihood Framework offers the potential for future refinements in different contexts. In this way, I embrace the idea that theory and framework are always incomplete. Refinements, adjustments, critiques do not represent flaws with the framework but rather that the framework has offered a way of taking the scholarly conversation forward and contributed toward iterative developments (Hibbert et al., 2014). In this way, the Autonomous Livelihood Framework is

not a static product. In the Transdisciplinary Wheel it is *product* that is perpetually in motion; it loops back into process through identification of the limitations and potential future iterations (see Figure 8 Adaptation of the Transdisciplinary Wheel)

Looking Back: Limitations of the Autonomous Livelihood Framework

Integrating autonomy into rural studies and agrarian change is an important emerging area of scholarship that partly addresses the unresolved calls for better ways to broaden livelihood studies and re-centre farmer's agency as a core component of examining how rural livelihoods are constructed. I have endeavoured to address this problem through the Autonomous Livelihood Framework by synthesising seminal bodies of work, formalising the identification of the individual components, and creating a graphic to represent the conceptual relationships. Ideally, this formalisation offers a structured and rigorous contribution to the scholarly debate.

Nevertheless, after application of the Autonomous Livelihood Framework to analyse and explain the participation of smallholder farmers in biodiesel schemes in Brazil and Timor-Leste, I have a number of insights about potential alterations in future iterations. These largely fall into two categories.

Firstly, as the Autonomous Livelihood Framework drew on the Sustainable Rural Livelihood Framework — it has replicated many of the problems identified by Scoones (2009). That is, an inability to address core questions such as values framing and resolution of the tensions between meta-level globalisation changes, macro-level policy and what is essential a micro-level household analysis.

Further, the application of the Autonomous Livelihood Framework has led me to return to the conceptualisations of autonomy and what is meant by an autonomous livelihood within the framework. Indeed, as this research was conducted with smallholder farmers, the application of autonomy was at an individual level — but it raises questions about application of the concept of autonomy at a household, community, or large-scale group. How would the idea of an autonomous livelihood translate into meta and macro level considerations? and How does the concept of autonomy translate across different communities (and their cultural values) that may arrange their societies along different groupings?

Incorporating unexpected findings

The notion of identity as central to smallholder farmers' livelihood strategies, decision-making and their sense of autonomy is well established in the literature (for instance Burton & Wilson, 2006; Emery, 2015; Stock & Forney, 2014) but was not included in this version of the Autonomous Livelihood Framework. However, *identity* emerged as a more prominent theme than I expected, promoting reflection on whether it should be included in future iterations of the Autonomous Livelihood Framework, and if so, where?

This led to reflection on earlier decisions I made about whether concepts such as freedom, independence, and agency would be better placed as explicit components within the Autonomous Livelihood Framework. This opens possibilities for future theorisation and development of the Autonomous Livelihood Framework.

The inevitable Paradox of Transdisciplinary Research

The application of the Autonomous Livelihood Framework created a paradox. The paradox created by the application of autonomy is thus:

By focusing on autonomy of smallholder farmers, and doing so in a way that uses the farmer own narratives to explain their experiences, it assumes that farmers hold the power and insight to see beyond their own context and social conditioning to express themselves and their perceptions of autonomy as something 'true'.

Yet, being socially embedded means that often farmers are socially conditioned to accept the status quo, including that of their own oppression, disenfranchisement or unequal access to power and resources. This is not to negate smallholder farmers' agency to change and alter social structures, but to point out that acting within social structures means being internally conceptual bound by them also. The paradox is that smallholder farmers' articulation of autonomy is socially embedded, possibly in ways that make them non-autonomous. This raises the important question: How is this relevant to smallholder farmers in biodiesel schemes?

In this study, application of the Autonomous Livelihood Framework lead to the conclusion that smallholder farmers incorporate the biodiesel schemes on their own terms into their livelihoods as best they can; and that biodiesel schemes can be beneficial for smallholder farmers, for instance, by reinforcing social capital networks or allowing access to financial capital.

Yet, there is a substantial argument that there are limited social and economic benefits for smallholder farmers in biodiesel schemes (Hunsberger &

Alonso-Fradejas, 2016; Khanna et al., 2016; Neville & Dauvergne, 2016; Tomei & Helliwell, 2016). Although application of the Autonomous Livelihood Framework illustrated positive views from smallholder farmers themselves, wider analysis of the schemes shows poor outcomes that structurally leave little room for smallholder farmers to manoeuvre.

Reassuringly, Wickson et al. (2006) identify paradox as an inevitable part of transdisciplinary research

In trying to integrate different knowledges (sic) and epistemologies, as well as theory and practice, the TD researcher will inevitably face the problem of paradox. While some might see the presence of unresolved paradoxes as evidence of poor quality TD outcomes, others may view the accommodation of dilemma as a necessary (perhaps unavoidable) feature of TD research processes. The challenge of how TD researchers approach or deal with this issue of paradoxes is an area that would certainly benefit from continued thought and attention (p.1054).

As such, I don't consider this paradox a flaw with the Autonomous Livelihood Framework but rather an area for further consideration and attention in future iterations.

Looking forward: future iterations of the Autonomous Livelihood Framework

Despite these issues both with autonomy and the application of the Autonomous Livelihood Framework, the framework has allowed to novel way to centre this research on smallholder farmers' experience and move to what I consider a nuanced and rich way to explain livelihoods in the context of biodiesel production. Through the integration of autonomy and the Sustainable Rural Livelihood Framework into a novel framework, I was able to address the research problem sphere in a way that a conventional Sustainable Rural Livelihood analysis would not. In particular, to present contradictions or seemingly nonsensical decisions not simply as 'outliers' in the data analysis but a core way that represents the negotiation for autonomy by the farmer informants. In addition, the definition of smallholder farmers as morally autonomous beings assisted to overcome any tendencies to place value judgements on decisions to participate or not participate in biodiesel schemes and to shift focus toward the meanings and outcomes of those decisions.

An important part of this reflection section is considering whether the Autonomous Livelihood Framework offers ways to talk about farmer livelihoods beyond Brazil and Timor-Leste. Here, I offer a tentative response — possibly.

Autonomy is a useful theoretical concept and at the most generic level, the Autonomous Livelihood Framework does offer a unique way of considering livelihoods. However, I am cautious as I am aware that *how* autonomy is configured and what autonomy means at an individual, household, community and wider societal level will alter depending on cultural, social,

political and economic context. Autonomy in one location will not be analogous with autonomy in another and thus futures iterations would need to explore a definition of autonomy in a local-context-bound way that still resonated with the philosophical underpinnings. Further, in the current framework there are not (yet) ways to show and discuss overlap and feedback loops.

In future iterations I would specifically reconsider

- (a) The ways that autonomy is articulated and graphically represented in the framework and
- (b) How to better represent the capitals and strategies as instrumental, hermeneutic and emancipatory.

10.6 Biodiesel Schemes and Smallholder Farmers: Areas for Further Research

This study made significant findings about the gap between the structure of biodiesel schemes in Brazil and Timor-Leste and smallholder farmers' experiences and perceptions of those schemes. Despite the importance of these findings for contributing toward understanding and explaining smallholder farmer's livelihoods — I am reluctant to veer into the arena of biodiesel policy recommendations and interventions based on these findings. This is because I believe that there are important research questions to be addressed prior to formulating specific intervention focused recommendations including:

- (a) How are in Government-Led-Biodiesel-for-Rural-Development schemes and policies are formulated and what role does academic research play?
- (b) How have other existing rural development schemes or policies in Brazil and/or Timor-Leste contributed toward sustainable rural livelihoods of smallholder farmers and what elements of these schemes could be transferrable to future iterations of biodiesel policy?

10.7 Concluding Remarks

This thesis is part of an emerging body of scholarship that is applying the concept of autonomy to rural livelihoods and moving forward not only via actor-centred approaches but with research grounded in farmer's own narratives. The development of the Autonomous Livelihood Framework and the embracing of a transdisciplinary approach to research has been transformational for myself as researcher.

Returning the starting point as outlined in Section 1.1, I have not necessarily found the answer to my early curiosity and enthusiasm for changing biodiesel policy in Brazil and Timor-Leste, but the richness and complexity of smallholder farmer's livelihoods has been rendered more vivid in ways I could not have imagined at the outset of this research. I am invigorated with the possibilities of future research and particularly enthused to pursue a feminist rendering of rural livelihoods and to engage with scholarly discussions about the concept of negotiating for autonomy.

Ethically, I do not personally agree with the use of the earth's ecological resources for the production of biofuels — in this way, my stance has changed little throughout the research period. I do not propose adaptations for more sustainable biodiesel policies because I fundamentally disagree with the premise of global demand for energy being met through tinkering with the source of liquid fuel production.

Abbreviations

Acronym	Term
AusAID	Australian Agency for International Development
EU	European Union
FAO	United Nations Food and Agriculture Organisation
GDP	Gross Domestic Product
GoTL	Government of Timor-Leste
IDPs	Internally Displaced Peoples
INGO	International non-government organisation
JICA	Japan International Cooperation Agency
MAFF	Ministry of Agriculture Forestry and Fisheries
MOU	Memoranda of Understanding
PNPB	National Biodiesel Production and Use Policy (Portuguese acronym)
SDP	Strategic Development Plan
SEPE	Secretary of State for Energy Policy (Portuguese acronym)
TD	Transdisciplinary
UN	United Nations

Glossary

Term	Definition
(the) researched	People or communities that are researched by outsiders.
Action Research	Research undertaken together with stakeholders which is subject to iterative, flexible design and aims for changes in the real-world problem space (as opposed to theoretical problem space).
Agency	The capacity to act, to do something. See 5.6 Agency for use of agency in the Autonomous Livelihood Framework.
Agrofuel	Liquid fuel made from agricultural products
Autonomous Livelihood	The pursuit of freedom to govern one's own affairs from within a socially embedded context, that drives and shapes instrumental, hermeneutic and emancipatory livelihood strategies and use of capitals.
Autonomy (Actual)	Actual autonomy involves a context specific conceptualisation that includes farm management for social and environmental goals as well as actions that contribute to community or collective well-being. In this way, social embeddedness is a core part of independence and subsequently autonomy (Stock et al., 2014, p.1). 'The enactment and practice of autonomy is a complex relationship involving context, culture, situatedness and experience ' (Stock et al., 2014, p.1)
Autonomy (Ideal)	Modern Westernised interpretations of autonomy focused on hyper-individualism and the notion of being free of all external influence and obligations. Ideal autonomy is often presented in opposition to relational autonomy
Autonomy (Negotiating for)	The process why an individual negotiates their context and agency in order to obtain a sense of full autonomy
Autonomy (Relational)	Relational autonomy is an umbrella term premised on the shared centrality of the social embeddedness, relationships and structure— such as race, class, gender, ethnicity— and it also has a strong social justice focus (Mackenzie, 2014; Mackenzie & Stoljar, 2000). Relational autonomy is often presented in opposition to ideal autonomy
Autonomy (Relative)	Autonomy as relative to the social context in which it is embedded.
Autonomy (Striving for)	Van der Ploeg's (2008) term referring to peasant's endeavors to be independent
Biodiesel	Liquid diesel made from agricultural products
Biodiesel Feedstock	Crops or plants that are processed in biodiesel
Bioethanol	Liquid ethanol made from agricultural products
Biofuel	Liquid fuel made from agricultural products
Co-researcher	People or institutions that provided significant input into the research design of this study

Collaborators	People or institutions that proved information, support or referrals to support this study
Counter-Discourse	Contrary positions within interview narratives. A term coined by Abu-Loghod (2000)
Creative engagement	Refers to theory development, a way of engaging multiple insights and inputs to theory.
Disobeying the rules	A form of everyday resistance. (See below).
Everyday Resistance	Subtle resistance by those in positions of less power in society. Includes sabotage, foot-dragging, false compliance, pilfering, feigned ignorance and slander (Scott, 1986).
Farmer Informant	An informant in this research study.
Food vs Fuel	A term referring to the main debates centred on whether agricultural crops should be used to produce food or biofuel.
Grounded Theory Method	An analytical method that uses the methods of Grounded Theory, but not necessarily aligned with the conceptual underpinnings.
Morally Autonomous	When an individual has the capacity to make their own decisions and speak for themselves, and be held morally accountable for their actions
Peasant Principle	The process by which peasants in striving for autonomy create novel rural livelihoods
Privileged Insiders	Refers to conducting research in communities or societies that are not part of the researcher's own. A privileged insider is someone in the community that is accepted and trusted.
Problem Space	Refers to the wider research context of a research question or problem. The term is used in part to acknowledge blurry boundaries and evolving (rather than static) problem spaces
Problematiques	Contemporary social and environmental problems that are both elusive to define and address
Re-Peasantisation	The process whereby smallholder farmers and others undertaking rural livelihoods (as peasants) redefine their social and political power as a class and strive for autonomy.
Social Exclusion / Excluded	The process whereby certain individuals and communities are not considered as part of the wider society
Social Inclusion	The process of ensuring all individuals and communities feel part of the wider society
Superdiscipline	An academic discipline that incorporates many other disciplinary approaches and practices
Thick Description	Description of research sites, experiences and notes from the researcher.
Transdisciplinary	"...an approach to conducting social research that involves synergistic collaboration between two or more disciplines...transdisciplinary research practices are issue- or problem-centred and...follows responsive or iterative methodologies" (Leavy, 2011, p.9).
Voices	Refers to the opinion, attitude or point of view from an individual or group or people
Wicked Problems	Wicked problems are societal issues that have no clear resolution, are ambiguous and have no clear stopping point Rittel and Webber (1973)

Foreign Language Terms

Portuguese

Portuguese	English
Assentamento	Settlement – refers specially to agrarian reform land
Campefino	Peasant
Casa de Farinha	Flour House
Dendê	Type of Palm
Fazendas	Landed Estate
Gato	Illegal connection to a public service (literally: cat)
Nortedestinos	Northeasteners
Sertanejos	Drylanders

Tetum

Tetum	English
Ai-oan Mutin	Jatropha
Ama sira	Parents
Avo sira	Grandparents
Hotu lalais	Everything quickly
Sosialiasi	Socialisation (public information campaign)
Tuba Rai / Moris Rasik	Names of Microcredit Schemes – officially <i>Tuba Rai Metin</i> (Feet Firmly on the Ground) and <i>Moris Rasik</i> (Live Independently)

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Annex 1: Brazil: Co-Researchers and Collaborators

Co-Researchers

Name	Role
Ednilson Ribeiro Santos	acted as videographer, sounding-board and was able to keep the farmer informants at ease despite the multitude of recording devices around them.
Catarina Camargo from the Permaculture Institute of Bahia	Was a co-researcher who had substantial input into the interview tool, field interviews, analysis and presentations in Bahia.
Carla Costa do Nascimento	a community mobiliser who facilitated contact with many farmer families and acted as both interviewer and interviewee.

Collaborators:

Name	Role
Valderly Casais dos Anjos (Pastoral da Terra de Itabuna)	Provided many contacts and facilitated personal introductions to farmers' and government officials.
Cooperative extension officers in Itajuípe.	Accompanied us on interviews to remote settlement areas and kindly invited us home for supper and a long discussion about the PNPB and rural development in his area. Name not disclosed as no permission sought.
Professor Donald Sawyer from the Institute for Society, Population and Nature	For assistance with design of the research project, facilitating my visit to Brazil and for being a conceptual sounding board.
Professor Dr. Ednildo Andrade Torres from the Federal University of Bahia	For introductions to government staff, academics and professional working in the biofuel industry within Bahia.
Aziel Silva Brito (Cooperativa dos Produtores Rurais de Una LTDA)	Personal communication and facilitated contacts
Geraldo Oliveira de Santana (COOPERO-Olindina)	Personal communication and facilitated contacts
Genildo Gomes Alves (Cooperativa da Agricultura Familiar do Território de Irecê)	Personal communication and facilitated contacts
Wilson Carvalho (Usina de beneficiamento de Mamona da Cooperativa dos Agricultores Familiares da Território de Irecê (COAFTI))	Personal communication, facilitated contacts and visit to refinery.

Annex 2: Timor-Leste: Collaborators

Name	Role
Oscar da Silva Faculty of Agriculture UNTL	Input and advice on research design, and survey tool
João Mendes Faculty of Agriculture UNTL	Input and advice on research design, and survey tool
José Salsinha Faculty of Agriculture UNTL	Input and advice on research design, and survey tool
Mario Viegas Tilman Faculty of Agriculture UNTL	Input and advice on research design, and survey tool
Filipe Tiago Faculty of Agriculture UNTL	Input and advice on research design, and survey tool

Annex 3: Excerpt from Research Journal

“ In my research design it just struck me how the process seems lacking— in talking about ACTION research, almost doing the complete opposite, in that the research design and literature review is all completed by me and I am struggling with break-throughs— how will the SLF in form an action research approach? Is AR really even what I want to do in Brazil? It feels kind-of like I am not really committing sufficient time or energy for this to be 'real' AR— I certainly don't expect a change at community level or even policy level as a result of the research. Perhaps I should enjoy more with the Network for Biofuel in Bahia and use those contacts— it struck me perhaps that the lack of understanding of the problems with a social inclusion approach is the cultural and socio-economic divide between those movers and shakers in government and the local communities actually involved. The class divide being reflected in the policy divide between policy and practice. Its hard to do this thinking by myself because I am not sure if I am on the right track of totally out of line thinking like that....How to define an AR project by yourself— its like an oxymoron approach”

Key:

AR = Action Research

SLF = Sustainable Rural Livelihood Framework

Annex 4: Data Sharing and Archiving via Databank

Archiving the data co-created through this research project to an Open Access Databank was incorporated into the research design and subsequently approved by the Human Research Ethics Committee: Approval HREC 2010000105.

Each farmer informant was explicitly asked about inclusion of their material in the databank, informed about the embargo periods imposed on the data and consent and release forms signed as part of the research process.

At the time of this thesis publication, the data has not yet been archived. I intend for it to be accessible and searchable via the Research Data Australia Data Discovery Service (<https://researchdata.ands.org.au/>).

The conditions on the data were designed as such:

Embargo Period:

- (a) Transcriptions: available 5 years post-interview
- (b) Full audio: available 10 years post-interview
- (c) Full video: available 20 years post-interview⁷⁶

Ownership and Access:

- (a) Co-researchers and Collaborators: unlimited access, cannot approve access to external researchers
- (b) Sarina Kilham: unlimited access, approves access to external researchers

Exclusions

The Study Ethics application only specified interviews (transcripts, video, audio) and field questionnaires as data. Since this time, I have come to

76. This is subject to whether the research informant agreed to identifiable data being shared.

recognise data as including research journals, memos and reflexive accounts.

This raises questions for archiving material in the databank such as:

- (a) What type of accompanying information is necessary for other researchers interpreting my data?
- (b) Am I willing and able to share research diaries and journals?
- (c) What about accompanying information that can't be physically attached? (My own memories, experiences, internal interpretations of what occurred?)
- (d) Is qualitative data able to be shared like quantitative data and become a commodity open to interpretation by anyone?

As noted by Denzin (2009): "Data sharing involves complex moral considerations that go beyond sending a body of coded data to another colleague (p.146).

Research journals and reflexive accounts could expose both the researcher and the researched to vulnerabilities and risks. I have chosen not to archive in publicly accessible database the associated research journals and research documentation at the time of writing this thesis.

Annex 5: Scoping Visits

Brazil

	Person / Position	Institute	Date
1.	Fábio Vaz Ribeiro de Almeida: Manager	Institute for Society Population and Nature	05/10/09
2.	Gabriela Carvalho: Researcher (Climate Change)	Institute for Society Population and Nature	05/10/09
3.	Donald Sawyer: Senior Researcher	Institute for Society Population and Nature	05/10/09
4.	Arnoldo Lima: Master candidate	Centre for Sustainable Development, Federal University of Brasília	05/10/09
5.	Fernanda: Master Candidate	Centre for Sustainable Development, Federal University of Brasília	05/10/09
6.	Gesmar Rosa dos Santos, PhD candidate, Director of Sector Studies IPEA	Federal University of Brasília / IPEA	06/10/09
7.	Claudio, PhD candidate	Centre for Sustainable Development, Federal University of Brasília	07/10/09
8.	Frederico Ozanan Machado Duraes: General Director, Embrapa: Agroenergia	EMBRAPA Agroenergia	07/10/09
9.	Professor Dr. Ednildo Torres	Federal University of Bahia	14/10/09
10.	Andre	Federal University of Bahia	15/10/09
11.	Orlando Viera Santana: Administrative Manager Petrobras Biocombustiveis	Petrobras	21/10/09
12.	Prof. Djael Dias da Silva	Federal University of the Recôncavo of Bahia	24/10/09
13.	Juliano Lopes: Coordinator, Bahia Biofuels Network	Secretariat of Science, Technology and Innovation (SECTI- Bahia)	26/10/09
14.	Andrea Zellhuber: International volunteer, Bahia Secretariat	Pastoral Land Commission (Portuguese: Comissão Pastoral da Terra)	27/10/09
15.	Catarina Camargo	Permaculture Institute of Bahia	29/10/09
16.	Kelly Silva	Anthropology Department, Federal University of Brasília	08/10/09

Timor-Leste

1.	Person / Position	Institute
2.	Lyn: Livelihoods Officer	Oxfam Great Britain
3.	Marcelo: Livelihoods Officer	Oxfam Great Britain
4.	Rui Pinto	Independent Researcher
5.	Oscar da Silva	Faculty of Agriculture UNTL
6.	João Rendes	Faculty of Agriculture UNTL
7.	José Salsinha	Faculty of Agriculture UNTL
8.	Mario Viegas Tilman	Faculty of Agriculture UNTL
9.	Filipe Tiago	Faculty of Agriculture UNTL
10.	Avelino Coelho	Secretary of State for Energy Policy
11.	Ego Lemos	Permatil (Permaculture Timor-Leste)
12.	Staff	Sustainable Land Management project (UNDP)
13.	João Fernandes	AusAID, Australian Embassy
14.	Inês Martins, Shona Hawkes and Meabh Cryan	Lao Hamutuk and Timor-Leste Land Network
15.	João Goncalves	Minister of Economy and Development
16.	Fernando de Mello Barreto	Ambassador Extraordinary and Plenipotentiary Embassy of the Federative Republic of Brazil
17.	Alfredo Pires	Minister for Petroleum and Mineral Resources

Annex 6: Research Information Letter



Sarina Kilham
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UTS CRICOS PROVIDER CODE 00099F

Day Month Year
Name of Addressee
Title of Addressee
Company Name
Street or Postal Address
State Postcode Country

Salutation,

**RE: INFORMATION LETTER ON THE RESEARCH PROJECT
'SOCIAL SUSTAINABILITY IN BIODIESEL PRODUCTION- BRAZIL AND TIMOR-LESTE'**

I am conducting a research project on "Social Sustainability in Biodiesel Production- Brazil and Timor-Leste". This research project is part of my PhD study at the Institute for Sustainable Futures, University of Technology Sydney. I am hoping to understand how farmers' perceive issues of social sustainability in biodiesel production, drawing on their own experiences of participation in biodiesel production programs. I hope to use the lessons learnt from farmers' in Brazil to inform farmers' in Timor-Leste.

If you chose to participate, the research will involve an open discussion with me about your experiences and perspectives which I expect will take between 2-4 hours. If convenient for you, the research may involve a look around your farm. With your permission, I will record the discussion, both by taking notes and using a digital audio recorder.

As I am also hoping to create a documentary about farmer's experiences in Brazil as I think it is very important that farmer's can express their own voice and film is an excellent way of communicating important information. Your participation in the documentary is entirely optional and you have no obligation to agree to be filmed. You may participate in the research without participating in the documentary.

You may choose to remain anonymous in the research. I may use some quotations from the interview in my reports, thesis and publications. If you chose to remain anonymous; no identifying information will be included in these publications.

I propose to store the written notes and transcript of the interview on an electronic archive, which will be available to the public after ten (10) years. If you choose to remain anonymous, all identifying information will be removed from the transcript and data.

If you agree to participate in the documentary, then you will not be anonymous. The original footage for the documentary will be stored on an electronic archive, which will be available to the public after twenty (20) years.

You may withdraw from the research project at any time by contacting Sarina Kilham, the [LOCAL PARTNER] or her supervisors listed at the end of this information

sheet. If you agree to participate in the documentary, please be aware that it will be made public as of 31 July 2010, after which time consent cannot be withdrawn.

If you wish, you will also be able to receive a summary of findings from the interviews when the research project is complete and a copy of the documentary film

Please feel free to ask any questions or express any concerns you may have either directly to me
or to [LOCAL PARTNER CONTACT DETAILS] or in Australia. Dr Juliet Willetts, Institute for Sustainable Futures, isf@uts.edu.au)

Complimentary close,

Sarina Kilham



Annex 7: Pro-forma Research Consent Agreement and Release



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UTS CRICOS PROVIDER CODE 00099F

RESEARCH CONSENT AGREEMENT & RELEASE

I of
(print name)

(Address)

agree to participate in the research project "**Social Sustainability in Biodiesel Production: Brazil and Timor-Leste**" being conducted by Sarina Kilham for her Doctor of Philosophy degree. Funding for this research has been provided by ETC Energy and is being conducted in conjunction with the Permaculture Institute of Bahia.

I understand that:

1. The purpose of this study is to obtain farmers' perspectives and opinions on their experiences participating in biodiesel production, specifically the PROBIODIESEL program.
2. My participation in this research will involve between 2 and 4 hours of time in an open interview with Sarina Kilham.
3. That participation may involve showing the researcher and/or research team around my farm or property, if I so choose.
4. That I can contact Sarina Kilham or UTS as listed on the attached information sheet if I have any concerns about the research.

5. I am free to withdraw my participation from this research project at any time I wish, without consequences, and without giving a reason.
6. That I may choose to remain anonymous in the research.
7. I understand that the research data (transcripts of my interview and notes taken during the interview) will be placed in a public archive in Sydney, Australia which will be available to the general public for use after a minimum embargo period of ten (10) years. If I chose to remain anonymous, then any information which may identify me will be altered by the researcher.
8. I acknowledge that any activities engaged/undertaken by me during my participation will be entirely at my own risk.

I choose to remain anonymous in this research **OR** I am willing for identifying details about me to be public

Signature..... Print name.....\

Signature of witnessPrint name of witness.....

Address of witness

.....

(please print)

Day_____ Month:_____ Year: _____

NOTE:
 This study has been approved by the University of Technology, Sydney Human Research Ethics Committee. If you have any complaints or reservations about any aspect of your participation in this research which you cannot resolve with the researcher, you may contact the Ethics Committee through the Research Ethics Officer (ph: +61 2 9514 9615, Research.Ethics@uts.edu.au) and quote the UTS HREC reference number.

Thumbprint

Annex 8: Video and Audio Consent



VIDEO & AUDIO CONSENT (DOCUMENTARY) AGREEMENT & RELEASE

I of
.....
(print name)

(Address)

Consent to be recorded by

Researcher :(print name)
Photographer:(print name)
Camera person:(print name)
Sound:(print name)

On the following conditions:

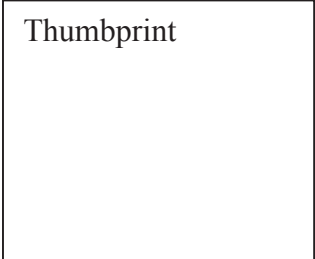
1. That Sarina Kilham has the absolute right of ownership to use my picture, silhouette and other reproductions of my likeness and voice in connection with any documentary, motion picture, television program, video-cast or online media in which this may be incorporated, and in any advertising material promoting it.
2. That Sarina Kilham will be entitled to publish, distribute and use the recordings of me in any manner she thinks fit, and, in addition may make such changes, adaptations, arrangements, substitutions, deletions and additions of, from, in and to the recordings as she thinks fit.
3. In exercising these rights, the Sarina Kilham agrees not to cause changes to be made to the recordings that are of a derogatory nature, that disrespect me, place me at risk of harm or potentially stereotype, sensationalise or discriminate against people, situations or places.
4. I understand that the video and audio recordings will be placed in a public archive in Sydney, Australia which will be available to the general public for use after a minimum embargo period of twenty (20) years.

5. I acknowledge that any activities engaged/undertaken by me during the interview/photography/recording will be entirely at my own risk.

Signature..... Print
Name.....

Signature of witness Print name of witness.....

Address of witness
(please print)
Day _____ Month: _____ Year: _____



Annex 9: Interview Tool Questions

General

Can you tell me about yourself?

What is your age? You were born here locally? Can you tell me about your family?

Can you tell me about your farm?

How long have you on the farm? What you plant over the years here?

How do you inform yourself about the world outside of here? Why?

You feel deprived of certain types of information? What?

Do you participate in any association, cooperative or other group? (Eg, church)

Who else in the family involved?

What do you think of the advantages and disadvantages of participating in these groups?

How has the issue of light in your community? And the water? As "and housing, you always lived in this house?

What changes have you seen these infrastructure (housing, sanitation, water) in the last five years?

What types of financial services / credit exist (both formal and informal)?

What services they provide, under what conditions (interest rates, collateral requirements, etc.)?

Which groups or types of people who have access to? What prevents others from having access?

Have family members or relatives living far away, they send money?

Women are able to make their own choices or are limited by pressure from family / local custom?)

How much food is produced on the property is purchased and how much?

What you bought at the fair this week? What did you eat yesterday?

How are the responsibilities of men and women differently on the farm?

How are decisions made on the property? There are things that men decide and other things that women decide? There are things that are decided together?

Biodiesel Questions

When, where or from whom you heard about biodiesel? (What they say 'Why did you decide to participate?')

And then you sold raw material for biodiesel? What happened then?

Suggestions: Where / Who did you get the seed and / or raw materials? You made a contract?

Have you ever sold raw materials for a refinery / mill / cooperative? Can you tell me about the process involved?

Suggestions: Who will buy its raw material? How was it transported? How were they paid?

You can say what you think about the price you received and how you used the money?

Tips: How to compare the price of other crop you have?

And this year, as is the production of castor oil or sunflower, etc. to biodiesel on his farm?

You're raising the crop for biodiesel? You think you'll attend next year? Can you tell me why?

What do your neighbors think about the biodiesel program? They participate in the program for biodiesel? Why not? What you hear people talking about this?

Do you think there are differences between working women and men in the production of biodiesel?

What are the advantages and disadvantages for men and women in the production of biodiesel?

What do you think are good things (forces) of the program in your opinion?

What do you like about the program?

What do you think are things that are not so good (weaknesses) of the program in your experience?

What you do not like about the program?

Suggestions: What would you like to change in the biodiesel program?

How do you imagine the situation in 10 (ten) years? You will be producing biodiesel?

Suggestions: You imagine that his farm will produce biodiesel or you think that your farm will do something else? Do you think you will still be here on the farm?

Annex 10: Survey Tool

Participant chose to remain anonymous Yes /No

Participants Name:

Age: Gender: Male / Female

Single / Married / Widowed / de-facto / divorced / separated

Number of children:

Children still at home: Separate household: Deceased:

Number of household members (inc. participant)

Name Household head: Age: Gender: Male /Female

Approx. size of farm (land area as described by participant):

Years on this farm:

Farm is: Rented / Owned by participant / Owned by family / Other:

Main crops grown on the farm:

Livestock on the farm (type and approx. #):

Does the participant have a source of off-farm income? No / Yes

Does the household head have a source of off-farm income? No / Yes

What approx. percentage of farm land is dedicated to biodiesel
feedstock production?

What approx. percentage of total on-farm income does biodiesel
production contribute?

Does the participant's farm own or rent mechanical farm equipment?

No / Yes . If Yes ..

Is the participant the member of an agricultural cooperative? No/ Yes

If yes...

Annex 11: Farmer Informants Brazil

Name	Residence	Biodiesel Feedstock	Age	Gender	Type of Property	Property Size (as reported) ⁷⁷	Principal Crops	Off-Farm Income & Source	Land area for Biodiesel
Antônio	Arataca	Dendê Palm	34	Male	Agrarian Reform Land (undocumented)	4 hectares	Cocoa, banana, rubber	None	Plans to plant 2 hectares
Antônio-Luiz	Ourolandia	Castor	53	Male	Family Owned	30 + 180 tariffs	Beans, Castor, corn	None	30 tariffs
Ariel	Cafarnaum	n/a	n/a	Male	n/a	n/a	n/a	n/a	n/a
Carla	Cafarnaum	n/a	n/a	Female	n/a	n/a	n/a	n/a	n/a
Carlos	Arataca	Dendê Palm	50	Male	Agrarian Reform Land (undocumented)	4 hectares	Cocoa, banana, Cassava	Yes. Family Allowance (Portuguese; <i>Bolsa Familia</i>)	Plans to plant 2 hectares
Edvalice	Umburaninha	Sunflower	40	Female	Family Owned	10 tariffs	Cassava, Beans, cashew	None	2 tariffs
Filomena	Umburanas	Castor	62	Female	Family Owned	25 + 5 + 200 tariffs	Beans, corn, Cassava, Castor, fruit	Yes. Family remittance, Retirees Government Pension	Non-participant
José	Olindina	Sunflower	42	Male	Family Owned	27 hectares	Cassava, Bean, corn, cashew, pasture	Yes. Upholstery and Building business.	3 hectares companion planted with cassava

⁷⁷ Farmer informants either reported their land size in tariffs or hectares. Figures separated by a '+' sign indicate several separated farming plots

Name	Residence	Biodiesel Feedstock	Age	Gender	Type of Property	Property Size (as reported) ⁷⁷	Principal Crops	Off-Farm Income & Source	Land area for Biodiesel
Lucio	Olindina	Sunflower	17	Male	Family Owned	27 hectares	Cassava, Bean, corn, cashew, pasture	Yes. Supports father business	3 hectares
Marcio	Morro de Chapéu	n/a	n/a	Male	n/a	n/a	n/a	n/a	n/a
Olimpio	Umburanas	Castor	64	Male	Family Owned	25 + 5 + 200 tariffs	Beans, corn, Cassava, Castor, fruit	Yes. Family remittance, Retirees Government Pension	Non-participant
Preto	Santa Luzia	Dendê Palm	25	Male	Family Owned	63 hectares	Pineapple, <i>guarana</i> , rubber, Cassava, coconut, Cocoa, black pepper, <i>urucun</i> , coffee	None -	Plan to plant 6 hectares with 2 brothers
Raimundo	Una	Dendê Palm	No answer	Male	Agrarian Reform	No answer	Palm heart, pumpkin, cassava	None -	Non-participant
Reinaldo	Umburaninha	Castor	64	Male	Family Owned	120 tariffs	Castor, bean, corn, watermelon	Yes. Retirees Government Pension	17 tariffs

Note: This Table does not contain all data created with the Farmer Informants. Full details will be available via a publically accessible Data Archive in the future. Details will be logged at <https://researchdata.ands.org.au/>

Annex 12: Farmer Informants Timor-Leste

Name	Residence	Biodiesel Feedstock	Age	Gender	Type of Property	Principal Crops	Off Farm Income & Source	Land Area for Biodiesel ⁷⁸
Agustino	Lautem	Jatropha	37	male	Ancestral Land	Jatropha, cassava, long beans, potato, sweet potato, corn, yam	Yes. Not defined.	4 hectares
Americo	Dili	Jatropha	No record	male	Transmigrant land	n/a	no	Greenhouse seedlings only.
Armindo	Aileu	Jatropha	29	Male	Ancestral Land	Corn, cassava, potato, long bean, guava, papaya, banana, orange, tomato, vegetables, peanuts, yam	Yes. Aged pension (parents)	Greenhouse seedlings only.
Domingas	Baucau	Jatropha	43	Female	Ancestral Land	Coconut, corn, cassava, banana, water spinach, Jatropha	Yes. Husband is NGO employee	6 hectares
Domingos	Baucau	Jatropha	38	male	Ancestral Land / Family Owned	Corn, papaya, chilli, potato, cassava, banana, coconut	Yes. NGO salary, livestock sales and aged pension.	16 hectares
Isaias	Dili	Jatropha	unknown	Male	Transmigrant land		yes	Small plot (undefined area) located several kms from house.
Jose	Dili	Jatropha	39	male	Individually owned	Corn, cassava, banana, coconut, papaya	Yes. Jose's mother receives aged pension.	Undefined land area. Around 50% of crops dedicated to Jatropha

Lucinda	Manatutu	Jatropha	40	Female	Transmigrant land	Water spinach, eggplant, mustard, bitter melon, coconut, banana, papaya, potato	no	3m x 3m on plot located 3km from house
Maria	Manatutu	Jatropha	42	Female	Transmigrant Land	Cassava, chilli, banana, vegetables, coconut, papaya	No	n/a. Using as a fence only.
Tomas	Ermera	Jatropha	57	male	Ancestral land.	Coffee, potato, papaya, banana, jackfruit, arrowroot	No.	Greenhouse seedlings only
Note: This Table does not contain all data created with the Farmer Informants. Full details will be available via a publically accessible Data Archive in the future. Details will be logged at https://researchdata.and.s.org.au/								

⁷⁸ As reported by Farmer Informants. My estimates of the land area planted with Jatropha during the field visits were significantly less than reported by Farmer Informants’.

Annex 13: Brazil: Summary of Key Findings

Autonomous Livelihood Framework Component	Sub-Component	Brazil
Livelihood Strategies	Pluriactivity	Pluriactivity across the lifespan was the norm rather than the exception. Pluriactivity is more than economic rationalisation: pluriactivity is a lifestyle choice. Pluriactivity was an important livelihood strategy that increased their autonomy, either through providing income that supported their farming activities, or through developing their own skill set or for meeting specific needs at a certain time.
	Diversification	Diversification strategies were associated with experiential knowledge. Participation in the PNPB was not considered the primary strategy of diversification. Participation in the PNPB was one activity that could diversify risk and potential income sources. Diversification is about internal ideals about health of people and the planet. It's not driven by economic considerations alone.
	Enhancing an Independent Resource Base: Auto-consumption	Motivations for auto-consumption were related to personal and environmental well-being. Smallholder farmers' take risks within boundaries. Even if those boundaries aren't well recognised, accepted or aligned with outside experts views of risks. Different farmers' combine different matrixes of strategies that fits their own personal circumstances, but that ultimately support an independent resource base. Having an independent resource base is an important component of autonomy. Having an independent resource base allowed the farmer informants to make their own on-farm decisions based on experiential knowledge and supports their ability to develop a livelihood that is largely independent of external development models.

		Local varieties of palm were advantageous for smallholder farmers' because many already had palm on their properties and that they were familiar with the cropping needs.
Capitals	De-commodification & Internalisation of Resources	Serves as a Livelihood strategy to diversifying their livelihood, spread risk and breaking their dependence on external markets
	Social Capital	Gender in a leadership role is telling as to the importance that issues such as gender can play influencing social capital.
		Provides some insights into differences between 'natural' social capital and 'structured' social capital.
		Role of the local broker is not a purely economic role and it entangled in relations of social capital with other benefits for the farmer informants
	Human Capital	The combination of limited knowledge of cooperative structure and minimal personal investment in the cooperative suggest low social capital on behalf of the farmer informants in the cooperatives.
		Actions of smallholder farmers' could be said to pivot on their experiential knowledge
		Willingness to take risks on new crops or practices may depend heavily on past experiences.
		New crops can pose an 'unknown' risk for smallholder farmers' that has to be managed if they decide to participate.
		Experiential knowledge can inform farmer's decisions to ' <i>disobey the rules</i> ' as part of simultaneously drawing upon and enhancing their experiential knowledge
		Experiential knowledge is closely linked to risk and decision-making.
	Financial Capital	Evidence that there was strong demand for agricultural extension services and that farmer were observing each other's practices anyways.
		Importance that farmers' placed on being able to access a cash income ³ and the ultimate realisation that cash from biofuels offers similar risks and benefits to other forms of cash crops.
		The financial risk associated with participation in the PNPB was significant for the farmer informants

		<p>He financial risk extended beyond the bank loan as the farmer informants would have allocated labour, land, and the feedstock crop displaced another crop, further compounding the financial investment on behalf of the smallholder farmer.</p> <p>Significantly different to the experiences of the farmer informants that were farming castor and participation in the PNPB meant a switch in end purchaser, rather a more widespread influence over their farms.</p>
	Physical Capital	<p>Lack of physical capital, in particular electricity and water, was a driver for migration for family members and a barrier to their return.</p> <p>Improved physical capital was seen as a way to diversify livelihoods</p> <p>Access to basic physical capital secured via clandestine activities such as illegal electricity connections.</p> <p>Access to new physical capital had to be lobbied, negotiated or fought for</p>
	Ecological Capital	<p>Access and utilisation of ecological resources (land) is linked with social justice issues</p>
Agency	Decision-Making	<p>Decision-making occurred frequently in farmer's broader narratives about their livelihoods, agency and identity.</p> <p>Decisions and experiences of managing risk more in term of 'imperfect information'</p> <p>Making decisions where some of the variables and probabilities are unknown and under conditions of uncertainty or ambiguity.</p> <p>Farmer informants expressed that they were open and keen to experiment with new crops, but felt cautious about factors such as land area to plant, accessing loans for seedlings, ability to pay back loans and longer term buying arrangements with cooperatives or corporations.</p> <p>Part of the on farm decision making appeared to be a balance between making a decision in an atmosphere of uncertainty and being to experiment to slowly adapt to unfamiliar practices and crops.</p>
	Experiential Knowledge	<p>Farmer informants were unfamiliar with the crop, it was harder for them to weigh up the associated risks, and farmers' reported different strategies for minimising risk.</p> <p>Farmers' experiment with risk based on their experiential knowledge—experiences in past agricultural schemes will inform how farmers' approach current government agricultural schemes.</p>

		Risks are managed through a balance of investing some time, labour, land into the 'new practice' whilst maintaining livelihood protection — that is, continuing with current livelihood and crop practices.
	Resistance	Observation of the neighbours experiences and practices were highly regards. Operating outside of the boundaries in ways that support autonomy Ignoring technical advice was not based on ignorance but rather grounded in well-informed habits of experiential learning on farm.
		Part of smallholder farmer's agency is the ability to both enhance and draw upon experiential knowledge
Context	Social Value	Emphasis on violence and prejudice as part of rural life Farmer informants reported a consistent prejudice by the wider society and formal institutions towards smallholder farmers'
	Social Differentiation	Heterogeneity of smallholder farmers' even within the same household
Autonomy		Different farmers' can have different experiences, needs and wants based on factors like gender. An independent resource base is an important component of autonomy. <i>Negotiating for autonomy</i> occurs as individuals at times and as a household or community members at other times. Autonomy is spatially and temporally in flux

Annex 14: Timor-Leste: Summary of Key Findings

Autonomous Livelihood Framework Component	Sub-Component	Timor-Leste
Livelihood Strategies	Pluriactivity	Social capital, in the form of mutual family obligations, has a significant impact on the individual's ability to be pluriactive. Farmer informants that were pluriactive continued to identify with 'being a farmer' —link between identity, social embeddedness and pluriactivity
	Diversification	Livelihood strategies and use of resources are adjusted based on social obligations arising from political and social conflict
	Enhancing an Independent Resource Base: Auto-consumption	'Real food' was considered having access to rice, and that having to eat cassava, arrowroot or traditional vegetables was seen as a negative outcome and associated with hunger. Auto-consumption is viewed in a negative light and producing exportable crops for income is seen as a positive activity. Auto-consumption can be considered as a livelihood practice that is valued-bound
	De-commodification & Internalisation of Resources	Farming only for auto-consumption represents poverty and lack of choice. Move toward farming a set plot, rather than shifting plots, had meant that fertiliser was essential to ensure a successful harvest.
Capitals	Social Capital	Shifts in livelihood practices need to adequately supported and that there needs to be good understanding of why farmers' are doing what they were/are doing — shifts to fixed plots means that farmers' are now looking how to fertilises and tend those plots Conditions and criteria were not the same across different government Ministries but each required separately established entities at community level to access goods and services.

		Cooperative members had minimal personal financial risk involved in their participation.
		Cooperative formation was a 'means to an end'.
		Farmer Informants were using their networks (social capital) with SEPE to ensure that their village received a development project that directed benefits to members of the community.
		In some cases, female farmers' were able to provide labour as part of biodiesel Cooperatives but were denied the benefits of influence or decision-making
	Human Capital	Familiarly does not equal all the knowledge that farmers' need to grow successful feedstock because biodiesel feedstock requires different types of use, harvesting and growing than traditional uses.
		Perceives limited opportunities for women wishing to develop their agricultural entrepreneurial skills.
		Several farmer informants had decided to join the Agro-Energy Program on their own terms and were increasing their experiential knowledge outside of the project boundaries
	Financial Capital	Should not be assumed that increased income would reduce food insecurity due to purchasing power proximity to Dili , it's markets, and waged did not seem related to financial security.
	Physical Capital	It was possible to undermine government programs by manipulating shortage of supply of essential material —physical capital became a tool by which other social and political endeavours were met.
	Ecological Capital	Shifts in weather patterns meant that farmer informants reported feeling confused about their farm activities and the timing of farm practices.
Agency	Decision-Making	women have a deep and broad experiential agrarian knowledge, in part due to the long hours that they spend farming. This informs women's farm-level decisions
	Experiential Knowledge	there are strong links between experiential knowledge and agency.

		several farmer informants had decided to join the Agro-Energy Program on their own terms and were increasing their experiential knowledge outside of the project boundaries
		strong links between experiential knowledge and decision-making as the farmer informants sought to increase their knowledge as part of on-farm decision-making processes.
	Resistance	Livelihoods in flux due to conflict (rather than <i>Empire</i> as per van der Ploeg (2008)) highlights a gap in research into sustainable rural livelihoods in unstable conditions and the oversight of assuming that context is largely defined by political-economic factors that smallholder farmers' can 'resist'
		Smallholder farmers' 'play the game' as needed by administrative requirements
		wariness manifested as non-participation in the Agro-Energy Program— a form of everyday resistance.
		Participation and non-participation can fluidly shift between being acts of resistance.
		This 'non-action' represents the idea of everyday resistance — there is no outright 'anti-coffee-tree-renovation' movement rather no-one bothers to follow the external advice due to lack of livelihood alternatives.
Context	Social Value	Some farmer informants saw themselves as simultaneously a 'common farmer' and 'better than' the common farmer.
		historical context Timorese smallholder farmer affected their current livelihoods with the ongoing use of <i>fazendas</i> (landed estates) common in this region
		farming practices in a long historical context associated with colonization e.g. coffee production
		farming livelihoods with a sense of greater social equality in the past. That is, the majority were 'one of the farming masses' and only roya
		farmer informants internalised discourses about farming and smallholder farmers', and that at times this created internal conflict around their identity and how they saw their role within society.
	Social Differentiation	Social differentiation and cultural norms transform livelihood strategies
		There is a gap between rationalisation for not involving women in biodiesel feedstock production ('work is too heavy') and women's current roles and responsibilities ('heavy work across multiple spheres').

Male farmer informants tended to firstly describe women's responsibilities as primarily located within the 'inner household' (cooking, cleaning and childrearing).

Male farmer informants tended to describe women's roles in diminutive forms or frequently as '*assisting*' '*helping*' '*supporting*' men in their farm work certain realms of farm work and on farm management decisions were *primarily* the responsibility of women. This included seed sorting and saving, planting, weeding, land preparation and livestock raising ¹. Further, women were often considered the primarily 'marketer' of any crops sold for income. That is, women were responsible for the transport of goods to market, calculating if transport could be paid from potential earning or otherwise physically carrying goods to market and responsible for selling the goods in the market.

Autonomy

Annex 15: Iterations of Autonomous Livelihood Framework Development

