MARGINS IN THE MOUNTAINS: POVERTY DYNAMICS IN INDIA'S WESTERN AND EASTERN GHATS

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DECLARATION

I certify that the work contained in this thesis, or any part of it, has not been accepted in substance for any previous degree awarded to me, and is not concurrently being submitted for any degree other than that of Doctor of Philosophy being studied at the University of Greenwich. I also declare that this work is the result of my own investigations, except where otherwise identified by references and that the contents are not the outcome of any form of research misconduct.

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ABSTRACT

Extreme poverty is a persistent issue in south India and there are moral and economic imperatives to change this situation. Effective poverty reduction strategies require ongoing advances in knowledge so that strategic action on poverty alleviation can be implemented. This thesis addresses that need by using an integrated methodological approach to explore household poverty dynamics in three mountainous regions in south India. Nine hundred household surveys and eight focus group discussions were conducted amongst landless, landed and scheduled tribal (ST) groups to answer four specific research questions: 1) *What are the perceived trajectories of local wellbeing* 2) *Do multiple equilibria poverty traps exist?* 3) *What is the influence of women's power and other covariates on household asset accumulation?* 4) *What are the local perspectives on government policy schemes?* Qualitative results indicate a general positive outlook of wellbeing that does not differ due to household land ownership or ST membership, but does show slight differences between research sites: positive in Jeypore, negative in Kolli Hills, and ambiguous in Wayanad. Quantitative results support this conclusion by showing no evidence of multiple equilibria poverty traps using income, expenditure or asset dynamic approaches. A novel semi-parametric multiple factor polynomial (MFP) analysis shows household characteristics such as age, education and female headship are positively related to asset accumulation, while factors such as household size and ST membership have a negative effect. Women's power was unexpectedly found to have a non-linear impact on asset accumulation, with the challenging conclusion that increasing women's power does not always enhance the wellbeing of a household; to my knowledge this is the first time that women's intra-household bargaining power is included in empirical poverty trap analyses. Finally, government schemes were considered to be a major contributor to this wellbeing advance. While this thesis sheds light on poverty dynamics in three remote locations, the primary research contribution is methodological: using the MFP approach to semi-parametrically assess poverty traps; and empirical: finding a non-linear relationship between women's power and household asset accumulation.

Keywords: multiple equilibria, poverty traps, semi-parametric, India, policy, asset dynamics, intra-household bargaining

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ACRONYMS

ALES: Faculty of Agriculture, Life and Environmental Science (University of Alberta, Canada)

APL: Above Poverty Line

APM: Alleviating Poverty and Malnutrition in Agrobiodiversity Hotspots Project

BRGF: Backward Regions of India Grant Fund

BPL: Below Poverty Line

CIFSRF: Canadian International Food Security Research Fund

CUSAT: Cochin University of Science and Technology

DFATD: Department of Foreign Affairs Trade and Development of Canada

DHED: Determinants of Household Economic Development Survey

DMK: Dravida Munnetra Kazhagam

FGDs: Focus group discussions

HDI: Human Development Index

IAY: Indira Awaas Yojana (housing scheme)

IDRC: International Development Research Centre of Canada

IGNOAPS: Indira Gandhi National Old Age Pension Scheme

IGT: Intergenerational Transmission of Poverty

LDF: Left Democratic Front

LOWESS: Locally Weighted Scatterplot Smoother

MDG: Millennium Development Goals

MDM: Midday Meal Scheme

MFP: Multiple Factorial Polynomial

MGNREG: Mahatma Gandhi National Rural Employment Guarantee Scheme

MLE: Maximum Likelihood Estimator

MSE: Madras School of Economics

MSSRF: M.S. Swaminathan Research Foundation

MVP: Millennium Villages Project

NRI: Natural Resources Institute, University of Greenwich

NSDP: Net State Domestic Product

OBC: Other Backward Caste

DHED: Determinants of Household Economic Development Survey

PCA: Principal Component Analysis

PFA: Principal Factor Analysis

PDS: Public Distribution System

PMGSY: Pradhan Mantri Gram Sadak Yojana (All India Roads Scheme)

PP: Purchasing Power

PPP: Purchasing Power Parity

RSVY: Rashtriya Sama Vikas Yojana

ST: Scheduled Tribe

SC: Scheduled Caste

SDG: Sustainable Development Goals

SHG: Self-help Group

TFP: Total Factor Productivity

TPDS: Targeted Public Distribution System

UA: University of Alberta, Canada

UDF: United Democratic Front

VRC: Village Resource Centre

GLOSSARY

Above Poverty Line (APL): a measurement tool in India based upon income used to identify individuals that have a high enough standard of living to not require government assistance through the PDS system.

Absolute poverty: the measure of poverty in relation to the amount of money necessary to meet basic needs such as food, clothing, and shelter.

Anganwadi Centre: community outreach centres across India that provide supplementary nutrition services, immunization, preschool education and health education.

Assets: the combination of conventional, privately held productive and financial wealth, and social, geographic and market access positions that provide economic advantage (Carter and Barrett 2006).

Behavioral poverty traps: a recent area of research for which the evidence is just starting to accumulate, and refers to individual behavioral characteristics that may limit the advance of welfare.

Below Poverty Line (BPL): a measurement tool in India to identify individuals that have a low standard of living that requires government assistance through programmes such as the PDS. BPL designation and identification cards entitle poor households in India to access to a range of government welfare services, including federally funded employment, housing, food, and small-value individual schemes offered across various government departments (Ram, Mohanty & Ram, 2009).

Development: a positive change from ill-being to wellbeing (Chambers, 2006).

Economic vulnerability: the proneness of certain household economies to downside risks (Cordina, 2004) and the associated perceptions of insecurity or potential harm within the household (Calvo and Dercon 2005).

Extreme poverty: a designation for those individuals who have less than $1.90 US per day food intake at low levels (Kraay and McKenzie 2014).

Focus Group Discussions (FGDs): a qualitative analysis technique used to elicit specific information through a guided conversation between an interviewer and a small number of participants.

Geographic poverty trap: conditions where the physical geography of a location provides a self-reinforcing mechanism of poverty to exist; for example a lack of road system due to mountain range or forests that prevents access to a remote region.

Gram Panchayat: the local self-government at a village or small town level in rural India.

Gram Sabah: village-level self-governmental body in India comprised of non-elected officials.

Income poverty: when a family's income fails to meet a federally established threshold that differs across countries (UNESCO 2014).

Integrated Farming: a holistic farming system where high quality food, feed, fibre and renewable energy are produced by using resources such as soil, water, air and nature as well as regulating factors to farm sustainably and with as little polluting inputs as possible (IOBC 2014).

Indira Awaas Yojana (IAY): a housing programme that provides beneficiaries in rural areas with funds to build or upgrade their homes.

Landless: households owning less than 0.002 acres of land (Rawal, 2008).

Literacy Rate: the total percentage of the population of an area at a particular time aged seven years or above who can read and write with understanding in any language (Government of India 2011).

Mixed / Integrated methods approach: research designs that include at least one quantitative method (designed to collect numbers) and one qualitative method (designed to collect words) (Greene, Caracelli and Graham 1989).

Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREG): an employment guarantee scheme that provides households in rural India with access to 100 days of paid manual labor work a year. If state governments are unable to secure the applicant with a job within 15 days, the applicant is entitled to receive an unemployment allowance.

Non-parametric analysis: relies on data that is not required to fit a normal distribution, which is often ordinal or ranked.

Nutritional poverty trap: a situation where poor individuals are too malnourished to physically be able to do productive work, thereby not earning enough or producing enough food to alleviate this malnourishment.

Occupational poverty traps: a situation whereby the combination of borrowing constraints and lumpy production technologies means that poor individuals who start businesses that are too small will be trapped earning subsistence returns (Kraay and McKenzie 2014).

Parametric analysis: relies on data that follows a normal distribution pattern.

Pareto efficient: a state of resource allocation where it is impossible to make any one individual better off without making at least one individual worse off.

Principal Component Analysis (PCA): a statistical procedure for identifying a smaller number of uncorrelated variables (principal components) from a large set of data in order to explain the maximum amount of variance with the fewest number of principal components.

Principal Factor Analysis (PFA): a statistical method used to describe variability among observed, correlated variables in terms of a potentially lower number of unobserved variables called factors.

Poverty: whether households or individuals have enough resources or abilities today to meet their needs (Coudouel, Hentschel and Wodon, 2002).

Poverty traps: a self-reinforcing mechanism that causes poverty to persist (Azardius and Stachurski 2005)

Public Distribution System (PDS): a federal government scheme established in India in 1997 that supplies food and non-food products at subsidised cost to India's poor. Quotas of common staples, including cereals and grain, rice, sugar, cooking oil, cooking coal, and kerosene are provided to eligible households through a nation-wide network of ration-shops.

Purchasing power (PP): determined by relative cost of living and inflation rates in different countries, and determines the quantity of currency needed to purchase a given unit of a good or common basket of goods and services.

Purchasing power parity (PPP): is a comparative tool to equalise the purchasing power of two currencies by taking into account the cost of living and inflation differences.

Ration-shop: outlets that distribute food and material goods to ration cardholders of the PDS.

Relative poverty: poverty in relation to the economic status of other members of the society; people are relatively poor if they fall below prevailing standards of living in a given societal context.

Scheduled Tribe/Scheduled Caste (ST/SC): traditionally disadvantaged minority groups comprised of ST (outside the caste system) and SC (lowest level within the caste system) that have been identified and are eligible for affirmative action policies, protective arrangements, and targeted government programmes.

Scheme: a common term in India for any government policy programme.

Self-Help Group (SHG): a co-operative, commonly comprised of women, that has been given access to micro-financing, institutional support, and capacity building.

Semi-structured interview: a qualitative research approach for conducting focus groups where the interviewer and respondents engage in a formal

interview that follows an interview guide, but the interviewer is able to follow topical trajectories in the conversation that may stray from the guide when he or she feels this is appropriate.

Total factor productivity (TFP): the portion of economic output not explained by the amount of inputs used in production, determined by how efficiently inputs are utilized in the production process (Ray, 1998).

Welfare: availability of resources and presence of conditions required for reasonably comfortable, healthy and secure living.

Wellbeing: defined as how well a household is doing and feeling, thereby encompassing both objective (material income, assets, etc.) and subjective (personal satisfaction) aspects of wellbeing, and the positive, holistic and personal qualities associated with the concept.

1. INTRODUCTION

Prevailing narratives on global poverty trends are strikingly positive. In 1990 approximately 40 per cent of the world's population lived below the global poverty line[1] and 47 per cent of people living in developing countries existed in a state of extreme poverty[2] (United Nations, 2015). Globally, the total number of people living in extreme poverty was 1.9 billion. Even considering global population growth, in 2015 this figure has dropped to 836 million. These statistics give some cause for celebration: the global number of extreme poor and undernourished people has declined by more than a half since 1990 and development professionals agree that the world is well on track to achieve the first Millennium Development Goal (MDG) and eradicate extreme poverty and hunger (United Nations, 2015). However, these statistics must not be interpreted with optimism alone: many people across the planet remain unable to attain a minimum accepted $1.90 US per day standard of living and are being left behind in a rapidly developing and globalized world.

The greatest number of the global poor are now concentrated in highly populated, middle-income countries (Sumner, 2012). India exemplifies this situation. Recently "graduated" from low to middle income status, India is richly endowed with natural resources[3] and human capital that has made the nation a rising economic power on the global stage (Statistics Times, 2015). Rapid rates of economic growth since 1990 have contributed to a decrease in poverty levels from 40 per cent in 1990 to 13.5 per cent in 2015 (World Bank, 2015a). Yet the poverty statistics within India continue to reflect the global tale of chronic poverty at a large scale. The World Bank (2015a) estimates that 231 million people in India remain below the global poverty line and 191

[1] The current global poverty line established by the World Bank in 2014.
[2] Extreme poverty is defined as those individuals who live on less than $1.90 US per day food intake at low levels (Kraay and McKenzie 2014).
[3] India has the largest population of any country and has vast resources in agrobiodiversity found in places such as the Western Ghats, a global agrobiodiversity hotspot (Pattison et al., 2014; Fisher and Christopher, 2007).

million people are undernourished across the country (FAO, IFAD and WFP, 2014). While this figure is lower in population percentage terms than sub-Saharan Africa, in gross terms it represents the highest number of poor people of any country in the world.

Within India, most of these people live in the rural areas. Approximately 67 per cent of India's population is rural (Government of India, 2013; Aubron, Lehoux and Lucas, 2015); 75 per cent of India's poor live in rural areas and 30 per cent of these people are below the national poverty line (Government of India, 2013). There are several reasons for higher poverty levels in rural areas. One reason is the enhanced risk that comes from reliance on agriculture. Over 60 per cent of activity in rural areas across India is based upon this single industry, where market volatility, changing climatic conditions, lower profit margins and global competition in the supply chain have led to greater uncertainty (Jacoby, 2016). Further, conversion of wild land to agriculture has depleted the biodiversity resources and natural functioning of ecosystems, leading to decreased food security for local communities (Fisher and Christopher, 2007). Rural areas are also highly populated by Scheduled Caste and Scheduled Tribe (SC/ST) populations, who account for 80 per cent of the rural poor in India (Census of India, 2011). Rural areas also have a high level of landlessness, defined as those household living with less than 0.002 acres of land[4] (Rawal, 2008). Finally, women are over-represented among the rural poor, holding a disproportionate number of marginal agricultural jobs with low wages (World Bank, 2015a).

While south India has relatively high standards of living compared with the north-eastern parts of the country, the Western and Eastern Ghat[5] regions of rural South India are anomalies to this trend (Government of India, 2016d). These remote mountainous locations are far from transportation corridors, have high proportions of SC/ST populations and are more impoverished than

[4] This definition of landlessness allows for "homestead land" where the family can build their house.

[5] Ghats is a term in India describing a series of steps leading down to a body of water. Although the term can refer to washing steps for humans, it also refers to mountainous regions that decrease in elevation to ocean waters, such as the Western and Eastern Ghats in south India.

other segments of the population – nationally and even within the same state (Haseena, 2015; Sahoo, 2011; Gaiha et al., 2007; Ministry of Tribal Affairs, 2015). High unemployment, high malnutrition and poverty persist in these locations (Ministry of Tribal Affairs, 2015; National Bureau of Asian Statistics, 2014).

Some researchers argue that these mountainous, marginalized populations in India are caught in a poverty trap – a self-reinforcing mechanism that causes poverty to persist (Azariadis and Stachurski, 2005). The concept of poverty being a trap that can somehow be sprung has captured the minds and research dollars of government policy makers and the general public[6]. Understanding the root causes and dynamics of poverty in India has particular importance as lessons from such a populated and economically powerful nation can have national, regional and even global implications. Therefore in 2011 the Canadian International Food Security Research Fund (CIFSRF) [7] sponsored a multidisciplinary research and development project in south India entitled "Alleviating Poverty and Malnutrition in Agrobiodiversity Hotspots" (APM). This project was implemented through a partnership between the M.S. Swaminathan Research Foundation (MSSRF) in India and the University of Alberta (UA) in Canada. Two of the objectives of this project were: 1) to increase the capacity of local farm families and communities to deal with social and economic change; and 2) to contribute to knowledge dissemination to policy makers at various levels of the Indian government. This thesis was primarily funded through the APM project with an overall goal to understand the poverty dynamics in three rural and remote locations in southern India: Odisha, Tamil Nadu and Kerala.

Over time a vast body of literature has grown across disciplines to understand the root causes of poverty and inform policy responses to this issue (Ferreira and Ravallion, 2008; Ray, 1998; Brady and Burton, 2016;

[6] Poverty traps were the conceptual foundation for the Millennium Villages Project (MVP) (Sachs et al., 2004) and has shaped much of the development narrative of the 21st century (Michelson, Muñiz and DeRosa, 2013; United Nations Development Programme, 2016; Barrett and Carter, 2013).
[7] CIFSRF is an initiative of the International Development Research Centre (IDRC) of Canada funded by the Department of Foreign Affairs, Trade and Development (DFATD).

Addison, Hulme and Kanbur, 2013). This research ranges from highly quantitative models (World Bank, 2015a; Sen, 1976) to qualitative initiatives, like the World Bank's Voices of the Poor initiative (Narayan et al., 1999, 2000; Narayan and Petesch, 2002). Among development economists much of this research is based upon the Solow-Swan neoclassical growth models, which assert that diminishing returns to capital will inevitably lead to convergence of households (micro-level) or nations (macro-level) in the long-run (Samuelson and Solow, 1956; Swan, 1956; Ray, 1998). While the economic development literature has evolved and such convergence is not always observed, most research remains founded on these foundational principles (Ray, 1998; Azariadis and Stachurski, 2005).

Curiously, while major efforts have been made to understand and release impoverished households from poverty (Barrett and Carter, 2013), the empirical evidence for multiple equilibria[8] poverty traps remains scant (Kraay and McKenzie, 2014; McKay and Perge, 2013). In economic theory, poverty traps are identified through the *absence* of upward mobility on the economic development "ladder" (Azariadis and Stachurski, 2005). This ladder can consist of different variables, such as income, price of consumer goods, education, food security, health access, nutritional security, etc. (Ray, 1998). Given a set of initial conditions, economic theory offers predictions on whether and how individuals and households will tend to evolve along a path of upward mobility (Ray, 1998). For example, a subsistence farmer may save and accumulate capital to overcome fixed costs of entering the off-farm labour market; they may then use their supplemental wage earnings to release working capital and credit constraints for starting a small business. The speed and final destination associated with this path is a complex function of initial conditions and economic parameters, and predictable through the use of economic models (Carter and Barrett, 2006). The evolutionary path is one of constant adjustment, possibly associated with short-run descents into poverty and debt. But over the long-run it leads to economic progress, higher

[8] Multiple equilibria poverty traps are a unique form of poverty trap that has three equilibrium points in the capacity curve. This concept is will be defined and explored in detail in Chapter 2.

incomes and more advanced technologies of production as individuals, households, regions and entire economies ascend up the development ladder (Ray, 1998; Azariadis and Stachurski, 2005).

In the presence of poverty traps these natural evolutionary processes break down, making a clear case for government intervention. As such, over the last few decades India has created a massive network of government social policy schemes (Government of India, 2016d) to alleviate poverty. Government action can affect the development trajectories of rural households through the construction and maintenance of public infrastructure, provision of public services, or the subsidisation of consumption. However, in the presence of the processes that create poverty traps, the same infrastructure or services may generate quite different policy outcomes for different households depending upon their individual household characteristics. Thus certain households, countries and regions seem more readily able to escape poverty traps than others (Kraay and McKenzie, 2014).

While the poverty trap literature has been evolving, another branch of economic research has been developing in a similar manner to understand how intra-household decision-making and women's empowerment impacts poverty levels. This body of literature asserts that the bargaining power between spouses plays a critical role in decision-making and wellbeing outcomes for households (Doss, 2013; Felkey, 2013; Alderman et al., 1995; Allendorf, 2007; Haddad et al., 1997). A standard assumption is that a positive and linear relationship exists between women's power and household expenditure on goods that will enhance household wellbeing (Agarwal, 1997; Haddad et al., 1997; Alderman et al., 1995; Doss, 2013). That is, women will spend more money on goods that benefit children and the overall household than men. However, some have suggested that this assumption may only be true at low levels power and not representative of higher levels of women's power (Allendorf, 2007; Basu, 2006; Felkey, 2013). While this challenge aligns with longstanding social anthropological gender research that suggests changing women's power dynamics have different impacts on household wellbeing (Ferraro and Andreatta, 2014; Lancaster, Maitra and Ray, 2006), to

my knowledge this relationship has not been empirically tested in the asset accumulation poverty trap literature.

Development research on poverty traps and women's empowerment literature are typically conducted among low-income settings to understand the context and decisions of poor households (Quisumbing and Baulch, 2013; McKay and Perge, 2013; Hatlebakk, 2014; Lybbert et al., 2004; Naschold, 2013; Azariadis and Stachurski, 2005). Conventional poverty trap literature compares assets today with assets yesterday to determine trends and seeks equilibrium points[9] in the dynamic pathway (Carter and Barrett, 2006). Most studies use non-parametric approaches with single assets (Lybbert et al., 2004; Carter and Barrett, 2006; Quisumbing and Baulch, 2013) while some recent studies use semi-parametric approaches to delve deeper and understand the influence of covariates into the traditional non-parametric models (Naschold, 2013, 2012). Surprisingly, to my knowledge the economic literature studying welfare dynamics and poverty traps has ignored the impact of intra-household power of women on asset accumulation. This study aims to address that gap.

Development economists assert that the *moral and economic imperatives to intervene in poverty traps motivate the identification of poverty traps and their structural causes so as to inform the design of appropriate policy responses* (Barrett and Carter, 2013). Moral arguments for intervention revolve around social justice and equality. Economic arguments may be less altruistic but no less pressing, as an increase in the wellbeing of all individuals and households increases political stability and through it the local and global economies. The re-invention of the MDGs in the form of the *Sustainable* Development Goals (SDGs) reinforces this imperative to eradicate poverty in its first two goals: *no poverty* and *zero hunger* by 2030 (United Nations Development Programme, 2016; Loewe and Rippin, 2015). Meeting these goals requires a combination of the moral and economic imperatives to stimulate ongoing research on poverty dynamics. The

[9] Equilibrium points are where assets yesterday are equal to assets today and their position(s) are foundational to multiple equilibria analysis (Azariadis and Stachurski, 2005).

persistence and evolving understanding of poverty demands ongoing exploration and analysis to design efficient alleviation strategies. With current global economic uncertainty, limited national budgets and international donor fatigue the issue of poverty is as relevant today as it has ever been (Bigsten and Tengstam, 2015).

1.1 Research Objective and Questions

The overall purpose of this research is to *obtain a current understanding of poverty dynamics among remote, rural, tribal (ST) populations in the Western and Eastern Ghats of South India*. Specifically, this research aims to: 1) advance the existing asset-based approach to poverty trap analysis using novel econometric techniques; and 2) bridge the gap between the economic poverty trap and spousal intra-household bargaining literature. Poverty dynamics will be assessed using an integrated methodological approach to explore perceived household wellbeing trajectories, dynamic asset pathways, spousal bargaining power and the locally perceived impacts of social policies. The following subsections describe the four research questions that will guide this analysis.

1.1.1 Trajectories of Wellbeing

The first research question is a qualitative exploration of wellbeing trajectories designed to understand the locally perceived state of wellbeing over time. Wellbeing is conceptualized in this study as "doing well – feeling well", thereby encompassing both objective and subjective aspects of wellbeing and the positive, holistic and personal qualities associated with the concept (White, 2010)[10]. The question asks *what are the local perceptions about the change of wellbeing over time?* Specifically, do participants feel wellbeing is improving, remaining constant, or decreasing - and what are the major contributing factors to this increase or decrease? While there is indication that improvements in poverty reduction are occurring even within

[10] Informed by the Centre for Development Studies "Wellbeing in Developing Countries Research" at the University of Bath.

these marginalized subpopulations (Government of India, 2013), most research suggests the current and future state of ST households in South India is not positive (Sahoo, 2011; Aubron, Lehoux and Lucas, 2015; Kirubakaran, 2013). Therefore, the hypothesis is that *the average household outlook will be pessimistic across the research locations, with positive trajectories identified within the non-ST and landed households* (Ministry of Tribal Affairs, 2015). This research question will be explored in Chapter 6 and is primarily informed by methods and data collected from qualitative focus group discussions (FGDs).

1.1.2 Semi-Parametric Poverty Traps

Quantitative methods to identify poverty traps and determine the households that are more likely to escape – or fall back into – poverty are constantly evolving (Barrett, Garg and Mcbride, 2016). Barrett and Carter (2013) discuss the evolution of methods and conclude that the identification and understanding of poverty traps remains limited (Barrett and Carter, 2013; Kraay and McKenzie, 2014; McKay and Perge, 2013; Naschold, 2013). Specifically, research studies on asset-based poverty traps in South India are few and have yielded ambiguous results (Quisumbing and Baulch, 2013; Hatlebakk, 2014; Rakib and Matz, 2015; Baulch and Davis, 2008). Therefore the second research question explores the quantitative evidence for the existence of poverty traps within three research areas. Employing a novel multivariable factorial polynomial (MFP) estimation approach, I ask *what is the shape of the poverty dynamic pathway across all research locations and do multiple equilibria poverty traps exist?* To determine the importance of outcome variables in conclusions for policy, results from four different outcome variables are analysed that represent wellbeing: income, expenditure, agricultural land area, and the total household asset index.

Based upon a lack of empirical evidence for identifying multiple equilibria poverty traps (Kraay and McKenzie, 2014) I hypothesize that *poverty traps do not exist in these locations, in part due to India's diverse economic activities that provide alternative sources of livelihood opportunities.*

Chapter 7 will contain the response to this research question, and will be informed by data collected from a quantitative survey instrument designed specifically for this study.

1.1.3 Women's Empowerment

Female empowerment is a positive contributor to household and individual wellbeing (Felkey, 2013; Haddad et al., 1997; Doss, 2013). Yet intra-household bargaining and spousal power indicators have not to my knowledge been incorporated within the asset poverty trap literature. Therefore the third research question asks *what is the role and nature of spousal decision-making power over asset trajectories and poverty dynamics?* A spousal asset purchasing power index is created for each household and included as a covariate in the semi-parametric MFP analysis. As a complementary and secondary objective, other household variables (covariates) are also included in this analysis to obtain insights towards the significance and functional form of these factors on asset accumulation pathways.

Most studies in the intra-household bargaining literature typically assume a positive linear relationship between women's empowerment and household wellbeing: if women are provided more money through policy schemes the household wellbeing trajectory will increase (Allendorf, 2007; Felkey, 2013; Haddad et al., 1997; Agarwal, 1997). Based on this information, the hypothesis is *that female spousal power has a positive and linear impact on asset accumulation pathways*. However, some scholars argue that this relationship may not always be linear (Felkey, 2013; Basu, 2006). Chapter 8 explores this research question and contains results based upon data from the quantitative survey instrument, complemented by FGD insights.

1.1.4 Policy Perspectives

Government schemes[11] play a significant role in assisting communities, households, and individuals escape poverty. India has a large array of universal and targeted government schemes to ensure basic levels of wellbeing and alleviate conditions of poverty (Government of India, 2016d). Due to the objective to provide policy insights to decision-makers, the final research question explores the impact of government policies within the research areas and asks *what has been the impact of government schemes on the wellbeing pathways of local households?* Specifically, respondents are asked in qualitative FGDs what government schemes they believe to be most effective and what makes some schemes more effective than others. Responses between research sites and household characteristics are contrasted, such as land ownership and ST membership.

Based upon a review of government schemes and previous policy evaluation analysis (Breitkreuz et al., 2014; Patnaik, Nath Sahu and Ranjan Hathy, 2011) the hypothesis is *policies have had a major positive influence on wellbeing but effectiveness will vary significantly between states and households based upon land ownership and ST designation.* This component of the research will be explored in Chapter 9 and is informed primarily from in-depth qualitative FGDs interviews that offer insight into policies from the perspectives and experiences of local people in local sites.

1.2 Contributions to the Literature

This study makes novel contributions to several branches of economics and development literature. First, it contributes to the asset-based poverty trap literature. Despite the growth of this literature in recent years, most studies are conducted in communities that rely on a single productive asset for their livelihood and most are based in sub-Saharan Africa (McKay and Perge, 2013; Lybbert et al., 2004; Barrett and Carter, 2013). Expanding the existing research in South Asia is important for transferability of results to

[11] Scheme is a common term in India for a specific government policy.

regions of greater market complexity[12] (Hatlebakk, 2014; Rakib and Matz, 2015; Quisumbing and Baulch, 2013).

Second, the research contributes to the poverty trap literature through the application of a novel semi-parametric econometric approach called MFP estimation. Most studies conduct both non-parametric and parametric estimations of poverty in parallel, first identifying the impact of previous period assets on future period assets and then exploring the influence of covariates on asset accumulation in a separate regression (Lybbert et al., 2004; Adato, Carter and May, 2006; Quisumbing and Baulch, 2013). To my knowledge only two papers address the methodological limitations of this approach through semi-parametric estimation methods (Naschold, 2012, 2013). The use of the MFP analysis to semi-parametric estimation is to my knowledge a first occurrence, with an advantage of allowing non-linear functional forms among covariates to be statistically – and not theoretically – determined (Sauerbrei, Royston and Binder, 2007). The greater objectivity of this approach in selecting covariates for inclusion in regressions is valuable econometrically and for policy determination.

Third, this thesis contributes to the literature on women's empowerment and intra-household bargaining power. Although the intra-household allocation of access to resources is well documented (Mohapatra and Simon, 2015) it is rarely explored quantitatively from an economics perspective due to data limitations (Felkey, 2013; Allendorf, 2007) and long-standing assumptions of a linear, positive relationship (Doss, 2013). Felkey (2013) asserts than the inherent linearity assumed in much of this literature is due to the research context situated among extremely disempowered women (Felkey, 2013). Through a study of Eastern European households she determines that non-linearity does exist when a woman has more power in the spousal relationship and therefore more empirical research is required understand the dynamics at different levels of empowerment (Felkey, 2013).

[12] Most research studies on asset-based poverty traps in Africa have analysed households that are reliant upon a single resource – often livestock (Lybbert et al., 2004; Giesbert and Schindler, 2012; Adato, Carter and May, 2006).

The MFP approach allows us to empirically track the impact of different levels of female power on asset ownership, and compare these results to the household expenditure assumptions in the literature (Ferraro and Andreatta, 2014; Haddad et al., 1997; Felkey, 2013; Basu, 2006; Lancaster, Maitra and Ray, 2006).

Fourth, the research contributes to the international development literature by building an empirical bridge between the poverty trap and intra-household bargaining power literature. Empirically incorporating women's empowerment within the asset-based poverty trap literature recognizes the assertions of the previous literature (Doss, 2013; Haddad et al., 1997; Agarwal, 1997), while empirical confirmation of those assertions can assist in policy design (Doss, 2013; Felkey, 2013; Mohapatra and Simon, 2015).

Fifth, the policy analysis contributes to the literature on Indian policy impacts in a unique way. In the spirit of critical ethnography, evidence from in-depth qualitative interviews that offer insights from local experiences into the wellbeing trajectories and effectiveness of government policies is used, from the assumption that the most effective way of "knowing" is from within (SmithLovin, 1987). This approach adds to the convergence of that literature with economics – specifically evaluation of policy effectiveness that consists of aggregate national, state or multi-state level evaluations on individual policy schemes (Deininger and Liu, 2013). This contribution does not claim to isolate particular factors, indicators of success, or even focus on one specific policy scheme, but rather provides evidence from the "subjective voice" of policy end-users on their experiences with government programmes. This study adds to the literature on micro-level analysis of multiple policy dimensions (Narayan et al., 1999, 2000; Narayan and Petesch, 2002; Breitkreuz et al., 2016; Novotný, Kubelková and Joseph, 2013), allowing the researcher to discover unconsidered elements of a particular policy intervention that may get overlooked in other macro-level approaches.

Finally, the entirety of this study is a timely contribution to government poverty alleviation strategies at three levels: within the research locations, within India and within South Asia. The three research locations are representative of rural mountainous communities that exist across the Indian sub-continent far from urban centres and with abundant natural resources. These locations are often marginalized from mainstream society due to social stigma associated with ST status and exacerbated by limited access to transportation, economic and educational infrastructure (Panda and Sahu, 2011; Census of India, 2011). My hope is that the lessons drawn from this study will be used to inform robust policy alleviation strategies for similarly marginalized populations across India and South Asia.

1.3 Structure of the Thesis

Chapter 2 provides defines poverty and its measurement within this study, and presents a review of empirical studies on asset-based poverty traps and women's intra-household bargaining power. Information and research studies on wellbeing trajectories are presented and discussed. Chapter 3 describes the research context of the thesis, including an overview the APM project and the geographic, demographic and historical characteristics of the research areas. An historical overview of the status of the scheduled tribes (ST) of India is also presented. The integrated qualitative and quantitative research methodology employed is described in Chapter 4, including the design and implementation of the survey instrument. Chapter 5 presents summary statistics from the survey instrument. Chapters 6 to 9 are results chapters that address wellbeing trajectories, unconditional poverty traps, women's power dynamics, and perspectives on policy, respectively. Each of these chapters maintains the narrative flow of the thesis but includes a concise literature and methodology section that is pertinent to the relevant research question. The thesis concludes in Chapter 10 with a general discussion, conclusion and identification of limitations.

2. LITERATURE REVIEW

2.1 Chapter Overview

The objective of this chapter is to situate this research within the existing literature on poverty measurement, asset-based poverty trap literature, intra-household bargaining power and describe the current policy scheme environment in India. To do so, poverty is first defined and the various approaches to its measurement are reviewed. Then, an integrated methodological approach for exploring wellbeing trajectories is presented that includes the importance of economic "shocks" – both positive and negative – that can influence these trajectories. The theoretical definition and conceptual evolution of poverty traps is established, before presenting an empirical review of this literature, including the methodological and econometric issues that currently exist. Second, the role of women's power is discussed within the intra-household bargaining literature. A review the empirical work published on this subject is presented and issues within the literature are identified. The importance of addressing those issues, or missing gaps, in the poverty trap and women's empowerment literature is discussed, thereby setting the context for the analysis conducted in Chapters 7 and 8. Finally, an overview of the relevant policy evaluation literature will be presented to establish a foundation for Chapter 9 and the concluding chapter of this thesis.

2.2 Conceptualizing and Measuring Poverty

Poverty is a multifaceted and complex topic and there is a vast quantity of literature dedicated to its study (Brady and Burton, 2016; Ray, 1998). Consensus on the definition, measurement, research and alleviation approaches to poverty are diverse. At a fundamental level poverty is defined as *whether households or individuals have enough resources or abilities today to meet their needs* (Coudouel, Hentschel and Wodon, 2002) and this study operates on that definition. Distinction is made between two broad

categories: *extreme poverty* – the minimum set of resources a person needs to survive and globally measured as less than $1.90 USD per day; and *relative poverty* – where people lack the minimum resources required to maintain an average standard of living in the society in which they live (Chambers, 2006).

The International Poverty Centre of the United Nations Development Programme (IPC-UNDP) dissects the concept of poverty into five "clusters of meaning" (Chambers, 2006). These clusters include *income or consumption* poverty – based upon monetary income and consumption of goods only; *material lack or want* – based upon assets and access to services; *capability deprivation* – based upon human capabilities such as skills, physical abilities and societal self-respect; *multidimensional deprivation* – based upon the assumption that material lack is only a part of several mutually reinforcing mechanisms of poverty; and finally a *multiplicity of meanings* – based upon an approach where all the previous clusters are combined. Poverty in the context of this thesis will encompass the first two clusters, and *development* is defined as a positive change from "ill-being to wellbeing" (Chambers, 2006).

Historically the measurement of poverty has been anchored within the IPC-UNDP's first "cluster of meaning" – per capita income (Ray, 1998; Ahluwalia, Carter and Chenery, 1979). In 1990 the World Bank introduced a systematic approach to assess the extent of *extreme* poverty based upon a "dollar per day" international poverty line (World Bank, 1990). This assessment of poverty was based upon purchasing power parity (PPP) and exchange rates adjusted every several years by the International Comparison Programme (ICP) (Ravallion, Datt and van de Walle, 1991; World Bank, 1990). Thus the international poverty line was increased to $1.08 in 1993, $1.25 in 2005 and most recently to $1.90 in 2014 (Ravallion, 2009). This "cluster one" approach is attractive for its ease of measurement and comparability within populations and across nations over time. A major disadvantage, however, is its conceptual one-dimensionality and therefore limited ability to direct long-term policy strategies (Alkire et al., 2015).

Over the last half-century there have been many attempts to enhance per capita income measurements of poverty (McGillivray, 1991). Most of these approaches overcome the one-dimensionality of the international poverty line by creating an index (Alkire et al., 2015; World Bank, 1990). These approaches are able to capture elements of the "cluster five" multiplicity of meanings approach discussed by the ICP-UNDP (Chambers, 2006). Examples include the Level of Living Index, Development Index, Physical Quality of Life Index and the Human Development Index (HDI) (United Nations Development Programme, 1990; McGillivray, 1991; Alkire et al., 2015). The HDI is comprised of three indicators – life expectancy at birth, educational attainment, and per capita income. These indicators are weighted and averaged to create a combined index of human development, between 0 and 1. Most countries and the 2014 United Nations Human Development Report use the HDI as a development indicator (UNDP, 2014), but the more recent and comprehensive Multidimensional Poverty Index (MPI) – that includes deprivations of people as in the traditional measures of the HDI – is gaining popularity (Alkire et al., 2015)[13].

2.3 Trajectories of Wellbeing

The first research question of this thesis seeks to understand the personal experiences with poverty over time and the wellbeing trajectories of households in the research sites. Of particular interest in this section are the factors that cause households to escape or descend into poverty. The following studies provide contextual insights to guide this inquiry.

When considering wellbeing trajectories over time, a major consideration is the "private" transmission of poverty from one generation to the next, or intergenerational transmitted (IGT) poverty (Moore, 2001). The cycle is one borne out across the world today: a poor young person from poor parents ultimately ends up as a poor adult, leading to poverty in the next

[13] Since 2008 there has be a slowing of the rate of advancement of all three components of the HDI although an overall global advance (Alkire et al., 2015).

generation (Bird, 2010). The majority of the intergenerational poverty literature has been conducted in developed countries and explores the household level factors contributing to the transmission of poverty across generations. These factors include: household composition, dependency ratios, health and nutrition, productive assets, education and child labour. Important external factors contributing to the rise from or descent into chronic poverty include conflict, cultural issues, caste, ethnicity and religion (Bird, 2010). Moore (2001) applied the intergenerational transmitted poverty framework to developing countries and identified several particularly important determining factors: migration patterns, health, climatic conditions, social entitlement (caste and ethnicity) and the presence or absence of social safety nets (Moore, 2001). These factors are briefly discussed below.

First, labour migration has provided a great opportunity for individuals and households to move out of chronic poverty (de Haan, 1999; de Brauw, Mueller and Woldehanna, 2013; Mosse et al., 2002). Seasonal movement provides greater opportunity for diverse employment and higher wages than can often be found locally. In some ST communities in western India labour migration is essential for coping and livelihood strategies (Mosse et al., 2002). Yet for other households in remote and rural parts of India, migration results in short-term benefits, but does not provide a long-term solution to problem of IGT poverty cycles (Deshingkar, 2010).

Second, significant household events can have serious consequences for the wellbeing trajectory of households (Narayan, Sen and Hull, 2010; Kochar, 1999; Baulch and Davis, 2008; Alam and Mahal, 2014). Commonly referred to in the literature as “shocks”, these positive or negative events can take various forms. Negative or depleting shocks can be *financial,* such as global food prices; *climatic,* such as extreme weather events or natural disasters; *individual,* such as illness or disease; or *household,* such as the death of a family member, dowry or bride price payments (Narayan, Sen and Hull, 2010). Shocks can also be positive, such as a family inheritance, introduction of government schemes, or new economic opportunities arising

from new business development in an area. The "lumpy" expenditure patterns associated with shocks is very difficult to absorb among poor rural households that do not have a steady source of income (Baulch and Davis, 2008). Some shocks are more difficult to categorize as they may have both positive and negative impacts, depending on the perspective of the household. Two examples of this situation are dowry or bride price payments, and migration for labour. Both positive and depleting events can have a significant impact on households decades after the experience (Narayan, Sen and Hull, 2010).

Health impacts are a significant depleting occurrence (Alam and Mahal, 2014; Mazumdar et al., 2014; Baulch and Davis, 2008). A summary of the literature on the household economic impacts of health shocks concludes that in low income countries poor households bear a very high burden of health expenditure out of pocket (Alam and Mahal, 2014) and are therefore highly vulnerable. Upon experiencing such an event, most of their financial resources are obtained from whatever source they can find – income, savings, borrowing, loans, or selling assets such as land and livestock. Further burden is often added when these shocks remove the ability to work. The resultant inability to "income smooth[14]" from anything greater than a very minimal health shock can be devastating (Alam and Mahal, 2014; Mazumdar et al., 2014).

Climatic shocks such as flooding and drought have serious negative consequences, particularly for rural communities that rely on agriculture for their livelihood (Mazumdar et al., 2014; Gaiha and Imai, 2004; Kreft et al., 2015). In a best case scenario, droughts or flooding in agricultural communities can deplete a household's income, limit food production for consumption or sale, and result in higher food costs in the local marketplace (Mazumdar et al., 2014). In a worst case scenario, homes and soil can be eroded and lives lost, thereby adding emotional stress and removing livelihood sources for a long period of time. Unfortunately these occurrences

[14] Income smoothing is the process where an individual or household's current expenditures are based upon their expected future income and not on current income levels.

are more frequent with extreme weather patterns in an era in which climate change exacerbates the possibility of climatic shocks (Kreft et al., 2015).

India is considered to be at particularly high risk of climatic shocks (Kreft et al., 2015). Gaiha and Imai (2004) explore the impacts of crop shocks on the rural poor in India on a dataset from 1975-84 and found that caste and class affiliation had a significant role on economic vulnerability – the proneness and perceptions of certain households to downside risks[15]. When asked about their perceptions about climatic shocks, poor respondents showed high levels of emotional and welfare stress, as climatic shocks are often compounded by death and illness due to lack of infrastructure and health facilities (Mazumdar et al., 2014).

Understanding the perceptions and mechanisms whereby households cope with significant shock events is essential to design appropriate policy alleviation strategies (Heltberg and Lund, 2009; Gaiha and Imai, 2004; Santos et al., 2011). Coping strategies are incredibly diverse, but one successful approach to reduce economic vulnerability is asset transfers (Gaiha and Imai, 2004). Insurance is another option, but in poor rural areas it is more difficult to insure against individual shocks, such as poor health or death, than it is for aggregate shocks like climatic effects (Heltberg and Lund, 2009). As in the other studies examined, these authors assert that there is need for more effective safety nets and provision for the extremely marginalized segments of the population (Santos et al., 2011; Heltberg and Lund, 2009; Gaiha and Imai, 2004).

These research studies highlight the economic vulnerability of the rural poor in navigating their wellbeing trajectories over the course of their lives and across generations. IGT poverty is a difficult cycle to escape and one of the most effective coping and advancement strategies is social insurance nets, such as government policy schemes. Underlying the literature on wellbeing

[15] There is debate about the definition of vulnerability, but in this context it is defined as the proneness of certain household economies to downside risks (Cordina, 2004) and the associated perceptions of insecurity or potential harm within the household (Calvo and Dercon 2005).

trajectories and household shocks is the importance of understanding the local context. The perceptions of the local people are essential to inform this narrative and therefore FGDs with participants is the foundation for the analysis of wellbeing trajectories and shocks in Chapter 6.

2.4 Conceptualizing and Measuring Poverty Traps

When individuals, households or countries remain consistently poor over time they could[16] be caught in a poverty trap – defined in this thesis as a self-reinforcing mechanism that causes poverty to persist (Azariadis and Stachurski, 2005). A foundational premise for poverty traps within development economics is the convex neoclassical production model of Solow and Swan. This model asserts that diminishing returns to capital will inevitably lead to economic convergence of households (micro-level) or nations (macro-level) in the long-run (Samuelson and Solow, 1956; Swan, 1956; Ray, 1998). Figure 2-1 below shows this relationship graphically and is mathematically based upon the standard aggregate production function of household *t*:

$$Y_t = K_t^{\alpha} (P_t L_t)^{1-\alpha} \quad (1)$$

where *Y* is the output of a single composite good, *P* is a productivity parameter, *K* is the aggregate stock of capital and *L* is a measure of labour input (Azariadis and Stachurski, 2005). Savings of capital from the current output level occurs at a constant rate *s*, where the stock of capital *K* evolves according to the rule:

$$K_{t+1} = sY_t + (1- \delta)K_t \quad (2)$$

where δ is a constant depreciation rate of capital. The convex growth pathway G(k,1) in Figure 2-1 tracks this pathway of capital accumulation –

[16] Households that remain consistently poor over time could also simply be on a very slowly increasing development trajectory that does not meet the definition of a multiple equilibria poverty trap (Azariadis and Stachurski, 2005).

increasing and then flattening out as depreciation occurs. Therefore households that have low levels of capital currently will benefit from positive returns to scale, while the decreasing returns at higher levels of capital will slow down productivity and cause households to converge towards this single, steady equilibrium point along the 45-degree line, which indicates all possible positions where capital today is equal to capital tomorrow (Azariadis and Stachurski, 2005; Ray, 1998). Deviations from this classical convex shape are a signal that something is not functioning as expected within the household economy, and may indicate the presence of a poverty trap. A rich literature has risen on this subject (Kraay and McKenzie, 2014; Azariadis and Stachurski, 2005; Barrett and Carter, 2013; McKay and Perge, 2013; Sachs et al., 2004) that has shaped the course of international development policy at a global scale (United Nations Development Programme, 2016; Michelson, Muñiz and DeRosa, 2013; Sachs et al., 2004).

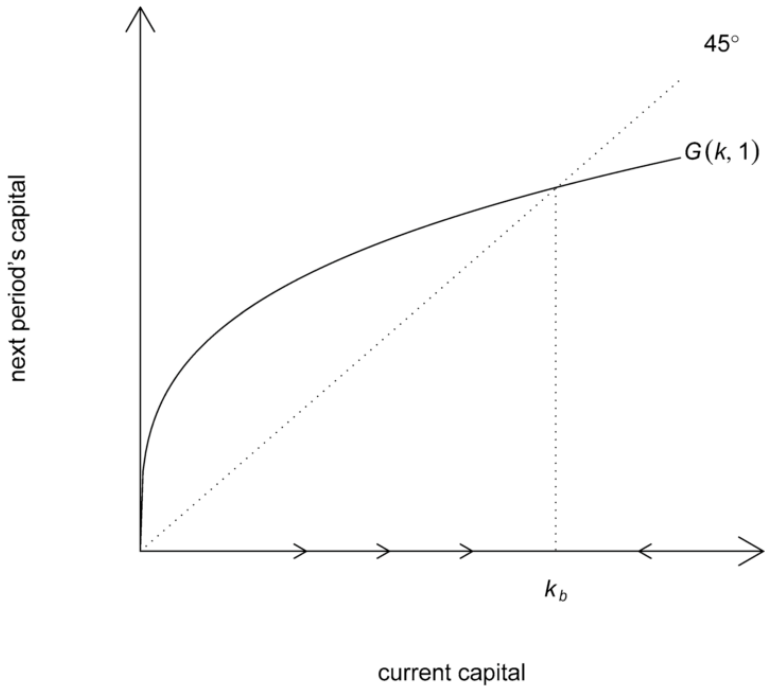


Figure 2-1. Deterministic neoclassical growth model with diminishing returns (Azariadis and Stachurski, 2005).

According to Kraay and Mckenzie (2014) four common types of household poverty traps discussed in the literature distort this convex pathway: *geographic traps* – where physical isolation reduces the

opportunities available for individuals and households in a given area (Kraay and McKenzie, 2014; Bloom, Canning and Sevilla, 2003; Jalan and Ravallion, 2002); *nutritional traps* - where the nutritional capacity of an individual is not met, thereby limiting the ability to work and earn a living (Kraay and McKenzie, 2014; Banerjee and Duflo, 2012; Dasgupta, 1997; Jha, Gaiha and Sharma, 2009); *behavioural traps* – where certain personal behaviours negatively impact an individual's ability to function productively (Kraay and McKenzie, 2014; Barrett and Carter, 2013); and *savings-based* poverty traps.

Savings-based poverty traps are based on the premise that if a household is too poor to save, they cannot build capital assets and therefore their standard of living will only increase at the rate of total factor productivity (TFP) – the portion of output not explained by the amount of inputs used in production, determined by how efficiently inputs are utilized in the production process (Kraay and McKenzie, 2014; Azariadis and Stachurski, 2005; Ray, 1998). Without an option to save or invest in the future, household's are trapped at a lower level of wellbeing with no option for advancement (Kraay and McKenzie, 2014; Barnett, Barrett and Skees, 2008; Carter and Barrett, 2006). Most forms of poverty traps at some level interact with – or prevent – a households ability to save financially, and therefore savings-based poverty traps (in the form of assets) is the focus of this thesis (Azariadis and Stachurski, 2005).

Measurement

Prominent development economists Christopher Barrett from Cornell University and Michael Carter from University of California, Davis summarize alternative approaches to poverty measurement into four "generations" described in Table 2-1 below (Carter and Barrett, 2006; Barrett and Carter, 2013).

Table 2-1. Overview of Carter and Barrett (2006)'s generational approaches to poverty measurement	
Generation	**Approach**
First Generation	Static Income / Expenditure Poverty
Second Generation	Dynamic Income / Expenditure Poverty
Third Generation	Static Asset Poverty
Fourth Generation	Dynamic Asset Poverty

The first generation of poverty trap analysis relies on household expenditure or income from one point in time. A poverty line is arbitrarily set, and the population of the country is divided into poor and non-poor categories based upon where they are situated relative to that level. Simply counting the number of households in each category is used to determine the extent of poverty within a country, and continuous surveys need to be employed to monitor its evolution. An application of this approach is the National Census in India, used to classify individuals in India as either Below Poverty Line (BPL) or Above Poverty Line (APL).

Second generation poverty analysis relies on longitudinal (panel) data where repeated observations of households are conducted over time (Grootaert and Kanbur, 1995). Households are categorized into three groups: the always poor, the sometimes poor and the never poor (Carter and Barrett, 2006). A common finding from studies that use second-generation approaches is that the transitory poverty category had a very large share of the overall people within poverty. According to Carter and Barrett (2006) a limitation of second generation approaches is that these analyses cannot distinguish between structural and stochastic transitions – for example structural, where there has been an accumulation of new assets, or the assets they already have are enhanced in some way; or stochastic – where the household is temporarily poor during due to period of bad luck (Carter and Barrett, 2006).

The third generation approach to poverty measurement defined by Carter and Barrett (2006) shifts the focus to household *asset* ownership as a measurement of wellbeing. Assets in this context are defined as *the*

combination of privately held productive and financial wealth, and social and geographic market access positions that provide economic advantage (Carter and Barrett, 2006). A static and arbitrary asset line is established to disentangle stochastic (unknown) and structural (known) transitions in poverty measurement (Carter and May, 2001). However, while this approach provides structural information it does not illuminate the long-term persistence of structural poverty, it cannot ascertain whether the currently structurally poor are likely to remain poor, remain caught in a trap or whether they can financially sustain themselves over the long term (Barrett and Carter, 2013). Attempting to address this situation, Carter and Barrett (2006) proposed the dynamic asset poverty threshold to decompose structural poverty into its transitory and structural components – the fourth and currently final generation.

In the fourth generation poverty approach, a temporal comparison of household assets over time is conducted (Carter and Barrett, 2006). Through this approach poverty among households can be decomposed into its transitory and structural components. The most important feature for dynamic poverty trap models is the existence of multiple equilibria points. The critical equilibrium point, or asset threshold, associated with household or individual behavior changes is known as the "Micawber Threshold" (Carter and Barrett, 2006; Zimmerman and Carter, 2003; Adato, Carter and May, 2006). Households suffering a shock below the threshold cannot increase their wellbeing, while households above the threshold – while still suffering from the shock – continue to invest, accumulate assets and advance economically (Carter and Barrett, 2006). According to the authors this "bifurcation" at the asset threshold creates very different long-term futures for the household and therefore their welfare status is markedly different (Zimmerman and Carter, 2003; Carter and Barrett, 2006).

Figure 2-2 below describes the trajectory of hypothetical asset dynamics both with and without poverty traps. The similarity with the capital accumulation pathway of Figure 2-1 is evident as assets replace capital in this equation. An appropriate asset index has been created that compresses the

multiple assets of a household at time period *t* into a one-dimensional index. The assets at an initial period A_t are measured non-parametrically against assets at a later period A_{t+1} and the 45-degree line indicates the equilibrium point(s) where $A_t = A_{t+1}$. Standard assumptions over decreasing returns to scale results in the convergent asset line, as the expected trajectory where a household will build up assets over time and converge to the equilibrium level A^*_c (Adato, Carter and May, 2006).

Multiple equilibria poverty traps exist when household assets accumulate in an s-shaped bifurcated pathway, where one trajectory leads to a higher equilibrium and one leads to a lower equilibrium. Several points are useful when interpreting this graph. First, any location where the pathway is above and to the left of the 45-degree line indicates positions where assets in the later period are greater than the initial period – a "positive" position. The opposite is also true: locations below and to the right of the 45-degree line are positions where the future period assets are less than the initial period – a "negative" position. Second, there are two "basins of attraction" in the pathway – the low and high level steady-state equilibrium points, A^*_p and A^*_c (Azariadis and Stachurski, 2005). Households that are to the left or right of these pathways will be drawn towards these positions due to increasing, decreasing or negative returns to asset capital. The low level equilibrium point, A^*_p, is a point of asset accumulation that represent conditions of relative poverty that are difficult to transition out of without exogenous assistance. Third, the single unsteady equilibrium point, A^*_m, is important as households occupying positions to the left of this point can easily slip back to the low-level steady state, and those occupying positions to the right will continue to the high level steady state. Finally, while households in positions to the right of the high-level steady state, A^*_c, are doing well, they will face decreasing or negative returns to assets and be pulled back towards the steady state (Barrett and Carter, 2013; Zimmerman and Carter, 2003; Azariadis and Stachurski, 2005).

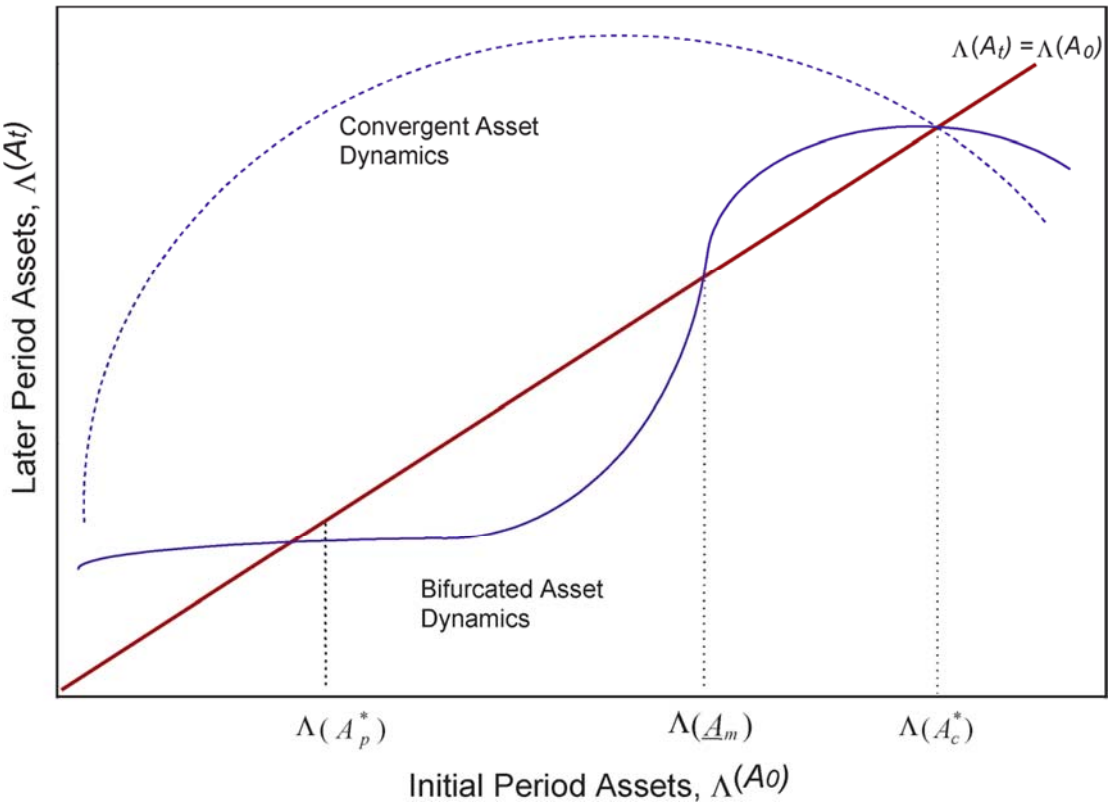


Figure 2-2. Hypothetical asset dynamic threshold and poverty trap (Adato, Carter and May, 2006).

In practice, single low-level equilibrium points can serve a similar function to multiple-equilibrium traps if A^*_p is below the poverty line, and thus should not be dismissed when considering policy responses to poverty (Barrett and Carter, 2013). However, multiple equilibria traps are a unique form of poverty trap that have important policy implications, because poverty alleviation responses are different for households above and below the Micawber Threshold: some households will slowly progress and some will not (Banerjee and Duflo, 2012; Carter and Barrett, 2006; Lybbert et al., 2004). The existence of multiple dynamic equilibria on the asset dynamics pathway will provide the foundation for the analysis presented in Chapter 7.

2.5 Multiple Equilibria Poverty Traps: Empirical Studies

Direct asset-based approaches to multiple equilibria poverty trap identification began in the early 2000s (Michelson, Muñiz and DeRosa, 2013; Barrett and Carter, 2013; McKay and Perge, 2013) and at that time were

predominantly researched in a sub-Saharan Africa context, with a few exceptions in South Asia (Adato, Carter and May, 2006; Lybbert et al., 2004; Quisumbing and Baulch, 2013). These studies predominantly use a non-parametric[17] econometric approach to determine the asset accumulation pathway, and a separate parametric approach to determine the influence of household characteristics and other covariates on the asset accumulation pathway. For the purpose of this review, these studies are divided into those that have found multiple equilibrium poverty traps and those that have not. An overview of several of these studies is provided below.

First, studies have positively identified asset-based poverty traps are explored (Lybbert et al., 2004; Adato, Carter and May, 2006; Santos, 2009; Kristjanson et al., 2007). Pastoral populations in Ethiopia were studied by Lybbert et al. (2004) as this research context was methodologically attractive, as livestock are the only productive asset and Ethiopia has no private land ownership. Using a seventeen-year panel dataset on cattle histories these authors confirm the presence of a dynamic poverty threshold (trap) and determine that recovery from major negative shocks depends on its severity and the risk management strategies of the population (Lybbert et al., 2004). Multiple equilibria were also discovered in a rural population in south Africa (Adato, Carter and May, 2006). A bifurcated asset trajectory confirmed the existence of a dynamic poverty threshold (Adato, Carter and May, 2006) approximately twice the asset level of the South African poverty line at that time. Their conclusions indicated the need for more refined measurement approaches as the authors felt households *above* the traditional categorization of poverty may still trapped in poverty (Adato, Carter and May, 2006). Finally, using a penalized spline semi-parametric approach in a case study in the Indian states of Maharashtra and Andhra Pradesh, Naschold (2012) determined that structural poverty traps do exist and that educated, higher caste and landed households are less likely to be in these positions.

[17] Non-parametric statistical analysis relies on data that is not required to fit a normal distribution, which is often ordinal or ranked. Conversely, parametric statistical analysis relies on data that does follow normal distribution patterns.

A recent study in India found poverty traps when exploring historic land asset distribution and credit constraints on poverty dynamics in Odisha (Hatlebakk, 2014). Poverty levels were determined based upon land asset transitions over time: higher land endowments indicated lack of poverty while lower land endowments indicated lower wellbeing. Parametric economic analysis was conducted for contributing factors for land asset accumulation. Households and village level poverty traps were determined to exist more often when the village was not integrated with the broader economy (Hatlebakk, 2014). This study also concludes that STs are more likely to be caught in a poverty trap than other segments of society, including SCs.

Despite these "positive" cases, most studies have not yielded empirical evidence of multi-dynamic equilibrium (McKay and Perge, 2013; Kraay and McKenzie, 2014; Quisumbing and Baulch, 2013; Kwak and Smith, 2013). McKay and Perge (2013) conducted a multi-country assessment using both non-parametric and parametric statistical analyses on asset groupings of land, livestock, durable goods and a measurement of social capital. While they determine that chronically poor households have lower levels of assets than other households, they find no evidence of multiple equilibria conditions signifying a poverty trap in any of the locations (McKay and Perge, 2013). Kwak and Smith (2013) expand the empirical analysis of asset dynamics by incorporating new econometric procedures over time and across regions in Ethiopia. Primarily considering household assets, they assert that single steady state equilibrium does exist, and again rule out a multiple equilibrium poverty trap. Following an approach outlined by Jalan and Ravallion (2002) to identify regional poverty traps, they stratify their examples by regions and find different equilibrium levels. This leads the authors to conclude that while there was no evidence for traps, nation wide datasets may have obscured the existence of traps and suggest more localized research contexts (Kwak and Smith, 2013).

Asset-based poverty traps were *not* identified in post-war Mozambique using parametric and non-parametric methods (Giesbert and Schindler, 2012). Exploring the impact of land assets over a three year time period, this

study found that households tended to migrate towards a low level equilibrium, indicating the existence of a low-level sectoral development that revolved around agriculture. Households that were able to increase their income-generating assets were found to increase their productive asset base in the short term and sustain it. Negative shocks were also included in the parametric analysis, and were found to contribute to the maintaining low standards of living that resemble poverty trap conditions (Giesbert and Schindler, 2012).

Quisumbing and Baulch (2013) conduct a comparable analysis in Bangladesh to explore if the determinants of asset accumulation over time were different between South Asia and sub-Saharan Africa. They find evidence for a concave asset frontier where households build assets over time towards a high-level equilibrium threshold, but again discover no evidence for an s-shaped, bifurcated asset trajectory where household are drawn to different equilibrium points, and therefore no multiple equilibria poverty traps. They conclude that highly functioning factor markets in South Asia could be causing the difference between their results and those found in several African studies (Adato, Carter and May, 2006; Lybbert et al., 2004).

Moving beyond the concluding results, each of the previous studies employs a similar non-parametric econometric approach to determine the asset accumulation pathways – where assets today are compared with initial time period assets only (Naschold, 2013). Other variables in the analyses – such as demographic factors or household shocks – are included as separate parametric analyses parallel to the non-parametric approach (Lybbert et al., 2004; Quisumbing, 2011). There are relatively few studies that use semi-parametric techniques to allow the inclusion of covariates in the asset accumulation pathway, as they are often limited by sample size (parametric) and functional form computing ability (non-parametric) (Naschold, 2012). The parallel analysis of these approaches is a methodological limitation that prevents deeper understanding of determinants of asset accumulation.

Economist Felix Naschold has attempted to address this concern using semi-parametric approaches. In a comparison of estimation methods in a location in Ethiopia and another in Pakistan, he combined the advantages of parametric and non-parametric techniques by using a partially linear model (Naschold, 2013). Naschold (2013) presents a particularly relevant analysis to this research. He questions whether the mixed results – some discover them and some do not – found in the relatively small literature on the subject of asset poverty trap identification is determined more by actual conditions on the ground or estimation methods to measurement. Using data from locations in Ethiopia and Pakistan and parametric, non-parametric and semi-parametric approaches, he concludes that the estimation method is of secondary importance – it has an impact on the estimated long term wellbeing of the household but not the dynamic asset equilibrium and associated poverty thresholds.

To summarize, although there is substantial reference to poverty traps in development literature, the quantitative evidence for multiple equilibria poverty traps is rare (Kraay and McKenzie, 2014). Most of the studies conclude that the lack of evidence does not necessarily imply a lack of traps (Kwak and Smith, 2013; Kraay and McKenzie, 2014; McKay and Perge, 2013), but there are many factors at play and the methodological analysis is complex (Naschold, 2013). Estimation techniques to incorporate covariates into the analysis are limited, and to my knowledge only two papers address the methodological estimation gap between non-parametric and parametric approaches. Greater insights into the relationship between asset dynamics and covariates may assist in disentangling some of the complexities arising from diverse locations. Many of these studies assert that more research needs to be done to understand poverty dynamics and seek poverty traps in local contexts in order to cut through the aggregate effect of national level household data, that may be blurring results (Kwak and Smith, 2013). I seek to address that gap in this literature through this research.

2.6 Spousal Bargaining Power

According to economic development literature an important factor in advancing household wellbeing is the relationship between spouses and intra-household bargaining power (Doss, 2013). To my knowledge relatively few studies bridge the gap between intra-household bargaining power and the empirical asset-based poverty trap literature. Therefore, I am interested in incorporating intra-household bargaining power as a covariate into the asset accumulation model. Knowledge on this issue has important policy implications about directing assets to the female or the male within households to alleviate poverty (Felkey, 2013; Doss, 2013; Ferraro and Andreatta, 2014). The important issues exist in this context: intra-household bargaining power and gender preferences. In this section these issues are discussed and the approaches of other studies are considered.

First, intra-household bargaining power is considered. Power is defined as the relative negotiating position between different household members and is considered to play an essential role in enhancing development (Haddad et al., 1997; Duflo, 2012; Doss, 2013). There have been significant advances in this field in recent years (Doss, 2013). Traditional economic literature typically treated the household as having a single utility function for modeling poverty dynamics (Lancaster, Maitra and Ray, 2006; Alderman et al., 1995). However, this unitary approach was critiqued for its inability to address the complex decision-making process in households with multiple members and between spouses (Alderman et al., 1995; Haddad et al., 1997; Agarwal, 1997; Felkey, 2013; Browning and Chiappori, 1998). Therefore an alternative “collective” household bargaining approach was proposed by Browning and Chiappori (1998) to address the issue of multiple household members. According to this model, household utility is defined by the weighted sum of the preferences of individual household members, and

must obey a Pareto efficient[18] sharing rule that satisfied certain conditions (Browning and Chiappori, 1998). The welfare weights are the designated proxies for the power of each member of the household.

Spousal intra-household bargaining power has led to a focus on gender differences in expenditure. Duflo (2012) asserts that empowering women leads to development and development empowers women. Other analysis of the spousal intra-household bargaining power relationship indicates that women have more "benevolent" preferences than men (Duflo, 2012; Doss, 2013; Agarwal, 1997). Therefore when a female spouse has greater power within a household, spending on children's nutrition and education is much higher and the overall wellbeing of a household increases (Holvoet, 2005; Bennett, 2013; Himmelweit et al., 2013; Agarwal, 1997; Doss, 2013; Kanbur, Haddad and Haddadt, 1994). Doss (2013) summarizes the development of this literature and concludes that spousal decision-making power is an important component of poverty alleviation.

While most studies provide evidence of a linear relationship between women's empowerment and household development, some suggest that a non-linear relationship exists at different levels of development. That is, at certain levels of development empowering women may cause the household wellbeing to level off or even become negative. Basu (2006) determines that a non-linear relationship exists when comparing women's power and child labour – child labour can decline and then rise as a woman's power in the household increases. Lancaster, Maitra and Ray (2006) explore the power dynamics between female and male household expenditure in India. They found that relative bargaining power has a significant and non-linear impact on budget shares by gender. For example, in households in Kerala they found higher educated males tended to have a lower share of income in wealthier households. They also found that the male share of earnings is higher in larger households. They conclude that households with a more

[18] Pareto efficiency is the state of resource allocation where it is impossible to make any one individual better off without making at least one individual worse off.

equal status between spouses enjoy the highest level of household welfare (Lancaster, Maitra and Ray, 2006).

Finally, Felkey (2013) provides empirical evidence from households in Eastern Europe of a u-shaped relationship between women's empowerment and expenditure on household public goods. She finds that at low levels of power any increase of women's power has a significantly positive and linear relationship, but at higher levels of women's power this relationship decreases in size and become negative (Felkey, 2013). The conceptual framework for this conclusion is presented graphically in Figure 2-3 (Felkey, 2013). Box 1 represents early stages of female empowerment, where any increase in women's power results in a linear and positive impact on spending on household public goods. Direct assistance to increase women's power would cause this response. Boxes 2 and 3 present possibilities at higher levels of women's power where diminishing or decreasing returns to scale may be observed. Reasons for these relationships could be shifting consumer preferences, external gender discrimination in business, or socially constructed norms about expenditure and "image" among powerful women (Felkey, 2013; Ferraro and Andreatta, 2014).

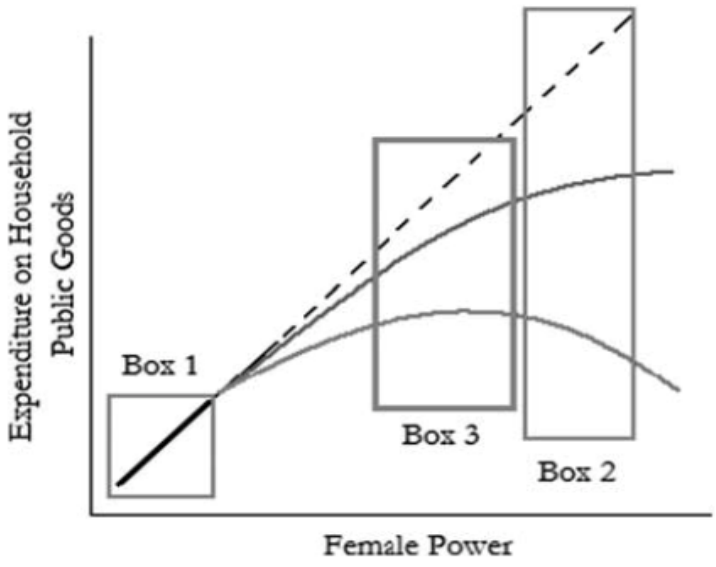


Figure 2-3. Relationship between female power and expenditure on household public goods (Felkey, 2013).

Felkey (2013) argues that much of the economic literature focuses on Box 1, and has therefore disproportionately guided the development policy response of governments. The upper bounds of female power represented in Boxes 2 and 3 are less explored, as much of the development research is conducted in locations where females already have little power within the household and *any* increase will have a positive increase on household wellbeing (Doss, 2013; Felkey, 2013). Some studies have began to explore gender differences, such as Dillon and Quiñones (2010), who compare differences in growth rates between "female" and "male" assets, and Quisumbing (2011), who look at how men and women accumulate assets generally. Allendorf (2007) also explores land asset ownership in Nepal, and concludes that women who own land themselves are more likely to be empowered than those women living in landed households.

Faced with well-documented evidence, many government development schemes have acted by financially investing in women's development schemes (Felkey, 2013; Doss, 2013; Government of India, 2016d). The assumption inherent within these policies is that empowering women will have a positive and linear relationship on household trajectories of wellbeing. While this situation is often true at low levels of development (Felkey, 2013), evidence of situations where this relationship does not hold true prompts research into cases where enhancing women's power may have different effects. In these situations, a more nuanced policy approach may be necessary to perpetuate the empowerment of women and the enhanced wellbeing (Felkey, 2013; Basu, 2006).

Given the importance of intra-household bargaining power on poverty alleviation, its emphasis within the asset accumulation literature seems insufficient. Gender dimensions are typically captured by male or female dummy variables in parametric regressions (Lybbert et al., 2004; Kraay and McKenzie, 2014; McKay and Perge, 2013; Carter and Barrett, 2006), but more nuanced gender influences on assets have been seldom explored. An exception is Quisumbing and de la Brière (2000), who compare expenditures of husbands and wives, and support the literature that suggests women

spend more on goods for children and men spend more non-essential household items. Dillon and Quiñones (2010) determine in Northern Nigeria that typically male assets – such as livestock – increase in value more than typically female assets – such as jewelry – and therefore the gender preference towards different kinds of assets can influence a household's elevation from poverty. And a more recent study by Quisumbing (2011) asserts that while men and women accumulate different assets, all assets stocks are negatively influenced by health and climatic shocks and therefore safety nets to assist with negative events are important.

In summary, despite the focus on women's asset rights as a policy tool to spur empowerment and development, the direct linkage between asset dynamics and women's empowerment have rarely been tested empirically, and to my knowledge no studies have attempted to integrate this approach within the asset-based poverty trap literature. Further, to my knowledge no studies have attempted to empirically search for non-linearity in women's power and asset accumulation pathways. I seek to address this gap by conducting a poverty trap analysis that includes a women's empowerment covariate in a total household asset analysis. Incorporating women's power as a covariate semi-parametrically will allow us to track the shape of the women's power pathway and contribute to both sets of literature. These results are presented in Chapter 8.

2.7 Policy Perceptions

The studies cited in previous sections assert that their results have important policy implications (Adato, Carter and May, 2006; Lybbert et al., 2004; Barrett and Carter, 2013). The policy influence of poverty research also motivates this research and so policy perceptions are specifically explored in the final research question: *what has been the impact of government schemes on household poverty dynamic pathways?* Understanding the local perceptions about policy impacts provides contextual information to evaluate existing policies and inform future policy design.

There are many policy schemes in South India to prevent poverty and remove limiting conditions to wellbeing enhancement (Government of India, 2016d). These schemes vary in scope and cover issues such as employment, infrastructure development, nutritional education and food provision, asset provision and health, and more. Their implementation strategies range from targeted micro-level approaches, such as the Public Distribution System (PDS), to "big push" macroeconomic models like the Pradhan Mantri Gram Sadak Yojana (PMGSY) – the "all India roads scheme" (Kraay and McKenzie, 2014; United Nations, 2015; Bigsten and Tengstam, 2015). Different insights have been put forth: policies should assist households in reaching and maintaining a minimum bundle of assets (Barrett and Carter, 2013); greater access to markets will allow households to build assets over time and thereby escape poverty (Adato, Carter and May, 2006); external injections into an economic system are important in times of household economic shocks (Lybbert et al., 2004); and *how* money is injected into households can seriously influence the wellbeing of both the household and the individuals within it (Doss, 2013; Haddad et al., 1997). Diversification of income sources is an important policy to facilitate escape from poverty (Krishna, 2006), and employment welfare schemes to build income levels are often separated into self-employment programmes or wage employment programmes (Mishra, 2014), and diversification.

Concomitantly, there is a large literature on evaluating these schemes in India. These evaluation studies range from aggregate national evaluations (Dreze and Khera, 2009; Nayak, Saxena and Farrington, 2002; Pankaj, 2012), state evaluations (Bardhan and Mookherjee, 2006; Das, 2012; Morduch, Ravi and Bauchet, 2012; Mishra, 2014), cross-state comparisons (Bonner et al., 2012; Jha et al., 2009; Kraay and McKenzie, 2014; Jha et al., 2013) and/or individual policy component evaluations (Deininger and Liu, 2013; Pankaj, 2012).

Across this evaluation literature several issues are highlighted that limit the effectiveness of government schemes. One issue is a lack of scheme *awareness* among the target policy recipients, thereby limiting the overall

effectiveness of the programmes as eligible families do not know of their existence (Das, 2012). A second issue is limited access due to bureaucratic complexity and corruption (Véron et al., 2006). A third is that marginalized populations or subgroups tend to be less engaged due to social exclusion (Nithya, 2014; Hasseena, 2014). Due to these challenges diverse evaluation techniques are needed to capture different aspects of scheme implementation. Quantitative studies are more common in the literature, and qualitative studies provide grass-roots policy experiences. There is a constant need to evaluate existing schemes in different ways to guide future policy development.

One approach within the qualitative literature is the micro-level analysis of multiple policy dimensions (Breitkreuz et al., 2016; Smith□Lovin, 1987; Weber, 2009)[19]. This literature uses a critical ethnographic approach to obtain evidence from the "subjective voice" of policy end-users on their experiences with government programmes (Novotný, Kubelková and Joseph, 2013; Breitkreuz et al., 2016) . An advantage of this approach is that it allows a researcher to discover previously unconsidered elements of a particular policy intervention that may get overlooked in other macro-level approaches (Breitkreuz et al., 2016; McCarty, 2011). This approach has been used to review policy perceptions on the preservation of "threatened" languages from case studies in Ecuador, Wales and Namibia (McCarty, 2011), to provide insight to MGNREGA in Tamil Nadu (Novotný, Kubelková and Joseph, 2013) and MGNREGA across South India (Breitkreuz et al., 2016).

The method for the research question on policy perspectives follows a critical ethnographic approach similar to these studies (Breitkreuz et al., 2016; Novotný, Kubelková and Joseph, 2013). Policy evaluation insights are gleaned from in-depth qualitative FGDs interviews with participants across the three research locations. No single scheme is emphasized, but participants are encouraged to share their thoughts on the role of government assistance

[19] It should be noted that the work of Breitkreuz et al. (2016) is not a revolutionary breakthrough in this field, but rather an example of the approach loosely followed in this study.

in their lives and ask them to provide insights as policy end-users. Analysis and results from this topic are provided in Chapter 9.

3. BACKGROUND AND CONTEXT

3.1 Chapter Summary

This chapter provides the background information and research context for this thesis. First, an overview of the Alleviating Poverty and Malnutrition in Agrobiodiversity Hotspots (APM) project is presented to provide a contextual research framework; motivations driving this thesis are established and clarification on how this thesis extends the objectives of the APM project is made. Second, physical and human geography descriptions are presented for the three project sites where the research is conducted. The current and historical policy environment at the local, state and national levels are included within these sections. Finally, the chapter closes with a historical overview of the STs of India.

3.2 Alleviating Poverty and Malnutrition in Agrobiodiversity Hotspots

In 2011 the Government of Canada's Department of Foreign Affairs, Trade and Development (DFATD) and International Development Research Centre (IDRC) funded an initiative entitled the Canadian International Food Security Research Fund (CIFSRF). The purpose of this fund is to improve global food security through applied research that combats poverty and hunger (IDRC 2015). The University of Alberta's (UA) Faculty of Agricultural, Life and Environmental Sciences (ALES), in collaboration with the M. S. Swaminathan Research Foundation (MSSRF) of India, successfully received funding for a three-year project to contribute towards that purpose, entitled Alleviating Poverty and Malnutrition in Agrobiodiversity Hotspots (APM). This study is a component of that larger project.

The APM project addresses three primary research questions: 1) the extent to which integrated (sustainable) farming practices contribute towards the alleviation of poverty and malnutrition among small farm families in rural

India; 2) how value chains enhance the economic status of households; and 3) how gender mainstreaming can assist in family nutritional enhancement and the social status of women (Pattison et al., 2014). These research questions were informed by five central development objectives. The first objective was to increase farm productivity by promoting sustainable crop and livestock diversity; the second, to enhance food and nutritional security at the individual, household and community levels with an emphasis on women. The third APM objective sought to enhance on- and off-farm livelihood diversification for participating households and communities; the fourth was to increase the capacity of local farm families and communities to deal with social and economic change – with a particular emphasis on the empowerment of women. The fifth and final objective of the APM was to understand and inform government policy decisions, accomplished through research on the earlier objectives and dissemination of the insights gleaned from the project to end-users and policy makers. In order to meet these objectives, various research interventions were initiated within the project sites, such as nutrition gardens and village knowledge centres. The evaluation of these interventions was monitored by extensive household surveys. The hypothesis maintained by the APM project was that *integrated agriculture working in partnership with local biodiversity and in a participatory manner offers the most cost-effective, fast and sustainable solutions to address the challenges of poverty and malnutrition in these remote mountainous regions of India* (Pattison et al., 2014).

As part of the management team of the APM project from 2011-2013, I was an active participant in coordinating the research strategy of the overall project: designing and implementing household surveys, and ensuring the central objectives were being addressed in a collaborative manner by individual teams of natural and social scientists across a number of disciplines. In 2012 it was evident that interest and funding was available within the APM project administration team to delve deeper into the contributing conditions of poverty within the project locations and the factors leading to households rising from, staying within, or dropping back into such

conditions[20]. Therefore this doctoral study was proposed to address these questions in partial fulfilment of APM project objectives four and five: expand the understanding of poverty dynamics to increase the capacity of local farm families and communities to deal with social and economic change; and to contribute to knowledge dissemination to policy makers at various levels of Indian government to guide future policy alleviation strategies.

Although the APM project is the funding framework for this study, the research methodology, results and conclusions contained within this dissertation are based solely on data obtained from surveys and FGDs designed and implemented specifically for this research component. However, I did greatly benefit from the support of experienced APM project staff that assisted in the implementation of the survey instrument and focus groups.

3.3 Project Site Descriptions

This research study seeks to shed light on the poverty dynamic pathways of marginalized mountainous communities in the Western and Eastern Ghats of South India. However, these results are also intended to be transferable to similar households and communities across India and south Asia. Thus, selection of research locations that were representative of rural and remote communities in India was an important decision-making factor so that the results could inform and guide the poverty alleviation strategies of state and federal governments – and ultimately to assist in-part to meet the overall objectives of the SDGs One and Two: no poverty and zero hunger (United Nations Development Programme, 2016).

A brief overview of the Indian political system is a useful precursor to a summary of the research site selection criteria. The Republic of India is a

[20] An issue identified in personal conversation with M.S. Swaminathan; founder of M.S. Swaminathan Research Foundation and known for his work in wheat genetics as the “Indian Father of the Green Revolution”.

"sovereign, socialist, secular, democratic republic" (Government of India, 2016a) that gained independence from Great Britain in 1947 and became a Republic in 1950. The nation functions with three levels of government: federal, state, and local. The federal or "Union" government deals primarily with issues of national importance; the Union is divided into 29 states and seven union territories that are administered by State governments; and the local governments within states are further divided into Districts, that are comprised of Blocks (Taluka) which are in turn comprised of municipalities (urban) or panchayats (rural).

Three Block level research locations were chosen [21] to be representative of economically disadvantaged mountainous communities within the Western and Eastern mountain ranges of South India: Koraput, Odisha; Kolli Hills, Tamil Nadu; and Wayanad, Kerala (see Table 3-1)[22]. Selection criteria were based upon a similar cross-site physical and human geographic profile between sites. That is, each research site was required to have a high degree of agrobiodiversity – the full degree of organisms living in an agricultural landscape (Jackson, Pascual and Hodgkin, 2007); a higher percentage of the local population identifying as SC/ST; the communities needed to be relatively poor, as indicated by the respective District receiving funding from the Backward Regions Grant Fund; and be located in remote regions far from major urban centres. Locations were also chosen to represent the spectrum of economic development across Indian states. Thus a politically geographic Block in Odisha (relatively poor), Tamil Nadu (relatively wealthy) and Kerala (wealthy) were identified[23]. To benefit from the international partnership with MSSRF, the final factor in the decision was an

[21] While the selection of the research sites was made initially for the APM project, this dissertation is a component of that project and therefore the same overarching selection criteria apply.

[22] While the research data for this thesis was collected at the Block level, the common name used by field staff at each research site was not consistent with the Block name, and the sites were referred to as *Jeypore, Kolli Hills and Wayanad*. Due to the use of this identification approach, references in this thesis will be consistent with this approach. These names are identified in blue text in Table 3-1.

[23] According to the Net State Domestic Product (NSDP) in 2013/14 prices, Tamil Nadu is the eighth ranked state at 112,664 INR ($2,464 USD), Kerala at eleventh position at 103,820 INR ($2,271), and Odisha ranked 27th with 52,559 INR ($1,150 USD) (Government of India, 2015a; Statistics Times, 2015).

MSSRF presence in each location, as the respected status of the research institution across India (Asia Research News, 2016) allows significant access to government officials and local landowners.

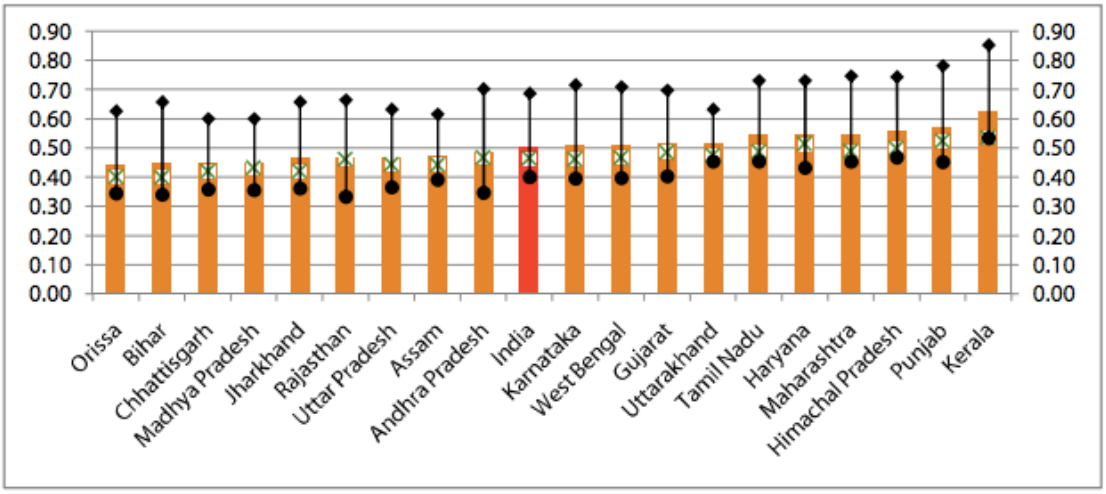
Table 3-1. Political and geographic locations of the three research sites of this study.

	State	District	Block*	Panchayat/Municipality
Site 1	Odisha	Koraput	**Kundra**	**Jeypore**
Site 2	Tamil Nadu	Namakkal	**Kolli Hills**	Semmedu
Site 3	Kerala	**Wayanad**	**Sulthan Bathery**	Meenangadi

* Level of analysis was conducted at the Block level.

The 2011 HDI statistics presented in Figure 3-1 below situates the research locations within the overall Indian state context (Suryanarayana, Agrawal and Prabhu, 2011). At this time India had an average HDI of 0.5. Odisha[24] had the lowest ranking of any state (0.44), Tamil Nadu was slightly higher than average at 0.55 and Kerala had the highest HDI at 0.63. These rankings confirm the relative difference across the range of wellbeing possibility within India that the three research locations represent.

[24] In 2011 the passing of the *Orissa (Alteration of Name) Bill, 2010* formally changed the name of the state from Orissa to Odisha to reflect its pre-colonial heritage.



Notes: Vertical bars (orange color for states and red for India) indicate the HDI; dark black circles (inside the bars) indicate the education dimension index; cross within white squares, the income dimension index; and dark black diamonds (outside the bars), the health dimension index; and the states are arranged in ascending order of their HDIs.

Figure 3-1 Human development index and its dimensions across Indian states in 2011. Source: Suryanarayana, Agrawal and Prabhu (2011).

Figure 3-2 below situates the research locations physically within the sub-continent of India. The Odisha research location is located in the southeastern part of the country, while Tamil Nadu and Kerala are located in the south part of India. The following subsections will describe the characteristics of each individual research location.

Figure 3-2. Location of the three research sites analysed in this thesis.

3.3.1 Jeypore Research Site, Odisha

The Jeypore research site is located in the Kundra Block of the Koraput District of Odisha. The state of Odisha[25] is located on the eastern side of India along the Bay of Bengal. It is the ninth largest state in terms of area and eleventh largest in terms of population with 41.9 million people and a

population density of 270 people per square kilometre (Government of India, 2013). In terms of gender balance, the ratio is 979 females per 1,000 males and the literacy rate is 72.9 per cent. The capital city Bhubaneswar is located in the east-central part of the country and is known as one of the "Temple Cities" of India; its economy is based primarily upon education, political administration, ecotourism and technology (Odisha Government, 2016). Although the state was ranked as the lowest in terms of HDI (Suryanarayana, Agrawal and Prabhu, 2011) it has in recent years experienced steady economic growth due to an abundance of natural resources and favorable political climate; in 2014 the World Bank Group identified Bhubaneswar as the best city in India to do business (World Bank Group, 2014).

At the state level Odisha has primarily been the contesting ground of two major parties: the centrist Indian National Congress (INC) and the socialist Biju Janata Dal (BJD). The INC effectively led the state since its inception in 1947 until 2000, with only two brief interludes in the late 1960s and early 1990s. In 2000 the socialist BJD took the political power that it still holds today. These political parties have significant influence over poverty alleviation schemes within their state not only as the state legislators but also as implementers of the federal schemes.

The research site is located in the Koraput District, a hilly region at the northern reaches of the Eastern Ghat mountain range in the southwestern arm of the state. The average elevation is 2,900 metres and there is an annual average rainfall of 1,522 millimetres, falling primarily in the monsoon months from June through October. The mean temperature is 38 and 12 degrees Celsius in the summer and winter, respectively (Odisha Government, 2016). These favourable climatic conditions have resulted in high levels of biodiversity, resulting in the Plant Authority of India to classify this area as the "Jeypore Agrobiodiversity Hotspot" (Khatana, Roy and Pradhan, 2004). This was particularly due to the high levels of rice diversity found in the area (Mishra and Chaudhury, 2011; Khatana, Roy and Pradhan, 2004).

Approximately 8,379 square kilometres in size (Arunachalam et al. 2008), the Koraput District has a total population of 1.38 million people (Government of India, 2013) and density of 156 people per square kilometre. The two largest urban centres are Koraput and Jeypore towns. In contrast to the economic optimism experienced in the capital and elsewhere in the state, the Ministry of the Panchayati Raj classified the District of Koraput as one of the nations "most backward" Districts in 2006 (Government of India, 2009). Located in a landlocked, remote area far from major industrial or urban centres, the surrounding mountainous region limits business and tourist access. Although the primary town of Jeypore is linked by the Vishakhapatnam highway and Kirandul-Visakhapatnam railway line, the District lies within the "Red Corridor" – an area frequented by leftist political extremists[26] that are opposed to development in the region.

The District is part of the southern Odisha "tribal" belt with sixty-two indigenous adivasi[27] (ST) communities comprising 54.6 per cent of the population (Mohanti, Mohapatro and Samal, 2006). The primary tribes are Poraja, Kandha and Penthia (Mishra et al., 2014). An ethnically and religiously diverse community with strong links to the local forests and biodiversity, these communities have struggled to adapt to changing cultural frameworks of Hinduism and Christianity and economic frameworks of deforestation and industrialisation in the District (Mohanti, Mohapatro and Samal, 2006). Further, their traditional agronomic practices are typically low in productivity, leading to lower yields and agricultural income overall. In 2011 83.8 per cent of people in the District had income levels Below the Poverty Line (BPL) (Government of India, 2013).

The Kundra Block municipality is the most local political area where this research is conducted. The population of the Block is 182 square kilometres and has a population of 58,885 people (Government of India, 2013). Nearly 40,000 of these people are SC/ST that have a literacy rate of

[26] Locally known as Naxalites.
[27] A term meaning "original inhabitants" that is preferred by the indigenous people of the area due to negative connotations associated with the term "ST".

approximately 40 per cent. The major economic activities in this block are agriculture and the primary crops are rice (paddy) and ragi (millet) (Rukmani, 2013).

Table 3-2 below summarizes the information discussed above at the State, District, and Block levels[28]. Figure 3-3 below situates the District physically within the state and within India.

Table 3-2. Summary demographic information on the Jeypore research site in the Kundra Block of Koraput District, Odisha.

Administration Level	**Area (km^2)**	**Capital**	**Population**	**Pop. Density (km^2)**	**Tribal (%)**	**Sex Ratio (F:M)**	**Literacy Rate (%)**	**HDI**	**BRGF**
Odisha	155,707 (9^{th})	Bhubaneswar	41,974,218 (11^{th})	270	22.8	979:1000	72.87	0.442 (19^{th})	NA
Koraput	8,379	Koraput	1,376,934	141	49.6	963:1000	36.2	-	-
Kundra	182	Kundra	58,885	323	67.9	-	-	-	-

Source: **Government of India (2013)**

[28] Some information was not available at the block level and is left blank in the Table.

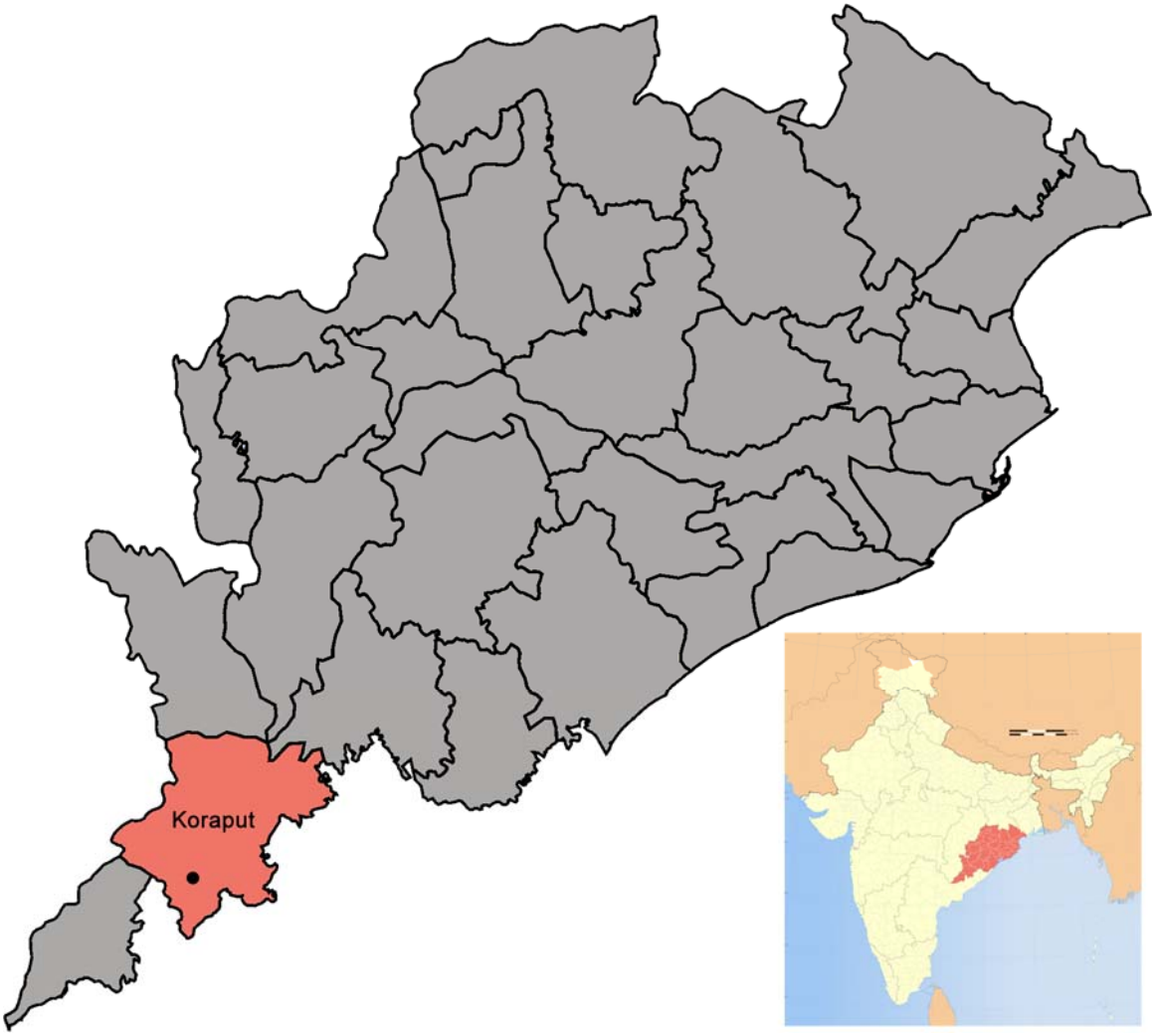


Figure 3-3. The location of the Jeypore research site in the Kundra Block of Koraput District in the state of Odisha, India.

3.3.2 Kolli Hills Research Site, Tamil Nadu

The Kolli Hills research site is located within the Kolli Hills Block of the Namakkal District of Tamil Nadu. Tamil Nadu is the eleventh largest state in geographic area and has a population of 72.1 million and population density of approximately 550 people per square kilometre (Government of India, 2013). Richly endowed with natural resources, it is the second largest state economy in India. It is also the most urbanized state, with a diverse economy based upon textile manufacturing (particularly leather), automobiles and heavy industry, electronics and agriculture (Government of India, 2013). The literacy rate is 80.3 per cent, and the historical connection with the ancient Tamil civilization has led to great social emphasis placed on arts and culture.

These combined factors have resulted in the state ranking as the third most developed in India, based upon a multidimensional development index (Rajan et al., 2013).

Initially known as Madras State (1950-67) upon independence from British colonial rule, Tamil Nadu became the political stronghold of the centrist INC. In 1971 the Fifth Assembly ceded control to the Dravida Munnetra Kazhagam (DMK), the political party in control in various forms until today. The DMK has politically left of centre roots and has historically advocated for Dravidians and Tamils over other groups. However this racial favoritism has changed in recent years and the state has been successful in implementing various poverty alleviation schemes for all citizens (Narasimhan, 2012).

Kolli Hills is located in Namakkal District in the central part of the state. This District has a population of 1.7 million people, with a gender ratio[29] of 986:1000 (Government of India, 2013). SC/ST account for 23.3 per cent of the population and there is an average literacy of 68.2 per cent – significantly lower than the District (80.3 per cent) and national (72.9 per cent) averages. The primary occupation is agriculture, primarily poultry and eggs – accounting for 65 per cent of the state egg production. It is also known for automobile manufacturing located primarily in the District Capital of Namakkal, a town of approximately 55,000 people (Government of India, 2013).

The Kolli Hills Block is both a political and geographical area within the District approximately 50km south of the town of Namakkal. The Block is located on a mountainous plateau at the southern portion of the Easter Ghats mountain range, a narrow north-south plateau of approximately 283 square kilometres. According to the 2011 Census of India, there are 42,200 people living in the Kolli Hills with a population density of 150 people per square kilometre (Government of India, 2013). Over 95 per cent of the inhabitants of the plateau are part of the Malayali ST community (Census of India, 2011).

[29] Female to male.

Most of the population resides within the fourteen rural panchayats[30] on the plateau.

As part of the Eastern Ghats, the plateau is significantly higher than the plain, with an elevation that ranges between 1,000 to 1,350 meters above sea level. The average rainfall in the area is 1,324 millimeters, falling primarily between May and December (Francis, Freeda and Dhivyaa, 2011). Mean temperature ranges daily between minimums of 10-20 degrees Celsius and maximums of 20-30 degrees Celsius. The monsoon season is divided between the "southwest" monsoon period between the months of June to September and the "northeast" monsoon season between the months of October to December (Namakkal District, 2016). According to Francis, Freeda and Dhivyaa (2011) the land cover in the area is 44 per cent forest, 52 per cent agricultural, and 4 per cent for other use, such as transportation corridors and villages.

The primary economic activity on the plateau is agriculture, followed by forestry and tourism. Agricultural land use is classified between spring-fed valley lands, rain-fed lands for millet and cassava, and fringe lands for plantations crops such as coffee and pepper (Gruère, Nagarajan and King, 2008; Francis, Freeda and Dhivyaa, 2011). Traditional agricultural crops include a variety of millet and rice, jackfruit and hill banana, while plantation cash crops such as coffee, pineapple and spice are increasing in acreage. In recent years cassava has increased in production as a response to expanding market opportunities and income stability that farmers can earn compared with other crops such as millet (Finnis, 2006).

The region is well known for the rich biodiversity of its primary forests and for its agrobiodiversity, particularly minor millets and wild foods (Gruère, Nagarajan and King, 2008). A large number of medicinal and aromatic plants also thrive in this region. Francis, Freeda and Dhivyaa (2011) documented 83 species of medicinal plants, and (Samydurai, Thangapandian and Aravinthan,

[30] Valavanti, Valappur, Devanur, Selur, Thinnennr, Ariyur, Thirrupuli, Alatriur, Gundaru, Edapuli, Perakavai, Chitturnadu, Gundurnadu and Bailnadu.

2012) identified 38 wild species of roots, rhizomes and tubers that are commonly consumed in the area.

As in many rural regions of India, malnutrition is a major problem. Padulosi, Thompson and Rudebjer (2013) determined within the Namakkal District 34 per cent of girls between the ages of 11-19 had normal nutritional status, 35.8 per cent were malnourished and 23.7 per cent were severely malnourished. The Ministry of Pachayati Raj does not classify Namakkal District as one of the Backward Districts of India due to the industrial activity in the urban areas, but Kolli Hills is a unique geographically isolated block that has high levels of malnutrition and poverty.

Table 3-3 below summarizes the information discussed above at the State, District, and Block levels[31]. Figure 3-4 below situates the District demographics within the state and across India.

Table 3-3. Summary demographic information on the Kolli Hills research site in the Kolli Hills Block of Namakkal District, Tamil Nadu.

Administration Level	**Area (km^2)**	**Capital**	**Population (Nat'l Rank)**	**Pop. Density (km^2)**	**Tribal (%)**	**Sex Ratio**	**Literacy Rate (%)**	**HDI**	**BRGF**
Tamil Nadu	130,060 (11^{th})	Chennai	72,147,030 (6^{th})	555	1.1	996:1000	80.1	0.57 (6^{th})	NA
Namakkal	3,363	Namakkal	1,726,601	-	23.3	986:1000	68.12	-	No
Kolli Hills	371	Semmedu	42,200	150	95.0	-	-	-	NA

Source: **(Government of India, 2013)**

[31] Some information was not available at the block level and is left blank in the Table.

Figure 3-4. The location of the Kolli Hills research site in the Kolli Hills Block of Namakkal District in the state of Tamil Nadu, India.

3.3.3 Wayanad Research Site, Kerala

The Wayanad research site is located in the Sulthan Bathery Block of the Wayanad District of Kerala. Kerala is located in the southwestern part of India and is the 22nd largest state by area and the 13th largest state by population with 33.4 million people (Government of India, 2013) and. The population density is 860 people per kilometre squared and the capital city is Thiruvananthapuran. Kerala is a state with a positive economic and social outlook: it has the highest Human Development Index in India (0.79), the lowest positive population growth rate (3.4 percent), the highest literacy rate (93.9 per cent), and the highest sex ratio (1084:1000) of any state in India (Government of India, 2013). Agricultural production is a large part of the GDP, particularly rubber, spices, tea and coffee, and the fishing industry. Tourism is also a major contributor to the state economy, with the backwaters of Kerala a major tourist destination domestically and internationally.

The political environment in Kerala has strong leanings towards communism (Nossiter, 1988). Since 1979 two different unions – the Marxist Left Democratic Front (LDF) and the United Democratic Front (UDF) have guided the politics in the state. The UDF is more centrist and aligned with the INC, and the LDF is leftist and aligned with the Communist Party of India. The strong socialist presence in the state has fostered a higher level of social support for government schemes than either Tamil Nadu or Odisha (Corbridge et al., 2005). The vast array of schemes available in Kerala is facilitated by the Social Justice Department of Kerala (Government of Kerala, 2016).

Wayanad District is located in the northeastern part of the state and has a total population of 816,558, with an average density of approximately 380 people per square kilometre (Government of India, 2013). Tribal populations comprise 17 per cent of the total population, and the most populous tribes are the Paniyas, Kattunaikkans, Kurumas and Kurichiyas (Narayanan et al., 2010; Raghu et al., 2014).

The Western Ghats mountain range has been identified as one of the planet's biodiversity hotspots due to the unique climatic and geographic factors in this location (Wayanad District, 2016). The physical geography of mountainous ridges covered in fragments of tropical forest – ranging from 700 to 2,100 meters above sea level – provides the ideal conditions for ecological growth. Relatively high elevation brings cooler temperatures than the surrounding areas, with annual average of 29 degrees Celsius, with lows of 20 degrees to highs of 31 degrees. The average rainfall is 2,322 millimeters and comes primary during the monsoon season between May and October. Native tree species include rosewood, anjili and mullumurikku, today serving primarily as shade cover for coffee plantations. Silver oak and eucalyptus are introduced species also providing shade and forest products for landowners. Many species of birds and mammals reside here, migrating from wildlife sanctuaries in Karnataka and Tamil Nadu. Species include the Asian elephant, tiger, bison leopard and spotted deer and the giant Asian squirrel (Wayanad District, 2016).

Economically the District relies primarily on agriculture. Teak, tea and coffee plantations are common in the forest reserves, and traditional agricultural crops for food include rice, banana, tubers and fruits, while the principal cash receipts come from plantation crops including coffee, tea, cocoa, pepper, rubber and spices (Wayanad District, 2016). The secondary economic activity in the area is tourism, as many people from the coast and southern parts of the state and India come for the beautiful scenery, forests, lower temperatures and wildlife viewing opportunities.

Sulthan Bathery Block is located in the western part of the District connected by the major highway between Kerala (Kozhikode) and Karnataka (Mysore). The town of Sulthan Bathery is the largest town in the District and is a staging area for tourist and commercial activities in the area. The majority of the population are recent settlers to the area (Wayanad District, 2016), although the rural parts of this Block are highly populated by STs that have lived in the area for generations.

Despite Kerala being one of the more economically advanced states in India, and Wayanad District and towns like Sulthan Bathery popular tourist destinations, in 2006 the Ministry of Panchayati Raj classified Wayanad as one of the nation's 250 most backward Districts. Due to this classification, the District is currently receiving funds from the Backward Regions Grant Fund Programme (BRGF) (Wayanad District, 2016). The primary reason for this classification is the economic disparity in the District, particularly among the SC/ST communities. Most households within these groups are very poor and fall within the Below Poverty Line (BPL).

Table 3-4 below summarizes the information discussed above at the state, District, and block levels[32]. Figure 3-5 below situates the District demographically within the state and national statistics.

Table 3-4. Summary demographic information of the Wayanad research site in the Sulthan Bathery Block of the Wayanad District of Kerala.

Administration Level	**Area (km^2)**	**Capital**	**Total Population**	**Pop. Dens. ($/km^2$)**	**Tribal (%)**	**Sex Ratio**	**Literacy Rate (%)**	**HDI**	**BRGF**
Kerala	38,863 (22^{nd})	Thiruvananthapuram	33,387,677 (13^{th})	860	1.5	1084:1000	93.9	0.79 (1^{st})	-
Wayanad	2,131	Kalpetta	816,558 (482^{nd})	383	~36	1035:1000	89.3	-	Yes
Sulthan Bathery	-	Sulthan Bathery	27,473	476	-	-	-	-	-

Source: **(Government of India, 2013)**

[32] Some information was not available at the block level and is left blank in the Table.

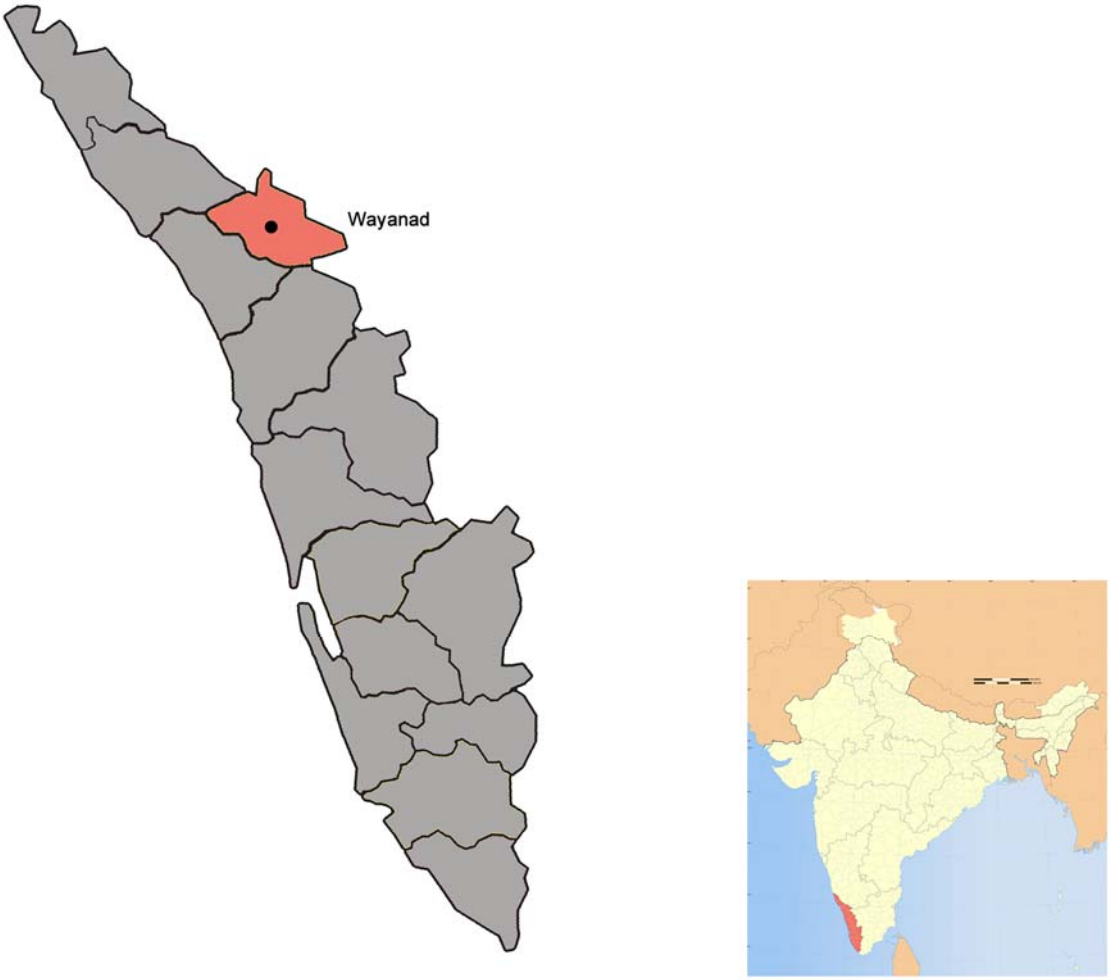


Figure 3-5. The location of the Wayanad research site in the Sulthan Bathery Block of Wayanad District in the state of Kerala, India.

3.4 The Scheduled Tribes: A History of Marginalization

Scheduled Tribes (STs) is the official term for the indigenous adivasis people of India. STs are often discussed in concert with Scheduled Caste (SC) individuals as the "Other Backward Castes" (OBC) of India, or "SC/ST". While grouped together due to their marginalized status in Indian society and economy, these groups are distinct from each other in that the SCs occupy the lowest caste, while STs exist outside the caste system. This thesis focuses on ST wellbeing but not SC, as the research sites are located in Districts with high STs populations. Approximately 8.1 per cent (104.3 million) of India's population is STs (Census of India, 2011); this is the highest gross number of indigenous people in any country. The Indian Constitution

recognizes the unique status of ST in Article 338 (Government of India, 2015b) and has created a Ministry of Tribal Affairs and National Commission for Scheduled Tribes.

Prior to the colonial period of the fourteenth through nineteenth centuries, the STs were self-governing indigenous communities that remained outside the influence of specific rulers. During this period they remained outside the sphere of the caste system but faced social discrimination (Bijay, 2001). With the advent of colonialism and private property ownership, these adivasis communities from the "frontier" – the primarily forested land where the ST communities lived – came under the control of feudal lords, after fighting between the ST communities and colonial forces (Bijay, 2001).

The independence of India from British rule did not change the difficult conditions STs faced. Government programmes aimed at environmental protection in particular impacted these communities, as they relied heavily on the natural forest ecosystems for their homes and livelihoods. The Forest Policy of 1952, the Wildlife Protection Act of 1972 and the Forest Conservation Act of 1980 led to the relocation of many ST communities and households to the periphery of the forests – where they remain today. Ongoing economic and cultural transitions have led to the ST communities being attached – or attaching themselves – to caste groups peripherally (Bijay, 2001). While they exist outside the formal caste structure of traditional Hindu society, they continue to face discrimination and occupy the lowest point on every socioeconomic indicator in India (Bijay, 2001).

In 1999 the Ministry of Tribal Affairs was created to specifically integrate the ST people socio-economically into the Indian economy. The mandate of this Ministry is the welfare and development of STs; protection of their legal land rights; and protection and promotion of ST culture and heritage (Ministry of Tribal Affairs, 2015). This body is also responsible for the *overall policy, planning and coordination of programmes for the development of Scheduled Tribes and provides the core funding for tribal development schemes for all state governments, union territory administrations and*

voluntary organizations (Ministry of Tribal Affairs, 2015). In 2014-15, there were 19 individual schemes available for STs.

There are many academic studies on ST issues in India (Borooah, 2005; Gang, Sen and Yun, 2008; Gaiha and Imai, 2004). Borooah (2005) determined that the income generating profile difference between higher caste households and SC/ST was nearly one third, which was attributed to the discrimination towards SC/ST groups. Gang, Sen and Yun (2008) contrast SC and ST households with a non-scheduled population and determine that the incidence of poverty is much higher amongst these households, affirming the statistical results of the Indian Census (Census of India, 2011). They use a probit decomposition analysis and find that poverty rates are different for SCs versus STs, but that the occupational structure and low education are determinants in their wellbeing. Gaiha et al. (2007) assesses how the ST and SC communities have fared in the recent development of the Indian economy. They affirm that the incidence and intensity of poverty among STs is due to structural differences such as living in remote areas with limited infrastructure and market access.

There is also a dearth of ST research specific to Odisha, Tamil Nadu and Kerala. Sahoo (2011) provides a socio-economic overview of the ST population among various Districts in Odisha, concluding that development activities such as mining have had a large impact on the ST communities, changing their lifestyles significantly. There have been positive factors associated with this change, such as higher literary status, educational achievement and higher employment rates. However, the benefits of development programmes have not fully reached the communities, and there remain large questions about the alignment of these programmes with cultural and livelihood requirements. This concern is also raised by Patnaik, Nath Sahu and Ranjan Hathy (2011) who use socioeconomic conditions to suggest innovative schemes to facilitate development of the ST population in Odisha.

Haseena (2015) provides an overview of the livelihood problems among STs in Kerala in general and in Attapaddy in particular. Although

Kerala has the highest literacy rate and development level of any state in India, the ST people in many parts of the state are very poor and do not benefit from the support systems nor the tourist income that benefits the other parts of the state. The author shows that there exists major "passive indifference" to ST communities in terms of education, employment opportunities and access to land ownership. Kirubakaran (2013) reaches a similar conclusion in a study of the ST populations of the Kolli Hills. Despite being in a well-off state, the forested land atop the Kolli Hills plateau meant ST populations are spatially and culturally isolated from the economic opportunities available in more accessible parts of the state. While considered a pleasant tourist destination, the poverty is very apparent in this largely ST area (Kirubakaran, 2013).

In conclusion, the marginalization of ST populations across India has a long history. Despite the policy attention these groups have had since the formation of the Republic of India, they remain outside the caste system and consistently occupy a lower state of wellbeing than other households within their communities. The social and economic disempowerment of these groups is an ongoing issue, and as such this thesis explores the differences in poverty dynamics between STs and non-ST households in Odisha, Tamil Nadu and Kerala.

4. METHODOLOGY

4.1 Chapter Overview

This chapter outlines the methodological approach used to respond to the research questions. A brief rationale for the chosen mixed methodological and recall approach is presented, and then the design and implementation of the DHED household survey instrument and qualitative focus group discussions (FGDs) are provided. The conceptual design and methodology employed for both these methods is discussed in this section, including a description of the qualitative (thematic) and quantitative econometric (semi-parametric multiple factorial polynomials) techniques employed.

4.2 Methodological Approach

4.2.1 Mixed Methodology

Greene, Caracelli and Graham (1989) define mixed methods[33] as a research design that has at least one quantitative method to collect numbers and one qualitative method to collect words. Such methodological pluralism is advantageous in social science research as it can provide a broader perspective and more nuanced understanding of the research objective (Azorín and Cameron, 2010). Kanbur and Shaffer (2007) assert that the most comprehensive information is elicited when the research methodology integrates qualitative and quantitative methods in the design stages rather than parceled together post design.

An integrated research design framework was created based upon an assessment process outlined in Creswell and Plano Clark (2011) as described in Azorín and Cameron (2010). This process was used as a blueprint for my approach and is summarized in Table 4-1 below.

[33] These mixed method approaches are also referred to as “Q-squared” or “quali-quanti” (Kanbur and Shaffer, 2007).

Table 4-1. Mixed methods approach to research design based upon the framework of Creswell and Plano Clark (2011)

Step	Response	Why
Determine if a mixed methods study is needed to study the problem.	Yes it would provide a greater understanding of the issue.	Poverty traps and social dimensions benefit from quantified HH information but the complexity of the issue benefits from human stories.
Consider whether a mixed methods study is feasible.	Yes it is feasible.	Human and financial resources are in place at all research locations to conduct a survey and focus groups.
Write both qualitative and quantitative research questions.	1) What is perception of wellbeing and shocks? (qualitative) 2) Do unconditional poverty traps exist? (quantitative) 3) What are the effects of women's power and other covariates on the dynamic asset accumulation pathway? (quantitative) 4) What is the local perception of the effectiveness of government policies? (qualitative)	Each research question is answered primarily by either quantitative or quantitative approaches, but is complemented by information from the other approach.
Review and decide on the types of data collection.	FGDs for qualitative data collection; surveys for quantitative data collection.	Provides a very large source of quantitative and qualitative data.
Assess the relative weight and implementation strategy for each method.	Survey data will be most important for asset poverty traps search (Q2). Focus Group Data will be most important for wellbeing and policy research (Q1 and Q3)	Many policy makers and research scientists will value the quantitative data from Q2. However others will place greater emphasis on Q1&Q3 as they frame the situation.
Present a visual model.	Did not present.	Did not present.
Determine how the data will be analysed.	Econometric techniques. Count models for interview data.	Basic income model, then moving to more advanced asset and occupational models.
Assess the criteria for evaluating the study.	Can the MFP model be used to identify the existence of a poverty trap (or not)?	Knowledge of the existence will assist in creating successful policy response.
Develop a plan for the study.	Identified timelines for survey design and implementation.	Early in the research process and before the end of APM funding.

From this framework it was determined that an integrated approach was achievable for this research, but would require careful preparation and insight to allow the qualitative information to complement the survey

questions, and vice versa. Three major components of primary data collection were organized: preliminary focus groups and pre-testing of a draft survey, survey data collection, and FGDs (Table 4-2).

Table 4-2. Primary data collection process followed in this study.

Data Collection Activity	Purpose and Description
Preliminary FGDs and Pre-testing	Identify the major issues and increase understanding of how to communicate and capture information from households across the three research sites.
DHED Survey	Obtain household and some member level quantitative information.
FGDs	Obtain personal insights on wellbeing trajectories, government schemes and future recommendations from local people.

The *preliminary focus groups* were exploratory meetings with members of the general public and stakeholders in the research areas. These sessions were designed to understand the poverty dynamics and context in each of the research locations. The *survey instrument* was partially informed by the information gleaned from the preliminary focus groups. Finally, the *focus group discussions* were conducted to gain deeper insights into the survey information collected.

4.2.2 Recall Approach

Understanding how individuals, households and communities escape from poverty requires information from several time periods. Typically this information is captured by longitudinal datasets with information in income, consumption and assets from previous time periods (Carter and Barrett, 2006). However, the relative paucity of such datasets in many developing country contexts has limited the ability of researchers to conduct and ascertain the structural or transitory nature of poverty in many of the locations where such information is required for effective policy design. In the absence of such longitudinal data, a common approach is to obtain this information is by asking individual respondents about the past through a “recall approach”. The limitation of this approach is that respondents may not be able to accurately remember information about their status and household activities in the past (Deaton and Kozel, 2005). This degradation of memory is referred to

as recall bias and has been found to impact the accuracy of responses from participants in both surveys and FGDs (Kjellsson, Clarke and Gerdtham, 2014; Deaton and Kozel, 2005; de Nicola and Gine, 2012). However, this limitation can be managed using cross-validation techniques, such as anchoring questions to important events that occurred during the requested time period, complementary community FGDs and validation from other sources of data (de Nicola and Gine, 2012; Abebe, 2012) and as such this methodology is accepted for research studies where previous data is nonexistent. Due to the lack of existing data from previous time periods in the three research locations, I made the decision to use a recall approach balanced with appropriate cross-validation techniques, such as anchoring for important events and complementary FGDs, for the DHED survey and FGDs.

4.3 Preliminary Focus Group Discussions

Preliminary FGDs were conducted in the research locations in August and September 2013. MSSRF APM staff in the research locations selected approximately 10 participants, comprising representatives from the local villages, local panchayat leaders and elders in the community. These discussions were semi-formal, with a primary purpose simply to discuss poverty dynamics and change over time in the communities. These discussions were structured on the "stages of progress model" to elicit wellbeing change over time (Krishna, 2004), and loosely followed the following format:

1) *Assemble a diverse and representative community group* to discuss poverty over time.
2) *Clearly present the objective of the exercise:* establish that participants receive no benefits and incur no costs for their input, but that they simply provide a level of understanding poverty in their personal context that will assist future policy recommendations.

3) *Ask about poverty status 20 years ago compared to today, considering the current households as the unit of analysis.* To reduce recall bias they referred to a national emergency that most individuals present could remember.

4.4 Determinants of Household Economic Development (DHED) Survey

Based upon a review of the relevant literature and information obtained in the preliminary focus group discussions, a detailed survey instrument was designed[34] in late 2013 and implemented in early 2014. The following sections discuss the design and implementation of this survey instrument.

4.4.1 Survey Design

The DHED survey was designed from August 2013 – December 2013 by the author in consultation with social science researchers from the University of Alberta, MSSRF, the Madras School of Economics (MSE) and the Cochin University of Science and Technology (CUSAT). The impetus for involving partners from MSE and CUSAT was that these teams had the cultural and technical experience to implement a large numbers of surveys in these locations in concert with APM staff. Various iterations of the survey instrument were drafted and discussed over Skype with the research partners before the final iteration was complete.

The overall objective of this survey instrument was to identify the change in the welfare of households over time. Therefore information from three generations was captured: the current or "young" generation (GEN3) less than 40 years old, the interim or "parent" generation (GEN2) between 40-65 years old, and the elder or "grandparent" generation over 65 years of age (GEN1). Current information was elicited on demographics and a range of household variables; historical data was captured on income, expenditure and

[34] Design for the DHED survey was primarily directed by Sandeep Mohapatra, my supervisor from the University of Alberta retained for specialization on development economics.

asset levels during the previous one, five, ten and 20 years[35]; and spousal perceptions and decision-making power were recorded. The survey was categorized into three main sections: household characteristics, intergenerational questions and spousal information (see Table 4-3). The final DHED survey instrument is contained in Annex 1.

Table 4-3. Summary of information collected in the DHED household survey.

Section	Variables Described
A: Household Characteristics	• Demographic characteristics • Activity/livelihood details • Expenditure and Expenditure History • House type, ownership, amenities and assets • Animal husbandry • Access to services and public services • Village amenities • Migration
B: Intergenerational Questions	• Time period controls • Activity and literacy history • Intergenerational household profiles • Standard of living • Economic trajectory shifts
C: Spousal Information	• Marriage decision making • Legal knowledge • Asset ownership • Purchasing power and decision making • Political awareness

4.4.2 Sampling Approach

The sampling approach followed for the DHED survey instrument involved identification of the appropriate research location, household selection method, and sample size. The research location for the DHED survey was pre-determined by the locations of the APM projects sites with a single Block in each of the Jeypore, Kolli Hills and Wayanad locations (see Chapter 3). Households selected for the DHED survey were randomly selected from among the panchayats within the Block based upon information

[35] Enumerators asked the income, expenditure and asset histories from an individual from each generation. If a generational representative was not present, the respondent (which was almost always the household head or spouse of the household head) answered. Extensive pre-testing found that the data are fairly accurate.

provided by MSSRF and local Block government administrative data. To determine the appropriate sample size, established social science sampling protocols were followed to ensure the number of households sampled was large enough to give sufficient statistical power to the results, while balancing the costs and time associated with the project (Ryan, 2013). After referencing the standard practices (Ryan, 2013) and discussing budgets, personnel and timelines with MSSRF and UA colleagues, 300 households were selected in each location, for a total pooled sample of 896 households[36]. Although the actual population of each block differed[37], this relatively large sample size ensured that sufficient statistical power existed to draw reliable conclusions on the comparative features of each location.

4.4.3 Survey Implementation

Pre-testing of the DHED survey instrument occurred in January 2014, and full implementation was conducted during the months of January – April 2014. I worked with the APM, MSE and CUSAT teams at each research location to train enumerators, pre-test and implement a small number of surveys. After establishing that the coordinators, enumerators and respondents understood the questions, multiple-day training with the APM project staff in each research location was conducted to ensure accurate recording of responses. Enumerators from the APM project implemented the remainder of the survey instruments and in the evenings transferred the data recorded from the day into electronic format that was checked for quality control by APM project site leaders. For clarification purposes, each site had an overall "quality control" expert that oversaw the data input and corresponded directly with the author. The original surveys were scanned for recording purposes. This data was then transferred to MSE and CUSAT coordinators and ultimately to the author for final confirmation[38]. CUSAT

[36] Four surveys were incomplete in the Kolli Hills research location, resulting in only 296 surveys.
[37] Populations in each research locations are: Jeypore (Kundra Block) = 58,885, Kolli Hills = 42,200 and Wayanad (Sulthan Bathery) = 27,473 (see Chapter 3).
[38] An additional aspect was to promote collaboration with partners in India for greater impact of the APM project. To that end, part of the contract is that MSE and CUSAT can collaborate with UA and MSSRF staff in future research from this dataset.

coordinated the survey implementation in Wayanad while MSE coordinated the surveys in Kolli Hills and Jeypore.

4.5 Focus Group Discussions (FGDs)

Focus groups are considered an effective method to obtain individual perceptions on a specific issue and explore themes of particular interest (Morgan, 1997). The “Determinants of Household Economic Development Focus Group Discussions” were designed in early 2014 and implemented in late 2014. The following sections discuss the design and implementation of these focus groups in the research sites.

4.5.1 FGD Design

A semi-structured interview format was used in this study. According to Richards and Morse (2012) this approach is designed to seek information about a particular topic while maintaining the flexibility of unstructured interviews. Questions of interest were identified from the overall research question and linked to questions from the DHED survey. Areas of particular interest were perception of changes in quality of life over time and between generations, changes in lifestyle, importance and identification of government schemes, significant positive and negative events in their life, and perceptions on the status of and role of women in society and in the household.

An interview guide was developed by the author to assist the interview process during the focus groups themselves. This guide was consistently followed to maintain continuity and comparability in FGDs. This style allows for consistent data to be collected while allowing the opportunity for important and enriching data to emerge (Mayan, 2016). The interviewer was also free to explore certain issues or questions as they arose in conversation and also ask questions in a responsive manner. The structure of questions developed and asked by the author in the interview was as follows:

1. *Do you think your general wellbeing has increased or decreased over the last 20 years?*

2. *What are the major changes in wellbeing that you have observed between the generations in the household during the lifetime of the older generations present?*

3. *Have there been significant events that have affected you negatively or positively during this time? For example: new laws, prices changes, drought, floods*

4. *How important has government assistance has been in leading to these changes?*

5. *Have any of you been lifted out of (escaped) poverty, only to fall back in again for some reason? What was that reason?*

6. *Have there been particular government programmes that you have used that significantly impacted your life?*

7. *What programmes were available in YOUR generation (looking at older generations) that is not available now? What programmes that currently exist do you wish you had access to then?*

8. *Is there something you think government could do - or stop doing - in terms of policies that will help in the future? Any recommendations?*

9. *For the women – do you think there have been significant changes in the status of women? Positive or negative? What are they?*

10. *All: Are you optimistic about the future for your children?*

In February 2014 pre-testing of the FGD questionnaire was conducted in the Jeypore site. Issues with the questions and discussion with the individuals allowed refinement of the questions and made the final FGDs more effective. Consent forms and information sheets in the local language (Malayalam, Tamil and Oriya) were developed and read to the participants prior to the FGDs.

4.5.2 Sampling Approach

The sampling approach followed for the FGDs involved identification of the appropriate research location, selection of participants, and sample size. The research location for the FGDs was pre-determined by the locations of the APM projects sites in the Jeypore, Kolli Hills and Wayanad (see Chapter

3). Participants for the FGDs were selected from among the respondents to the DHED survey, and were stratified to represent households with members of three generation living and inclusion of spouses. To determine the appropriate sample size, established social science sampling protocols were followed to ensure the number of participants was large enough to provide sufficient qualitative data to inform the results, while balancing the costs and time associated with the project (Ryan, 2013). After referencing the standard practices (Ryan, 2013) and discussing budgets, personnel and timelines with MSSRF and UA colleagues, three FGDs were considered appropriate for each location with a target of 12 people participating in each discussion.

4.5.3 FGD Implementation

Selection criteria for participants included: geographic area, participation in the DHED survey, designation as landless or landed, ST or non-ST, and where possible, households that had living members from three generations present. Eight FGDs were conducted in total (Table 4-4). Each focus group was designated an identification code based upon location and whether the participants had land or a ST designation. Therefore the codes were: L = landed; LL = Landless; T = ST; NT = Non-ST. Intergenerational representation was included in all focus groups.

Table 4-4 Codes and descriptions of FGDs conducted in Jeypore, Kolli Hills and Wayanad in August 2014.

Code	**Description**	**N**
W1LNT	Wayanad focus group 1 composed of landed non-ST participants	5 female 5 male
W2LT	Wayanad focus group 2 composed of landed ST participants	7 women 5 men
W3LLT	Wayanad focus group 3 composed of landless ST participants	5 women 5 men
KH1LLT	Kolli Hills focus group 1composed of landless ST participants	10 women 9 men
KH2LT	Kolli Hills focus group 2 composed of landed ST participants	11 women 9 men
J1LLT	Jeypore focus group 1 composed of landless ST participants	6 women 6 men
J2LNT	Jeypore focus group 2 composed of landed non- ST participants	6 women 6 men
J3LT	Jeypore focus group 3 composed of landed ST participants	6 women 7 men

In Wayanad, three FGDs with landed non-ST, landed ST and landless ST households were held on August 2 and 3, 2014. FGDs were held at the Meenangadi Panchayat Village Resource Centre (VRC), the ST hall and ST community centre. The author conducted the interviews, and they were simultaneously translated and transcribed by MSSRF staff members fluent in Malayalam.

In Kolli Hills, two FGDs of landed ST and landless ST population were held on July 31, 2014 at the Allavattapaddi VRC of the MSSRF. The VRC was a central location for people working in the fields and had an electrical light source for evening meetings. Approximately 12 people had been invited to participate, but interested members of the community did arrive, increasing the total number of participants to 19. Although somewhat unwieldy with this size of group, conversation was open and participants exhibited enthusiasm and willingness to discuss the issues.

In Jeypore three FGDs were conducted with landless ST, landed non-ST and landed ST groups. All FGDs were held at the MSSRF Bioresource Centre outside of the Jeypore town. Participants were recruited by MSSRF staff and transported to and from their homes. At this location nearly all households had representatives from three generations present.

All questions in FGDs were asked in English and simultaneously translated into the local language by a trained APM staff member. Detailed field notes and transcripts were developed throughout the meeting and were reviewed and compiled at the end of each day by the interviewer, in consultation with the translators. Recordings were also made at each FGD and photographs were taken. A sample of the FGDs information sheet, consent form and survey guide are provided in Annex 2.

4.6 Qualitative Analysis: Thematic Approach

A thematic approach was used to analyze FGDs data to respond to research question one (household trajectories) and four (policy perspective). Thematic analysis is a method for identifying, analyzing and reporting patters in qualitative data (Thomas and Harden, 2007), and is a useful tool commonly employed in the social sciences. The advantage is that through minimal organization a dataset can be described in detail (Braun and Clarke, 2006). A "theme" in this context captures something important about the data in relation to the research question. Identification of a theme is not dependent on quantifiable measures and does not need to be observable in over 50 per cent of the respondents. This "theoretical thematic" approach allows participants to respond to questions freely about a certain topic – in this case perceived household wellbeing trajectories and policy insights.

The data analysis process described in Table 4-5 was followed, based upon the methods described in Braun and Clarke (2006):

Table 4-5. Summary of the thematic review process used to synthesize the FGD responses from the three research sites conducted in August 2014.

Phase	**Description of Action**
Phase 1: Data Familiarization	Listen to recordings and transcription from meetings, linking with observations and comments.
Phase 2: Initial Code Generation	Each "response"* was coded by site, gender, generation, ST and land ownership.
Phase 3: Thematic Search	Re-read the responses to search for common themes.
Phase 4: Thematic Review	Identify and write down themes, and consider in the context of the literature and the DHED survey questions.
Phase 5: Thematic Identification	Finalize, define and name themes.
Phase 6: Synthesis and Interpretation	Establish criteria for categorization of responses within themes.
*** "Responses" are uninterrupted responses from any individual in the discussion, not group consent or non-verbal communication techniques.**	

After conducting the FGDs, time was spent listening to the recordings and transcribing this information and linking it with written observations and comments from the meetings. Initial codes were developed based upon the

thematic component of the questions: wellbeing trajectories and policy perspectives. Each response was coded by site (1 = Jeypore, 2 = Kolli Hills and 3 = Wayanad), gender (1 = female, 0 = male), generation (1 = grandparents, 2 = parents or 3 = current), ST membership (1 = ST or 0 = non-ST) and land ownership (1 = landed or 0 = landless). A second reading of the discussion responses allowed for thematic analysis that searched for any significant common themes. After identifying the themes they were written down and considered in the context of the literature. Themes were finalized, defined and named. These themes were primarily aligned with the questions asked. For example, a theme for the first set of questions is "trajectories of wellbeing". The responses were categorized as positive, negative or neutral. Overall trends in each FGD were proportionally calculated based upon the total number of responses in each category (positive, neutral or negative) divided by the total number of responses in each group. Finally, these responses were linked with themes and a general overview was presented based upon pooled sites, specific research locations, land assets and ST designations.

4.7 Quantitative Analysis

Empirical analysis to identify asset-based poverty traps was based primarily upon the DHED survey data and involves three separate components. First, proportional count indices were created for discrete variables, such as household access to public services and use of government schemes. Second, asset indices for continuous variables, such as total number of assets, were created using a principal factor analysis (PFA) approach. Finally, an unconditional[39] non-parametric analysis was conducted using a multivariable factorial polynomial (MFP) estimation approach (Sauerbrei, Royston and Binder, 2007) to track the poverty dynamic pathways and influence of covariates on asset accumulation (Minoiu and Reddy, 2014).

[39] Unconditional in this context means that no variables other than previous period assets were considered.

4.7.1 Index Construction

Count Index

A proportional count based asset index was created from the dataset based upon household access to services. An index is a composite indicator based upon underlying indicators that represent an individual or household's ownership of an array of assets or access to services (Johnston and Abreu, 2013; Moser and Felton, 2007). An index is any indicator S_i computed as a function of a set of underlying variables s_{ij}, where s_{ij} denotes household i's access to service j.

$$S_i = f(s_{ij}) = f(s_{i1,\ldots,} a_{im} \quad) \qquad (1)$$

A proportional count index was created for several variables in the analysis: household access to services, village access to public services, and household use of government schemes. Each individual variable was assigned a dummy variable (1 = exists, 0 = does not) and all the similar variables included in this count index are summed and divided by the total possible number of variables, thus proportionally assigning a value between 0 and 1.

Weighted Index: Principal Factor Analysis (PFA)

According to Michelson, Muñiz and DeRosa (2013) there are five common approaches to constructing household asset indices: principal component or factor analysis (PCA or PFA) (Filmer and Pritchett, 2001; McKenzie, 2005); factor analysis (Naschold, 2012); multiple correspondence analysis (Booysen et al., 2008); livelihood regression on household assets and characteristics on income and expenditure (Adato, Carter and May, 2006; Naschold, 2012); and weighting assets based upon their monetary welfare. As there is no set rule on the approach, the majority of poverty trap literature in the last decade has relied on asset indices. Michelson, Muñiz and DeRosa (2013) evaluated these different approaches to determine if poverty trap

assessments are affected by the choice of asset index construction. They conclude that while the existence of a poverty trap does not seem to be impacted by the choice of index, the level of nuance and understanding provided by the asset choices differs (Michelson, Muñiz and DeRosa, 2013).

The principal factor analysis approach (PFA) was chosen for this research because this method is thought to comprehensively capture the various weights of different variables based upon importance (Michelson, Muñiz and DeRosa, 2013). In this approach the orthogonal linear combinations of selected variables are extracted in order to successfully glean the most common information (Filmer and Pritchett, 2001). Intuitively, the first principal factor is the linear index of the variables that captures the most information that is common to all variables. The foundational idea behind factor analysis is that p observed random variables, x, can be expressed as linear functions of m $(<p)$ random variables or common factors (Jolliffe, 2002). If $x_1, x_2, \ldots, x_p$ are the variables and $f_1, f_2, \ldots, f_m$ are the factors, then:

$$\begin{aligned} X_1 &= \lambda_{11}f_1 + \lambda_{12}f_2 + \ldots + \lambda_{1m}f_m + e_1 \\ X_2 &= \lambda_{21}f_1 + \lambda_{22}f_2 + \ldots + \lambda_{2m}f_m + e_{2\ 2} \\ &\vdots \\ X_p &= \lambda_{p1}f_1 + \lambda_{p2}f_2 + \ldots + \lambda_{pm}f_m + e_p \end{aligned} \qquad (2)$$

Where λ_{jk}, $j = 1,2, \ldots p$; $k = 1,2, \ldots. m$ are constants called factor loadings and e_j, $j = 1,2, \ldots, p$ are error terms (Jolliffe, 2002). This equation can also be written in matrix form:

$$X = \Lambda f + e \qquad (3)$$

In order to use this approach, it is necessary to determine what assets to include in the index. While there are various combinations explored in the literature (McKay and Perge, 2013; Kwak and Smith, 2013; Michelson, Muñiz

and DeRosa, 2013; Naschold, 2013) most studies use general categories of: 1) land ownership; 2) livestock ownership; 3) productive assets, including agricultural and business equipment; and 4) consumer durables. In Chapters 7 and 8 the total household asset index employed is a summation of land, livestock, productive and consumptive assets.

4.7.2 Semi-Parametric Analysis: MFP

The standard approach to estimate an asset accumulation equation is to use a univariate non-parametric method (Barrett and Carter, 2013; Lybbert et al., 2004; Quisumbing and Baulch, 2013; Azariadis and Stachurski, 2005) that compares assets across two time periods. This approach assumes the relationship between current assets and lagged assets must be estimated by fitting a function *f* through a scatterplot without making assumptions about its functional form (Naschold, 2013; McKay and Perge, 2013). The key assumption of this approach is that *f* is "smooth" and that the covariate (A_t) is uncorrelated with an error term with a normal and identical distribution of zero (Naschold, 2013). Mathematically, household assets in the future (A_{t+1}) are a function of household assets in a previous period (A_t), such that:

$$A_{t+1} = f(A_t) + \varepsilon_{t+1} \qquad (4)$$
$$\varepsilon_{t+1} \sim N(0, \sigma^2_{\varepsilon})$$

This equation is commonly estimated using a locally weighted scatterplot smoother (LOWESS) approach[40] (Carter and Barrett, 2006; Lybbert et al., 2004), that calculates *n* weighted local regressions at each data point A_t based solely upon the data points in the "neighborhood" of each A_t, defined as a proportion of the total number of observations (Naschold, 2013). The local regressions weights are based on a kernel function and vary inversely with the distance from A_t and difference bandwidths are chosen that impacts the bias and variance (Stata Press, 2015). The "smoothed" value of A_{t+1} is then

[40] Other less common estimation approaches include locally linear and polynomial regressions, and different forms of splines. These approaches are not discussed in this thesis but are described in detail by Naschold (2013).

based upon the prediction of the locally weighted regression at each value of A_t (Naschold, 2013).

This standard non-parametric approach is operationalized in Chapter 7 using the MFP estimation technique to search for multiple equilibrium poverty traps under different univariate outcome variables (income, expenditure and single and multiple assets). The full advantages of the MFP estimation approach are employed in Chapter 8 by incorporating multiple covariates in a non-parametric framework, thereby combining the strengths of both non-parametric and parametric estimation techniques in a semi-parametrically manner.

Mathematically, a MFP function of degree m $\geq$ 1 is an extension of a conventional polynomial that can be written as:

$$\text{MFP } m(x) = \beta_0 + \beta_1 x^{p1} + \ldots + \beta_m x^{pm} \quad (5)$$

where p is the power (functional form) such that $p_1 = 1$, $p_2 = 2$, … $p_m = m$. An MFP function is derived by generalizing the powers p_a, …, p_m to a certain fractional and non-positive value so that each p_j for $j = 1,\ldots m$ belongs to the set S = {-2, -2, -0.5, 0, 0.5, 1, 2, 3} rather than a set of integers {1, …, m} (Royston and Sauerbrei, 2007). For a given outcome variable, the best fitting powers are selected by maximizing the likelihood of the above model over all the combinations of powers in S. When conditioned on powers, the model is linear in the transformed x's. Maximizing the likelihood is done by enumerating the models generated by all possible combinations of powers, fitting each of them in a conventional manner, and then evaluating the likelihood function of each (Stata Press, 2014; Royston and Sauerbrei, 2007).

The MFP is chosen for as the semi-parametric estimation approach for two major reasons. First, MFP statistically selects important covariates in the regression through backwards elimination of variables, using conventional statistical testing of p-values. Even with a substantial background knowledge

of the literature and the local context, researchers constantly face challenges in selection of variables for regression models; this approach provides statistical assistance to this process (Royston and Sauerbrei, 2007). Second, the MFP approach checks the linearity assumption using maximum-likelihood estimation (MLE) of various models and chooses the best fit for functional form based upon pre-specified degrees of freedom. Although the MFP approach cannot entirely solve the problems of functional form selection and omission bias, by bootstrap resampling it can find stable multivariable models to reduce this problem (Royston and Sauerbrei, 2007).

MFP models are estimated through a statistical algorithm that processes the selected covariates in sequence (Stata Press, 2014). Initially, the covariates are treated linearly and arranged in order of decreasing statistical significance (based upon p-values), to identify the relative importance of each covariate. After this, the best fitting function for the first covariate is determined, and all other variables are assumed to be linear. Retaining the most significant functional form for the first variable, this same process is repeated for each consecutive covariate in turn and this first iteration of the model is only complete when all the covariates have been processed in this way (Stata Press, 2014). The next iteration is done similarly, except that the functional forms from the initial cycle are retained, except for the one currently being processed. This process continues for each functional form until the functions and variables included in the overall model do not change – or “convergence” is achieved (Stata Press, 2014); this is often achieve within 1-4 cycles, depending upon the model.

In summary, the MFP approach incorporates covariates into the asset accumulation pathway and statistically selects their functional form and removes un-influential predictors from the model (Royston and Sauerbrei, 2007). This estimation has several advantages: 1) simultaneous inclusion of multiple explanatory variables; 2) individual covariates are able to nonlinearly influence the outcome variable; 3) the degree of non-linearity in the model is not imposed, but determined from the data using a backward algorithm based upon statistical tests; 4) MFP is considered to provide a better fit from

expected to actual outcomes than conventional polynomial models; and 5) allows for a non-parametric assumption within a parametric model, using maximum likelihood estimators (MLE) (Sauerbrei, Royston and Binder, 2007). To my knowledge this approach has not been used in the poverty trap literature and has great potential to assist in identifying the determining factors of poverty.

4.8 Ethical Considerations

The ethical principles of informed, voluntary free and confidential participation were maintained throughout the research process. All participants were informed about the objectives of the study and their participation in the data collection process. Information sheets containing the purpose, objectives and contact information were provided in the local dialect and translated by enumerators (see Annex 2). Participants were informed they could exit the survey or discussion at any time with no personal consequence.

Physical copies of the consent forms for the survey and FGDs are organized and securely stored at the Department of Resource Economics and Environmental Sociology (REES) of ALES at the UA. All digital recordings of the FGDs were computerized and password protected on a personal laptop. Study protocols for obtaining participant consent were approved by the Research Ethics Office of the UA (Study ID#s: Pro00024077 and Pro00049709) as the grant-holding institution for the APM project, and the University of Greenwich Research Ethics Committee (App#: 14.2.5.17) as the degree granting institution for this thesis.

5. DESCRIPTIVE STATISTICS

5.1 Chapter Overview

A total of 896 households were sampled during the course of the DHED survey – 300 households in Jeypore, 296 households in the Kolli Hills, and 300 households in Wayanad. This chapter provides a summary of the household level descriptive statistics. Where available, national and state level statistics for similar variables is presented for comparative purposes. Presentation of results at this point provides a foundation for the following results chapters.

5.2 DHED Survey

5.2.1 Household Demographics

Data collected in the DHED survey was primarily conducted at the household level[41]. Table 5-1 summarizes the demographic information provided for the household heads at each individual research location and pooled together. Frequency and percentages are provided for most variables, though for continuous variables such as age and household size the mean and minimum and maximum values are also presented.

One of the site selection criteria was prevalence of ST populations. ST membership for each household is determined by the status of the household head[42], and when pooled is found to be 62.7 per cent of households. In Jeypore 54.7 per cent of the households surveyed were ST, in Wayanad this dropped to 35 per cent, and in Kolli Hills 100 per cent of households surveyed were ST (Table 5-1). These numbers are consistent with the local Block level demographics on ST populations (Ministry of Tribal Affairs, 2015; Kirubakaran, 2013; Sahoo, 2011; Haseena, 2015).

[41] Household member information was also collected for specific questions, such as occupation and employment. This information summarized in Appendix 4.
[42] Determining the ST status of the household based upon the household head's response is an acceptable identification approach in rural areas of India as ST households tend not to marry outside of the ST community (Gang, Sen and Yun, 2008).

A second site selection criterion of was landlessness, as measured by those households that did not own any agricultural land. In the pooled sample, 27.3 per cent of household were agriculturally landless, while in the individual research sites this was slightly higher in Jeypore (35 per cent) and Wayanad (30.3 per cent), and lower in Kolli Hills (16.7 per cent). These numbers are within the range of national estimates for rural India that place landless – excluding those with homestead land – percentage of the population between 30-40 per cent (Rawal, 2008; Government of India, 2013).

The mean household size of the pooled sample is 4.6 individuals, with a range from one to ten individuals (Table 5-1). The mean is fairly similar across the locations: slightly larger families are present in Jeypore (5.2), slightly smaller in Kolli Hills (4.2), and very near the average in Wayanad (4.4). Again, these findings are consistent with the national average of 4.8 household size, and state household sizes. No evidence was found for the larger households sometimes common in remote and ST areas (Nayak, Behera and Shillong, 2014).

The age of household heads of the pooled sample ranged from 20-96 years of age with an average of 47.1 years (Table 5-1). Jeypore and Kolli Hills were slightly younger with a mean of 44 and 42.6 years, respectively, while Wayanad had a much higher average age of 54.6 years of age. The generation of household heads was also identified by age: GEN1 are those individuals over the age of 65, GEN2 are those between ages of 40-65 years, and GEN3 are those younger than 40 years. In the pooled sample a small majority (52.3 per cent) of household heads were from GEN2. GEN3 was slightly less represented at 33.7 per cent and there were only 13.9 per cent of household heads are from GEN1. These generational numbers are relatively consistent across research sites, with the exception of Wayanad, where there are a lower percentage of GEN3 representatives (14 per cent). This pattern affirms the transition of household headship to younger generations within rural Indian communities (Samanta, Chen and Vanneman, 2015).

The gender of the household heads across all sites is predominantly male – 85.4 per cent male compared to 14.6 per cent female (Table 5-1). The pooled average is comparable to the national average of 13.6 per cent female headed households (Government of India, 2007), but there the individual sites have major differences. Jeypore is similar to the national with 13.3 per cent of female-headed households, but Kolli Hills has only 7.3 per cent while Wayanad has 23.3 per cent.

Table 5-1. Household level descriptive statistics from the DHED survey in Jeypore, Kolli Hills, Wayanad and the pooled sample.

LOCATION	VARIABLE		N	Per cent	Mean	Min	Max
POOLED	**AGE**		896	100	47.1	20	96
	GENDER	Female	131	14.6			
		Male	765	85.4			
	LITERACY	Illiterate	356	39.7			
		Literate	540	60.3			
	TRIBAL	Non-Tribal	334	37.3			
		Tribal	562	62.7			
	AGLAND	Landless	245	27.3			
		Landed	651	72.7			
	EMPLOYED	Ag Related	548	61.2			
		Non-Ag Related	261	29.1			
		Unemployed	87	9.7			
	GEN HEAD	GEN3 (<40)	302	33.7			
		GEN2 (40-64)	469	52.3			
		GEN1 (>65)	125	13.9			
	HHSIZE		896	100	4.6	1	10
JEYPORE	**AGE**		300	100	44	20	77
	GENDER	Female	40	13.3			
		Male	260	86.7			
	LITERACY	Illiterate	189	63.0			
		Literate	707	37.0			
	TRIBAL	Non-Tribal	139	46.3			
		Tribal	161	53.7			
	AGLAND	Landless	105	35.0			
		Landed	195	65.0			
	EMPLOYED	Ag Related	143	47.7			
		Non-Ag Related	147	49.0			
		Unemployed	10	3.3			
	GEN HEAD	GEN3 (<40)	137	45.7			
		GEN2 (40-65)	134	44.7			
		GEN1 (>65)	29	9.7			
	HHSIZE		300	100	5.2	1	10

KOLLI HILLS	**AGE**		296	100	42.6	21	80
	GENDER	Female	21	7.1			
		Male	275	92.9			
	LITERACY	Illiterate	105	35.5			
		Literate	791	64.5			
	TRIBAL	Non-Tribal	0	0.0			
		Tribal	296	100			
	AGLAND	Landless	49	16.7			
		Landed	247	83.5			
	EMPLOYED	Ag Related	245	82.8			
		Non-Ag Related	43	14.5			
		Unemployed	8	2.7			
	GEN HEAD	GEN3 (<40)	123	41.6			
		GEN2 (40-65)	151	51.0			
		GEN1 (>65)	22	7.4			
	HHSIZE		296	100	4.1	1	8
WAYANAD	**AGE**		300	100	54.6	35	96
	GENDER	Female	70	23.3			
		Male	230	76.7			
	LITERACY	Illiterate	62	20.7			
		Literate	834	79.3			
	TRIBAL	Non-Tribal	196	65.0			
		Tribal	105	35.0			
	AGLAND	Landless	91	30.3			
		Landed	209	69.7			
	EMPLOYED	Ag Related	160	53.3			
		Non-Ag Related	71	23.7			
		Unemployed	69	23.0			
	GEN HEAD	GEN3 (<40)	42	14.0			
		GEN2 (40-65)	184	61.3			
		GEN1 (>65)	74	24.7			
	HHSIZE		300	100	4.4	1	10

The Census of India in 2011 (Government of India, 2013) determined that the national literacy rate[43] is 74.0 per cent. Literacy rates are highly variable across states. In Kerala, the average literacy rate is 94.9 per cent, Tamil Nadu is 80.1 per cent, and Odisha is 72.9 per cent. In the DHED survey the literacy rate of household heads is much lower than state averages. The pooled household head literacy rate is 60.3 per cent – 13.7 per cent below the national average (Table 5-1). In Wayanad the literacy rate is 79.3 per cent (15.6 per cent lower than the state average), in Kolli Hills 64.5

[43] The literacy rate in India is defined as the percentage of the population over the age of 7 that can read and write with understanding.

per cent (15.6 per cent lower than the state average) and most significantly in Jeypore, where the literacy rate is 37.0 per cent, 35.9 per cent lower than the state average. However, these numbers are consistent with local District level literacy rates for each site; Koraput District has an official literacy rate of 36 per cent (Odisha Government, 2016).

The final variable presented is employment status of the household head, simplified to employment within or outside in the agricultural sector, or unemployed. Across all sites unemployment of 9.7 per cent was observed, but this number ranged from 2.7 per cent in Kolli Hills to 23 per cent in Wayanad. Agricultural sector related work was very high in Kolli Hills at 82.8 per cent, while accounting for approximately half in Jeypore (47.7 per cent) and Wayanad (53.3 per cent).

5.2.2 Income and Expenditure

Household consumption (income and expenditure) data was collected in each of the project locations in the current year and historically. For comparison, Table 5-2 below shows the federal and state-level average per capita income for each of the time periods recorded in the DHED survey.

India's GDP has grown by approximately 8 per cent annually since 1990 (World Bank, 2015b). This increase is reflected in the significant eight-fold increase in gross national income (GNI) during that same time period. This increase has not occurred equally across all states or regions. While Kerala was marginally the wealthiest state in the earlier time periods, Tamil Nadu has increased substantially and overtaken them in recent years. Odisha has remained significantly lower than the other states and below the national average through all time periods, though has been experiencing greater growth in recent years.

Table 5-2. Mean gross national income (GNI) per capita nationally and by state across five time periods (based on 2014 INR).

Location	Current (2014)	Last Year (2012-13)	5 Years Ago (2008-09)	10 Years Ago (2004-05)	20 Years Ago (1994)
India	**87,748**	**80,388**	**43,604**	**26,629**	**10,283**
Odisha	60,800	49,241	29,464	16,359	10,622
Tamil Nadu	112,664	98,550	45,058	27,512	19,434
Kerala	94,380	88,527	49,316	29,071	19,461

Source: **Government of India (2016)**

Comparison of the national level figures with the pooled DHED income and expenditure results is shown in Figure 5-1[44]. Several conclusions can be taken from this data. With respect to income, the data indicates that the pooled income in the project sites has been consistently growing over the last 20 years, but has remained lower than the national average at all time periods. An exception is Wayanad, where the income level is comparable with the national average and is much higher than the other research locations. This result can be explained by the high standard of living in Kerala and more diverse income opportunities within the District of Wayanad. A high degree of standard deviation is evident in the data, indicating that there is greater income inequality in this location than the other sites. There has been a concomitant rise in household expenditure during these time periods. Again, the Wayanad research location increases the pooled average. Finally, income is higher than expenditure across all project sites and time periods.

[44] Unfortunately due to enumerator error the historical income and expenditure levels for the Kolli Hills research site are not available.

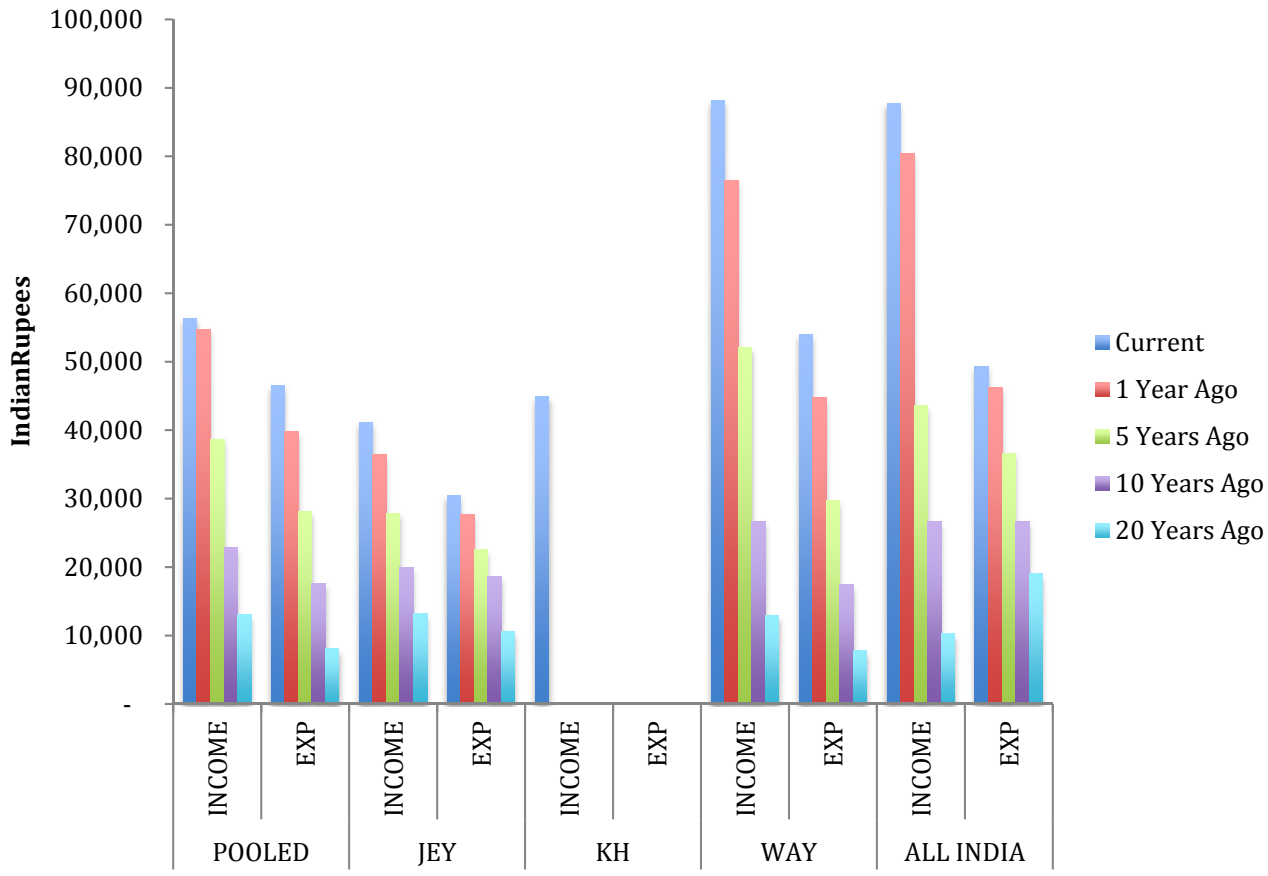


Figure 5-1. Comparison of the household income and expenditure levels across five time periods in all project sites determined from the DHED survey conducted in 2014.

Finally, comparing this information with the national Indian poverty line provides a useful benchmark. In 2014 the Government of India (2014b) defined the rural poverty line as 4,860 INR expenditure per month for a household of 5 people – or 58,360 INR annually. Using this number as a benchmark, 66.4 per cent of the pooled DHED sample is below this line based upon household expenditure. Considering income, 61.8 per cent of households do not earn enough income to meet this expenditure need. Although incomes and expenditure levels are increasing across all sites, many people are still below the poverty line (BPL).

6. RESULTS: TRAJECTORIES OF WELLBEING

6.1 Chapter Summary

This chapter presents results on the first research question of this thesis – *what are the local perceptions and contributing factors to household wellbeing in the project areas over three generations*? A thematic analysis approach was used based primarily upon FGDs data and supplemented by several questions in the DHED survey. When all FGDs data was pooled, there was on average a positive change in wellbeing trajectories over time between generations and a positive outlook for the future; when divided into research locations, Jeypore site was the most optimistic, Wayanad site had no consensus position, and Kolli Hills site more pessimistic. Landed and landless shared different concerns about the future and generally did not have a consensus position; and ST and non-ST FGD participants were on average spread between positive, neutral and negative outlooks, but again shared different concerns about the future. Negative shocks were primarily health and climatic events, while positive shocks were due to land inheritance and government schemes. The null hypothesis of a pessimistic outlook for this research question is rejected and it is concluded that households are generally positive about their wellbeing trajectory over time.

6.2 Introduction

India has been experiencing a high annual GDP growth rate of approximately 8 per cent since 1990 (World Bank, 2015b). Unfortunately many segments of the Indian population have been left behind in this state of rapid growth that has been primarily concentrated in urban areas (Government of India, 2013). The remote and mountainous communities of the Western and Eastern Ghats have been particularly marginalized (Haseena, 2015; Panda and Sahu, 2011; Kirubakaran, 2013).

Some scholars assert that the best way of "knowing" is from within (Weber, 2009; SmithLovin, 1987; Novotný, Kubelková and Joseph, 2013). While quantitative measures of consumption are often favored metrics to understand the wellbeing of households, experiences of the local household members – their personal stories of change over time – are a very important component of understanding poverty dynamics (Krishna, 2004; Narayan et al., 1999, 2000; Narayan and Petesch, 2002). There is a rich body of literature on social theory that has developed over the last century that has refined the conceptual and methodological techniques to address these qualitative questions (Weber, 2009; Inglis and Almila, 2016).

In order to understand the local perceptions regarding poverty, the first research question takes an integrated, qualitatively focused exploration of poverty dynamics: *what are the local perceptions about the change of wellbeing over time? Do household representatives from three household generations believe their wellbeing is improving, remaining constant or decreasing over time – and what are the major contributing factors to this increase or decrease?* While some metrics indicate that marginal improvements in poverty reduction are occurring across the country (World Bank, 2015a), there is an overwhelming indication that poverty is persistent and trajectories are negative for many marginalized rural households in South India (Government of India, 2013; Hatlebakk, 2014; World Bank, 2015b). Based upon 2011 Indian census data for the three Districts in this study (Government of India, 2013) and large populations of SC/ST, the hypothesis is that the average household response in the three research locations will be pessimistic, with participants telling a story of a flat or decreasing trajectory of wellbeing over time. It is also expected that there will be more optimistic perceptions of wellbeing observed in the landed and non-ST households.

The objective of this chapter is to explore the wellbeing narratives from the three research sites through the use of in-depth FGDs interviews. Specifically, questions pertaining to their understanding of wellbeing changes over time, significant events that have impacted their households and

expectations of the future will be explored. This information will contribute to the development literature by exploring poverty perceptions in a location previously unstudied in this context, and therefore enhance the narrative of this thesis. The remainder of this chapter is organized as follows: an overview of the data and research methodology employed; a results section emphasizing trajectories of wellbeing and shocks, with analytical distinction between households across research site locations, land ownership and ST membership. A discussion and conclusion section will close the chapter.

6.3 Data and Methodology

The primary data informing this analysis are the FGDs, informed and complemented by specific questions from the DHED survey. Following an integrated approach, introductory focus groups were conducted to gauge public awareness and understanding of major issues in advance of the survey and FGDs. These preliminary discussions gave insight into the identification of locally relevant issues and how to frame the questions in the survey instrument and FGDs.

Eight FGDs were conducted in the three research areas in August 2014. Focus groups were composed of a sub-sample of DHED respondents that had living representatives from all three generations present where possible – the current or "young" generation (GEN3), the interim or "parent" generation (GEN2) and the elder or "grandparent" generation (GEN1). Having representatives from all three generations present was helpful to determine wellbeing change over time, allowing for crosschecking and validation of results vertically within households and horizontally with peers of the same generation. A summary of the FGDs composition is described in Table 6-1.

Table 6-1. Codes and descriptions of FGDs conducted in Jeypore, Kolli Hills and Wayanad research locations in August 2014.

Code	**Description**	**N**
J1LLT	Jeypore focus group one composed of landless ST participants	6 women 6 men
J2LNT	Jeypore focus group two composed of landed non-ST participants	6 women 6 men
J3LT	Jeypore focus group three composed of landed ST participants	6 women 7 men
KH1LLT	Kolli Hills focus group one composed of landless ST participants	10 women 9 men
KH2LT	Kolli Hills focus group two composed of landed ST participants	11 women 9 men
W1LNT	Wayanad focus group one composed of landed non-ST participants	5 female 5 male
W2LT	Wayanad focus group two composed of landed ST participants	7 women 5 men
W3LLT	Wayanad focus group three composed of landless ST participants	5 women 5 men

The FGDs included six questions on trajectories of wellbeing designed to complement and enhance the information derived from the DHED survey. These questions are contained in Table 6-2.

Table 6-2. Trajectory and wellbeing questions for FGD participants conducted in Jeypore, Kolli Hills and Wayanad research locations in August 2014.

Q1	How well off do you think you are, and why? (very poor, poor, ok, well-off)
Q2	Do you think your general wellbeing has increased or decreased over the last 20 years?
Q3	What are the major changes in wellbeing that you have observed between the generations in the households during the lifetime of the older generations present?
Q5	Have there been significant events that have affected you negatively or positively during this time? For example: new laws, prices changes, drought, floods
Q6	Have any of you been lifted out of (escaped?) poverty, only to fall back in again for some reason? What was that reason?
Q10	Are you optimistic about the future for your children – will life be better for them that it was when you were young?

Analysis of the focus group responses was conducted using a thematic qualitative approach (see Table 6-3). In the first phase, recordings and notes from the focus group were reviewed and linked with facilitator observations from the meeting[45]. In the second phase, care was taken to ensure that each

[45] Only responses to questions that dealt with wellbeing change or significant events were included in this review – not those that dealt with government policy schemes and effectiveness, which are analysed in in Chapter 9. If participants volunteered information that fit thematically into the other categories, they were identified and made part of that analysis.

response [46] provided by participants was identified with the discussant's gender, generation, research location, land ownership status and ST status. In the third phase, responses were read again searching for common themes, such as major events, optimistic and/or pessimistic impressions. Fourth, these themes were considered and weighed in perspective with literature and information from the DHED survey. Fifth, these themes were finalized and identified. Three distinct categories were associated with wellbeing trajectories: optimistic, neutral and pessimistic. These categories each represent the general opinion expressed by the respondent towards their wellbeing trajectory. Finally, these results were synthesized and interpreted for each category of interest (pooled, site, land ownership, generation and ST membership). Representative quotes from each FGD response category are identified and recorded in the results section to give examples of the sentiments. Significant events were also included in the trajectory of wellbeing analysis.

Table 6-3. Summary of the thematic review process used to synthesize the focus group responses on perceived trajectories of wellbeing from the three research sites conducted in August 2014.

Phase	**Description of Action**
Phase 1: Data Familiarization	Listen to recordings and transcription from meetings, linking with observations and comments.
Phase 2: Initial Code Generation	Each response was coded by site, gender, generation, ST and land ownership.
Phase 3: Thematic Search	Re-read the responses to search for common themes.
Phase 4: Thematic Review	Identify and write down themes, and consider in the context of the literature and the DHED survey questions.
Phase 5: Thematic Identification	Finalize, define and name themes. Trajectory themes were those that dealt with changes from the past and identified as POSITIVE, NEUTRAL or NEGATIVE. Significant events were identified in the same manner.
Phase 6: Synthesis and Interpretation	Establish criteria for categorization of responses within themes: if the majority of the responses fell into one perception category then that group was generalizes within that category. If there was a relatively equal spread between positive and negative perspectives, then it was determined that there was "no consensus position" within the group.

[46] An uninterrupted response from any individual in the discussion, not group consent or non-verbal communication techniques.

The DHED survey data integrated within this analysis is solely obtained from the Intergenerational Section (see Appendix 1) that contains two questions on wellbeing and significant events. To obtain the wellbeing perspectives over time, these questions were framed to respondents as "during the decade that you were 30-40 years old"; if the respondent was not yet 30 years old, the question was framed to the respondent as "during the last five years of your life".

The wellbeing question was framed in the same manner, and respondents were provided with five categories ranging from low (one) to high (five). For the significant event in question, respondents were asked to identify the primary major events that have positively and negatively affected their economic wellbeing – again in the decade between 30-40 years. Based upon a review of literature on significant events (Santos et al., 2011; Heltberg and Lund, 2009; Rakib and Matz, 2015), and informed by insights from the preliminary FGDs, respondents were provided with nine categories of shocks: natural disasters, livestock ownership change, land ownership change, change in crop production (new varieties), health, dowry or wedding expenses or receipts, government schemes, new business activity and migration for labour.

6.4 Results

The null hypothesis for this research question is that the average household response will be pessimistic, indicating a constant or decreasing trajectory of wellbeing, with marginal improvements observed in only a small number of households. The alternative hypothesis is that the average household response will be optimistic about the future. The decision point will be the percentage of total responses within the FGDs that represent positive, neutral or negative outlooks. These hypotheses provide the theoretical framework to interpret the results.

6.4.1 Standards of Living

The DHED survey posed questions about changing standards of living and significant events that impacted their wellbeing in order to understand trends and the perceived success of various forces to assist people out of poverty. The responding household heads were asked to recall their perspective of the standard of living within their household when they were between 30-40 years of age. The number of household heads from each generation varied: GEN3 was 302, GEN2 was 466 and GEN1 was 122[47].

Table 6-4 provides an aggregate snapshot of the perceived standard of living across three generations. Data indicates that an improvement has been occurring over time – 41 per cent of GEN1 representatives felt they were at a "low" standard of living when they were in their fourth decade of life, with this number dropping to 22.3 per cent in GEN2 and even lower to 10.3 per cent in GEN3.

Table 6-4. Perceived standard of living of the household by generation respondent was 30-40 years of age (pooled sample from DHED survey).

Standard of Living	**GEN1**		**GEN2**		**GEN3**	
	N	**%**	**N**	**%**	**N**	**%**
1 - Low	50	41.0	104	22.3	31	10.3
2 – Medium Low	36	29.5	232	49.8	157	52.0
3 - Medium	29	23.8	105	22.5	95	31.5
4 – Medium High	5	4.1	19	4.1	18	5.9
5 - High	2	1.6	6	1.3	1	0.3
TOTAL[48]	122	100	466	100	302	100

A graphical representation to visualize the results is presented in Figure 6-1. There has been a decrease of those households in the "low" category, and an increase of those living in "medium", "medium high" categories. Very few households ever considered themselves in the "high" category. The "medium low" category is where much of the transition is likely occurring (Barrett and Carter, 2013) – many households moved between "low"

[47] Missing values were provided for 6 of the household heads, resulting in a total sample size of N=890 for this question.

and “medium low” categories between GEN1 and GEN2. Between GEN2 and GEN3 more of the transition occurred to the higher wellbeing groups, hence the tapering off of those identifying as “medium low” in GEN3.

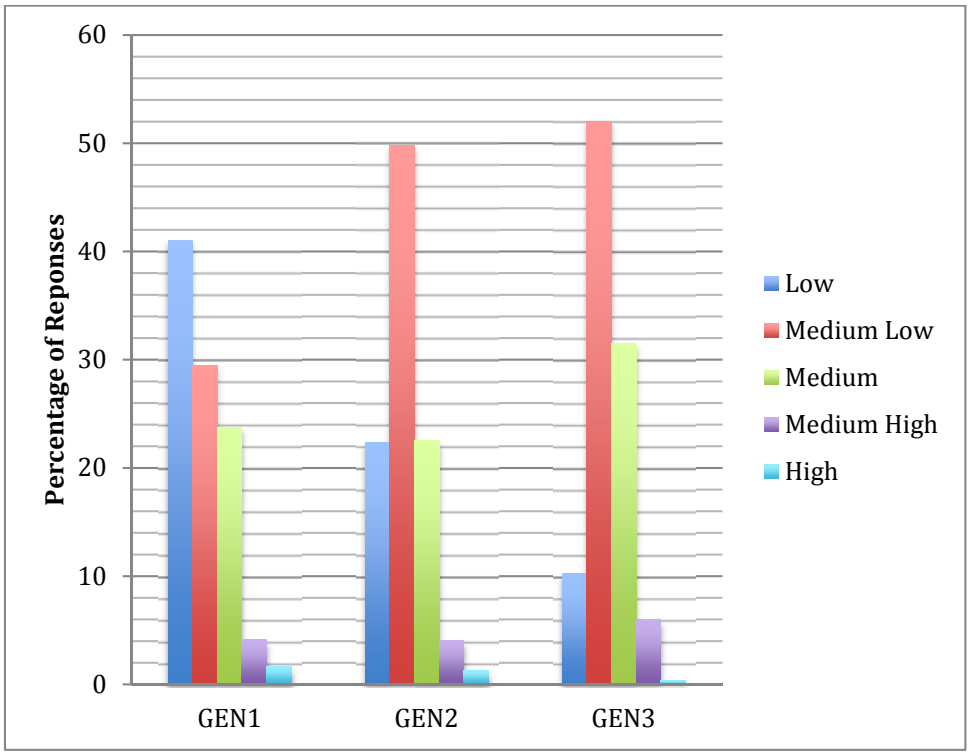


Figure 6-1. The perceived standard of living among DHED household heads when they were between 30-40 years of age (pooled sample).

The FGDs delve further into this issue in question one: *has your status of wellbeing changed over the last twenty years?* Aggregating the 49 responses in question 2 (wellbeing change over the last 20 years) from all FGDs, 47 per cent of participants indicated a general sense of improvement; 29 per cent of responses suggested that things had gotten worse. 24 per cent of the responses were neutral, where respondents felt their wellbeing had remained flat over time. Several representative responses are provided in Table 6-5.

Table 6-5. Perceptions regarding the change in wellbeing status over the last twenty years in the three project sites based upon pooled FGD data of 49 responses collected in August 2014.

Most thought things have got better (47 per cent):
J1G1 man: *"earlier we used to live with little resources…and steal goods for survival. But now we get government help in terms of rice, etc."*
J2G2 woman: *"earlier if we wanted to have rice, we did not have enough. We had to cook handfuls of broken rice that was coming from Andhra Pradesh"*
Some thought things had gotten worse (29 per cent):
KH1G2 man: *"the price of commodities available in the market has increased so much. And whatever we earn now is not sufficient to purchase those things"*
KH2G2 man: *"back then, we could make oils etc., but now we have to purchase everything… everyone knows that it was easier then"*

Major changes identified between generations are: major increases in infrastructure provision (schools, roads, hospitals, etc.), change in food and lifestyle – diets are increasingly less reliant on food produced locally and in the forests; marketing has become easier with trucks coming direct to the farm to pick up produce; and an increase in migrant work opportunities, particularly in the Jeypore site. There was also consensus that wellbeing will improve in their children's generation. Most participants felt that education levels were increasing and that if this trajectory continues, it will mean greater prosperity for future generations. The oldest (GEN1) participants spoke with greater optimism than the younger individuals – in particular those with young children. In every FGD a sentiment was expressed lamenting the urban migration of rural youth. An exception to the general optimistic outlook shown among most FGDs was the landless ST group in the Kolli Hills. Participants in this group felt that droughts in recent years have left them destitute and they are unable to think of a more positive future. Repeated reference to alcoholism amongst men in this FGD exacerbated this narrative.

6.4.1.1 Research Site Comparison

A comparison of responses between the individual FGDs and a summary of pooled responses from each research location provides insight into the different issues faced by respondents in different Blocks, and while these Blocks are not representative of the state in which they are located, it can also be interpreted as a signal of state-level differences. The pooled results from each location provide an initial overall impression of the perceptions in each location. Jeypore has a much higher percentage of positive responses than the other sites; Kolli Hills tends to be more pessimistic, and Wayanad had no consensus position, with responses varying between positive, negative and neutral (Table 6-6).

Table 6-6. Overall impressions of wellbeing trajectories defined in FGDs and pooled by research location conducted in August 2014.

Location	N Responses	Negative		Neutral		Positive	
		N	%	N	%	N	%
Jeypore	68	14	21	8	12	46	68
Kolli Hills	95	53	57	31	32	11	10
Wayanad	60	23	37	15	25	22	37

The Jeypore research site is located in a remote rural District of southwestern Odisha, the lowest ranked state in terms of HDI. Therefore the *a priori* expectation of the outlook from this location was for pessimistic perceptions of wellbeing. However, respondents in all three FGDs were on average more positive about the future outlook than negative. In the first group (J1LLT) there were 21 responses, 15 of which were positive, three neutral and three negative. In second group (J2LNT), there were 22 responses, 13 that were positive, three neutral and six negative. In the third group (J3LT) there were 25 responses, 18 that were positive, two neutral and five negative. Of the pooled 68 responses, 46 were of responses were positive, eight neutral and 14 negative (Table 6-7).

Table 6-7. Overall impressions of wellbeing trajectories within the FGDs conducted within the Jeypore research site in August 2014.

Location	N Responses	Negative		Neutral		Positive	
		N	%	N	%	N	%
J1LLT	21	3	14	3	14	15	71
J2LNT	22	6	27	3	14	13	59
J3LT	25	5	20	2	8	18	72
TOTAL*	**68**	**14**	**21**	**8**	**12**	**46**	**68**
*** Percentages weighted and averaged.**							

Representative statements of the responses from the FGDs are presented in Table 6-8 below. New wage earning opportunities and crop prices were identified as positive contributing factors, while government corruption that limited access to schemes was identified as a negative factor.

Table 6-8. Sample of trajectory of wellbeing responses from FGD participants in the Jeypore, Odisha research sites conducted in August 2014.

Positive (68%)	**J1LLTG3 man**: *"better because there are more wage earning opportunities. Now we can get more than 150 rupees per day, as opposed to 20 per day"* **J3LTG1 woman**: *"productivity of crops has increased. Before we would only sow, now they have better practices: crop varieties, line planting, etc. that is increasing the yields of our crops"*
Neutral (12%)	**J2LNTG2 man***: "it's somehow ok…earlier the food prices were low, but then the price for the agricultural products we sold was low as well. So now we have higher prices for our products, so can afford to pay the higher prices for the food we buy in the shops. Although we buy fertilizer and everything that is costly, we also get higher production and are able to sell it for more. So things have really not changed ALL that much"*
Negative (21%)	**J1LLTG1 woman**: *"we have no children, so what can we do? Me and my husband are both eligible for old age pension, but I am the only one that gets it. There is an allotted number of people for old age pension, so we are in a line and can only get it when somebody older dies. We often don't have birth certificates and so it all depends on the government official implementing the policy…sometimes there are younger people getting the pension because of corruption"*

Despite the advanced HDI of Tamil Nadu relative to other Indian states, the participants in the Kolli Hills FGDs were pessimistic. The pooled results from the two FGDs conducted here are provided in Table 6-9. On average, responses in both groups were negative with respect to their wellbeing trajectories. In the first group (KH1LLT) there were a total of 35 responses, six per cent were positive, 31 per cent were neutral and 63 per cent were negative. In the second focus group (KH2LT), there were 60 responses, 15 per cent of which were positive, 33 per cent neutral and 52 per cent negative.

Of the 95 responses from both FGDs, 10 per cent were positive, 32 per cent neutral and 58 per cent negative.

Table 6-9. Overall impressions of wellbeing trajectories within the two FGDs conducted within the Kolli Hills, Tamil Nadu research site in August 2014.

Location	N Responses	Negative		Neutral		Positive	
		N	%	N	%	N	%
KH1LLT	35	22	63	11	31	2	6
KH2LT	60	31	52	20	33	9	15
TOTAL	**95**	**53**	**58**	**31**	**32**	**11**	**10**
*** Percentages weighted and averaged.**							

Representative statements from the FGDs are provided in Table 6-10. Factors such as changing climatic conditions, long distances to market and alcoholism amongst men were major concerns that resulted in a majority of responses having a very pessimistic or neutral outlook.

Table 6-10. Sample of trajectory of wellbeing responses from FGD participants in the Kolli Hills, Tamil Nadu research site conducted in August 2014.

Positive (10%)	**K1LLTG2 man:** *"things are better now as there was no road back then. Now there is. 10 years ago the government built the road through the electricity board, but they did not pave this road, and then next month the government is starting to build a dam. The dam had been stopped but now has started again. About 15 years ago a market was started close by (5km). The market was started when the government was petitioned. 18 km away was the next closest market, so we could not walk this far to purchase or sell our goods"*
Neutral (32%)	**K1LLTG1 man:** *"in those past days we used to get in-kind labour, but then the cost of rice and vegetables was also low. I don't see much change between then and now. The wages have increased, but the cost of foods has also increased. If you go to Kerala or Karnataka you can get higher income, so that is how we can manage it"*
Negative (58%)	**K1LLTG2 woman:** *"my family is trying…and we are starting to think of constructing a house. But then because of my husband's alcoholism we are dropping back down and can't get anywhere. Drunkenness is a key problem, and my son hasn't spoken to his father for the last 5 years. My husband used to go to the field and earn money, but now he is an addict and doesn't do anything"* **K2LTG2 woman:** *"some children are ok, as the parents are suffering to give them the best. We are making them educated, but we need to give bribes to get them jobs! Only after giving 1 or 2 lakhs can a child get a job"*

Kerala is the most developed of the states in India (Government of India, 2013) and Wayanad in particular is a popular destination for domestic and international tourists. Further, the mean household income is the highest of all the research sites. However this higher income is not affirmed by the

FGDs, which did not have a consensus position about the trajectory of wellbeing of households (Table 6-11).

Table 6-11. Overall impressions of wellbeing trajectories within the three FGDs conducted within the Wayanad, Kerala research site in August 2014.

Location	N Responses	Negative		Neutral		Positive	
		N	%	N	%	N	%
W1LNT	23	11	48	6	26	6	26
W2LT	16	5	31	5	31	6	38
W3LLT	21	7	33	4	19	10	48
TOTAL*	**60**	**23**	**38**	**15**	**25**	**22**	**37**

*** Percentages weighted and averaged.**

Pooling the results from the three Wayanad focus groups results in a total of 60 responses, 38 per cent positive, 25 per cent neutral and 37 per cent negative. Delving into the individual focus groups, W1LNT had a total of 23 responses, with six of those positive, six neutral and eleven negative. In the second FGD (W2LT) there were 16 responses, with six of those positive, five neutral and five negative. In W3LLT there were 21 responses, of which ten were positive, four were neutral and seven were negative. The relative balance of perspectives between all three FGDs indicates a diversity of experience, and therefore wellbeing expectations, between the different groups. Detailed quotes representing each category are provided below in Table 6-12.

Table 6-12. Sample of trajectory of wellbeing responses from FGD participants in the Wayanad, Kerala research site conducted in August 2014.

Positive (37%)	**W1LNTG2 woman:** *"It is better now because the technologies have increased and government is helping them with many things – providing machinery, schemes etc. The problem is that it is not reaching right down to the farmers – it is not reaching their hands"* **W3LLTG1 man** *(oldest in the group): "in my childhood days, I was not able to have clothes, umbrellas, etc. Now my children can have this – so this has been a good change. Also, now most of the houses have TV and electricity"*
Neutral (25%)	**W2LTG2 man**: *"normally we depend more on agriculture than anything else. If we are working and not getting the expected productivity it will surely affect their life"* **W3LLTG2 woman:** *"now there is some improvement actually, as we are getting a bit more money. Even though it is still hard and not sufficient for everything. Earlier, we got a small amount of rice that must be used for the whole family. So now we can buy the rice, and then be able to afford some more little things. So*

	there has been some improvement. Also, for men the wage is 350 rupees per day, for women it is 200 rupees per day. And this is not enough to buy things from the market…the labour days are decreasing, especially in paddy, as paddy cultivation is decreasing due to other cash crops"
Negative (37%)	**W1LNTG2 man:** *"in my case, I don't think things are getting better. Before, their ancestors were doing agriculture – they knew what to do, what to produce in which season and which climate. Now the new generation doesn't know anything about agriculture so they are producing anything and getting lower productivity. Also government is not giving much attention to farmers and they are not encouraging agriculture"* **W3LLTG2 woman**: *"I am not working for MGNREG, and my husband is not going for work because of health problems. So my son (GEN3) is feeding the family. There is also only help from the health department once in a year or so"*

In summary, the information obtained from the FGDs presents a narrative of disparity within the state level wellbeing statistics. Jeypore households, although in a relatively poor state and area, have a relatively positive outlook. Kolli Hills households, situated in a relatively wealthy state but marginalized area, have a relatively pessimistic outlook. Finally, Wayanad households, although situated in a wealthy state and wealthy area, have perceptions on wellbeing that is ambiguous between positive, neutral and negative.

6.4.1.2 Land Ownership Comparison

A comparison of the FGDs responses based upon land ownership provides insight into the influence of land asset holdings on the wellbeing expectations of households. The pooled results presented in Table 6-13 provide an initial impression of the perceptions of each group: both landed and landless households did not have a consensus option on their wellbeing, with responses relatively balanced three ways between positive, negative and neutral positions.

Table 6-13. Overall impressions of wellbeing trajectories from FGDs pooled by ownership of land assets conducted in August 2014.

Location	N Responses	Negative		Neutral		Positive	
		N	%	N	%	N	%
Landed	146	58	36	36	22	52	42
Landless	77	32	37	18	22	27	42

Land is an important asset among the predominantly agricultural communities in the research sites (Jackson, Pascual and Hodgkin, 2007; Jacoby, 2016). Specifically, a total of 146 responses were provided from the 5 focus groups with landed participants: 42 per cent were positive, 22 per cent neutral and 36 per cent negative. Diversity in responses between the FGDs was again evident: J3LT had the highest positive response rate at 72 per cent, while KH2LT had the lowest at 15 per cent (Table 6-14).

Table 6-14. Overall impressions of wellbeing trajectories within the five landed FGDs conducted across all research locations conducted in August 2014.

Location	**N Responses**	**Negative**		**Neutral**		**Positive**	
		N	**%**	**N**	**%**	**N**	**%**
J2LNT	22	6	27	3	14	13	59
J3LT	25	5	20	2	8	18	72
KH2LT	60	31	52	20	33	9	15
W1LNT	23	11	48	6	26	6	26
W2LT	16	5	31	5	31	6	38
TOTAL*	**146**	**58**	**36**	**36**	**22**	**52**	**42**
*** Percentages weighted and averaged.**							

Examples of responses from the landed FGDs are presented in Table 6-15 below. The overall reasons for responses among the landed households revolve around crop varieties, climatic change, size of farmland, and a movement of children to new opportunities out of agriculture.

Table 6-15. Sample of trajectory of wellbeing responses from FGD participants from landed households conducted in August 2014.

Positive (42%)	**J3LTG1 woman**: *"the productivity of crops has increased. Before we would only scatter sow, now they have better practices: varieties, line planting, etc. that is increasing the yields of their crops"* **W1LNTG2 woman**: *"it is better because the technologies have increased"*
Neutral (22%)	***W1LNT man:*** *"surely our children will not be selecting agriculture, but will go for jobs with good and secure income"* **K2LTG2 man**: *"we can get loans without interest…but only for agriculture. And only if we have land. Not for landless people"*
Negative (36%)	**J3LTG2 woman:** *"about 3 years back there was a very hard rain where we lost most of our crops"* **K2LTG3 woman:** *"things are not good, as government schemes are only given to big farmers, and things are not evenly distributed. Many of the schemes are not even known to most people"*

Despite to the importance of land assets, landless FGD participants did not have a consensus about their trajectory of wellbeing (Table 6-16). Although the average of responses among the three landless focus groups was very comparable between negative and positive responses (37 per cent and 42 per cent, respectively) there was less of a sense of optimism in the tone of conversations and there was one group that fit each category. The individual focus groups were also quite diverse in their responses. KH1LLT was the least positive (6 per cent), while J1LLT was the most positive (71 per cent); W3LLT was generally positive (48 per cent).

Table 6-16. Overall impressions of wellbeing trajectories within the three landless FGDs conducted across all research locations in August 2014.

Location	**N Responses**	**Negative**		**Neutral**		**Positive**	
		N	**%**	**N**	**%**	**N**	**%**
J1LLT	21	3	14	3	14	15	71
KH1LLT	35	22	63	11	31	2	6
W3LLT	21	7	33	4	19	10	48
TOTAL*	**77**	**32**	**37**	**18**	**22**	**27**	**42**
*** Percentages weighted and averaged.**							

Examples of quotes from responses are provided in Table 6-17 below. Dominant responses for the reasons for their responses included labour migration opportunities, price of commodities and changing climatic conditions – indicating that landless households are highly dependent upon agricultural work for their livelihoods, even if they do not own the land themselves.

Table 6-17. Sample of trajectory of wellbeing responses from FGD participants from landless households conducted in August 2014.

Positive (42%)	**J1LLTG2 man:** *"migration for work has really helped me to increase my life. When I go out and migrate for work, then I can come back with 20,000 rupees or something, which is a very large amount of money for me. Although it only lasts for 3 months or so"*
Neutral (22%)	**K1LLTG1 man**: *"in those days we used to get in-kind labour, but then the cost of rice and vegetables was also low. I don't see much change between then and now. The wages have increased, but the cost of foods has also increased. If you go to Kerala or Karnataka you can get higher income, so that is how we can manage it"*
Negative (37%)	**K1LLTG2 man:** *"I used to work fields to work to get money, but now there has been no rainfall, no monsoon, so I can't go to the field to work. My wife is the same. So we are without wages and suffering"*

In summary, a comparison of landed and landless households indicates that perceptions of wellbeing trajectories are similar whether the households own land or not. This factor is likely because the dominant economic activity in the research locations is crop agriculture, and both landed and landless livelihoods are highly dependent upon this asset base.

6.4.1.3 ST Membership

The third categorical breakdown of focus groups is based upon ST membership. Comparison of the perceptions between ST and non-ST households in the research area is particular interest due to the marginalization of ST populations across India (Haseena, 2015; Census of India, 2011). As the populations in all the research locations are predominantly ST, six of the FGDs were composed of ST households and two were non-ST, representing the general population composition in these areas.

Contrary to expectations, pooling the responses from all ST and non-ST groups did not yield significant difference between the ST and non-ST participants. Overall, 42 per cent of the ST groups were positive while 43 per cent of the non-ST groups were positive (Table 6-18). Negative and neutral responses were also very similar in terms of response percentages.

Table 6-18. Overall impressions of wellbeing trajectories in STs defined in pooled FGDs in August 2014.

Location	**N Responses**	**Negative**		**Neutral**		**Positive**	
		N	**%**	**N**	**%**	**N**	**%**
ST	178	73	36	45	23	60	42
Non-ST	45	17	38	9	20	19	43

Narrowing the focus to the individual ST FGDs, distinct differences are observed in responses between the groups. J1LLT and J3LT have a very high positive response rate at 71 and 72 per cent; KH1LLT has a 6 per cent positive response rate; and W2LT has a relatively “average” rate of 38 per cent positive (Table 6-19).

Table 6-19. Overall impressions of wellbeing trajectories within the six ST FGDs conducted across all research locations conducted in August 2014.

Location	N Responses	Negative		Neutral		Positive	
		N	%	N	%	N	%
J1LLT	21	3	14	3	14	15	71
J3LT	25	5	20	2	8	18	72
KH1LLT	35	22	63	11	31	2	6
KH2LT	60	31	52	20	33	9	15
W2LT	16	5	31	5	31	6	38
W3LLT	21	7	33	4	19	10	48
TOTAL*	**178**	**73**	**36**	**45**	**23**	**60**	**42**
*** Percentages weighted and averaged.**							

Examples of the responses from the ST groups are provided in Table 6-20 below. Common responses for the wellbeing placement include: wage increases, caste certificates and education.

Table 6-20. Sample of trajectory of wellbeing responses from FGD participants from ST households conducted in August 2014.

Positive (42%)	**J1LLTG1 woman**: *"as our children are now studying they are informing us parents of things, and so we are pleased about what the future is looking like"*
Neutral (23%)	**W3LLTG2 woman**: *"now there is some improvement actually, as we are getting a bit more money. Even though it is still hard and not sufficient for everything. Earlier, they got a small amount of rice that must be used for the whole family. So now we can buy the rice, and then be able to afford some more little things, but not enough to buy things from the market. Also the labour days are decreasing, especially in paddy, as paddy cultivation is decreasing due to other cash crops"*
Negative (36%)	**J3LTG1 man**: *"education is very good, but to get a caste certificate they have to give money to the revenue councilor, who will be a revenue inspector for the whole block. Once we get the caste certificate then they are able to access different things. Only then will we be eligible for the stipend. But we have to bribe, and then spend for the advocate and much traveling to get this certificate. It is a real challenge"*

Responses from the two non-ST focus groups again shows a distinct difference in between the two groups that is obscured in the total average. Of the 45 responses from non-ST FG, 19 of these responses were positive, nine were neutral and 17 were negative. However, J2LNT has a relatively positive outlook of 59 per cent, while W1LNT is much lower at 26 per cent (Table 6-21).

Table 6-21. Overall impressions of wellbeing trajectories within the two non-ST FGDs conducted across all research locations conducted in August 2014.

Location	N Responses	Negative		Neutral		Positive	
		N	%	N	%	N	%
J2LNT	22	6	27	3	14	13	59
W1LNT	23	11	48	6	26	6	26
TOTAL*	**45**	**17**	**38**	**9**	**20**	**19**	**43**
*** Percentages weighted and averaged.**							

Examples of responses are provided in Table 6-22 below. Common response themes are more specific to the agriculture industry than the other groups: technology improvement, government schemes, commodity prices and climate variation.

Table 6-22. Sample of trajectory of wellbeing responses from FGD participants from non-ST households conducted in August 2014.

Positive (43%)	**W1LNTG2 woman:** *"it is better because the technologies have increased and government IS helping them with many things – providing machinery, schemes etc."* **J2LNTG2 man**: *"there was no card system before. We used to get 10kg of this rice of very poor quality, at 2 rupees per kg. We had no PDS card, and have to purchase it outright. And they had to survive for about one month on 10 kg of rice. Things are now better"*
Neutral (20%)	**J2LNTG2 man:** *"it's somehow ok…earlier the food prices were low, but then the price for the agricultural products they sold was low as well. So now we have higher prices for our products, we can afford to pay the corresponding higher prices for the food we buy in the shops"*
Negative (38%)	**W1LNTG3 man:** *"my family is very much concentrated on agriculture for our livelihood. Yet production is negatively affected by climate variation. And then marketing facilities are a main problem. We are not getting their expected price from the market. We are getting the market price, but not the expected rate, so lowering rates"*

In summary, despite the significant statistics on the disparity between ST and non-ST households, the *perception* of wellbeing and future trajectories between both groups is relatively similar.

6.4.2 Significant Events

The open-ended questions from the previous section establish a general trend of wellbeing perspectives based upon household characteristics. This section shifts towards information provided from the

DHED survey on particular positive and negative significant events, or "shocks". The significant event categories provided in the survey were identified in the preliminary FGDs and literature. They include: natural disasters, livestock inheritance, land inheritance, crop production changes, health, dowry or wedding expenses, government programmes, new business activity, migration for labour, and "did not experience". Survey respondents were asked to rank these events in terms of priority within their household during the decade when they were 30-40 years old.

Positive Events

A common result across all generations was that approximately two-thirds of all respondents did not experience a positive significant event. However, different patterns of the kind of *positive* events experienced differed between generations. In the "grandparent" generation (GEN1) the most important positive event was the opportunity to migrate for work – 11.2 per cent of individuals felt this has significantly positively impacted their lives. GEN2 household heads considered new crop production techniques and land inheritance the two most important events, impacting 11.1 and 9 per cent of respondents. Livestock inheritance was also important for 5.3 per cent of respondents. The most important positive event for GEN3 was government schemes – 12.9 per cent of individuals attribute their wellbeing advance to this factor. New business opportunities and changes in crop production were also important to GEN3 respondents (Table 6-23).

Table 6-23. Most important significant positive or negative from the DHED survey (N=896).

Significant Event	GEN1 (N=125)		GEN2 (N=469)		GEN3 (N=302)	
	POS	NEG	POS	NEG	POS	NEG
0. Did not experience	78.4	72.0	66.5	74.4	59.3	67.2
1. Natural Disaster	0.0	10.4	0.0	11.3	0.0	5.6
2. Livestock Inheritance	0.0	0.0	5.3	0.9	0.7	1.7
3. Land Inheritance	2.4	2.4	9.0	1.7	3.0	3.3
4. Crop Production Change	2.4	0.8	11.1	1.1	9.3	1.0

5. Health	0.0	8.0	0.0	9.8	0.0	17.6
6. Weddings	0.8	0.0	1.9	0.6	3.6	3.3
7. Government Schemes	1.6	0.0	2.6	0.2	12.9	0.0
8. New Business	3.2	2.4	2.8	0.0	10.3	0.0
9. Migration for Labour	11.2	4.0	0.9	0.0	1.0	0.3

The FGDs delved further into the responses provided in the DHED survey data. Question 5 asked respondents to *identify the significant positive or negative events they have experienced in the last 20 years.* Of the 62 responses to this question, only 11 per cent of these were positive. Statements from respondents about these events are provided in Table 6-24. Common responses include: migration, inheritance of land, infrastructure improvements (such as roads and marketplaces), and new farming technology and government assistance.

Table 6-24. Sample of the positive significant event responses* from FGD participants across all projects sites conducted in August 2014.

J1LLTG2 man: *"one good thing would be work migration for the last 8-9 years"*

K1LLTG2 man: *"there was no road back then. Now there is. 10 years ago the government built the road through the electricity board). They did not pave this road, and then next month government are starting to build a dam. The dam had been stopped but now has started again. About 15 years ago a market was started close by (5km). The market was started when the government was petitioned. 18 km away was the next closest market, so we could not walk this far to purchase or sell our goods"*

W1LNTG2 woman: *"it is better because the technologies have increased and government IS helping us with many things – providing machinery, schemes etc. The thing is that it is not reaching right down to the farmers – it is not reaching our hands"*

*** 7 (11 per cent) of the 62 total responses were positive.**

Negative Events

Table 6-24 also records the negative or "depleting" events that have occurred in the DHED survey households. Again, there was a relatively high percentage of nearly two-thirds of respondents that did not experience any of these events. Among those that did have negative shocks, however, they ranked natural environment disaster and health related problems as the most significant. Natural disasters impacted 10.4, 11.3 and 5.7 per cent of

households in GEN1, GEN2 and GEN3, respectively. Health problems impacted 8, 9.8 and 17.2 per cent of households across the same generations. Other significant events were not as highly represented or as consistent among respondents. Shocks such as weddings, new business opportunities and migration were deemed by some households to be positive and by others to be negative. This result is consistent with the different impacts (dowry or bride-price) and risks (loss of business, difficulty working far from home) associated with these events (Anderson, 2007; Goody and Tambiah, 1975; Deshingkar, 2010).

Negative events often receive more attention in FGDs, as participants are able to share their concerns and receive a level of support from the group experience (Breitkreuz et al., 2016). This pattern was evident in the DHED data: 33 (53 percent) of the responses regarding significant event recollection were negative and 35 per cent were neutral. Some of the examples of negative events described over the last twenty years are presented in Table 6-25 below. Examples of negative events experienced include: drought 20 years ago and currently in the Kolli Hills; death of a son in a family in Wayanad; personal injury and sickness and the loss of a home due to fire. One significant event mentioned by the ST focus groups in Wayanad was their removal from the forest several decades ago. While only the GEN1 participant remembered this event clearly, the level of trauma this experience created in these individuals, households and communities was very high. When asked about falling back into poverty, no families specifically mentioned this occurring; while household wellbeing trajectories seemed to plateau and even dip at times, they did not perceive themselves to be in trapped in a condition of chronic poverty.

Table 6-25. Sample of the negative significant event responses* from FGD participants across all projects sites conducted in August 2014.

K2LTG1 man: *"last Monday one of the neighboring men lost a grandson. He was a good worker, died, had 3 children, and it was another man's brother in law. Because of heart attack"*

J1LLTG1 woman: *"my husband died about 8 years ago, and since then my son then became the head of the home. I managed the family by having 2 elder daughters and all of us went to work for wages. That his how we survived"*

W2LTG2 man: *"about five or six years ago there was severe drought. We were not even getting water to drink. So the panchayat would provide water for drinking and irrigation….this was 10 years back"*

J2LNTG2 man: *"we have a handicapped child in my family that seems to be affected by polio. He is four years old today. We had an older child that also suffered from polio and died. We spend a lot of money on medical expenses, and it is keeping us poor. Government does not have any programmes that provides assistance for this situation"*

J3LTG3 woman: *"my husband had to pay a fine to my father. He had to pay this because he was "marrying down", and would lose his position in the caste of his community unless he paid something to maintain it. So out of the 20,000, 10K was paid to the community, and then he also gave a feast and some goats. So pretty much he spent all of his money to maintain his position in the community"*

K1LLTG2 man: *"as a DISABLED family in this place I cannot get sufficient income to survive"*

W3LLTG1 woman: *"if some tragedy happens in my family, then nobody will help. Our family alone has to suffer"*

W1LNTG1 man (and his daughter in law and grandson here): *"in 2002, my son was 32 years ago, he had bad stomach issues, so he went to hospital and the nurse gave injection (not the doctor) and because of not getting proper treatment, he died. And then the doctor said it was suicide! The post-mortem medical report identified the issue as a problem of giving the wrong medicine, but the doctor's report was changed to say it was suicide (drank poison) – all the records and everything had been switched and changed to cover the hospitals procedure"*

*** 33 (53 per cent) of the 62 total responses were negative.**

6.5 Discussion and Conclusions

This chapter presents an integrated analytical response to the first research question on the perceptions of wellbeing changes over time. It is presented first among the results chapters to establish a foundational qualitative understanding of local poverty dynamic perceptions across the research sites. Based upon national and state level research on rural, remote and ST areas, the expected outcome for this research question was that the average household response would be pessimistic, indicating a constant or

decreasing trajectory of wellbeing, with marginal improvements observed in only a small number (specifically landed and non-ST) of households. The alternative conclusion was that the average household response would be optimistic about the future. The decision point was the percentage of total responses within the FGDs that represent positive, neutral or negative positions.

Contrary to expectations, the greatest number of statements regarding wellbeing trajectories is positive (optimistic), based upon the pooled responses in both the FGDs and DHED survey. Despite the challenges posed by living in remote and rural locations, and evidence on the marginalization of communities in these areas (Nithya, 2014; Mohapatra, 2011; Sahoo, 2011; Gang, Sen and Yun, 2008; Government of India, 2013) the wellbeing trajectories and perceived future outlook is positive.

Stratification of the FGDs samples provides slightly different results across individual research locations, but no consistent differences between ST or land disaggregation. Jeypore is very positive, Kolli Hills is predominantly negative and Wayanad is divided between the three categories. *Land asset ownership* was ambiguous, as optimism and pessimism were fairly equally represented by both landed and landless households. *ST membership* again showed mixed results: non-ST households were fairly neutral and ST households were similarly neutral. A comparison of the different responses between FGDs is provided in Table 6-26 below.

Table 6-26. Comparison of FGD level perceptions of wellbeing across location, landed and ST status.

	Jeypore	Kolli Hills	Wayanad
Landed ST			
Landless ST			
Landed Non-ST		No FGD	

Green = positive; Yellow = neutral; Red = negative; Grey = ambiguous

As such, I conclude that socioeconomic conditions specific to each research site are predominant over ST or landless household characteristics. This predominance of local conditions over ST or landless conditions contrasts with other quantitative research that has found a large poverty incidence gap between ST and non-ST households (Gang, Sen and Yun, 2008) and landed and landless households (Rawal, 2008). However, I suggest that the difference is due to the different measurement approaches. Qualitative perceptions of poverty do not always align with quantitative measures of income or expenditure. Therefore while these households may – and likely do – live in poverty, they do not *perceive* their future to be negative.

As this chapter follows a critical ethnographic approach that assumes the best way of "knowing" is from within (Smith□Lovin, 1987), the stories and insights shared by participants in the in-depth FGDs are an essential component of allowing insights into their perspectives and responses beyond landed or ST lines[49]. Two particular insights were evident.

One insight is the differences in generational perspectives. GEN1 participants in the FGDs tend to discuss "how things used to be" more frequently than younger participants, but they were also more optimistic about the future than these younger individuals. GEN1 also reported that a major contributing factor to the positive change was due to factors such as migration for labour and less importance on government schemes. This result is consistent with the fact that many government schemes and infrastructure were not in existence in their fourth decade of life (Jha et al., 2009; Gaiha et al., 2007; Government of India, 2016d). Their general optimism could also be attributed to their abdication of household headship and the lessening weight of responsibility for the future (Himmelweit et al., 2013). GEN2 were only marginally less optimistic than GEN1, and attributed much of their positive advancement to the inheritance of land and adoption of new crop varieties. This result follows the literature on the importance of land and

[49] Land ownership and ST dynamics will be discussed in greater detail in the concluding chapter of this thesis.

intergenerational asset transfer (Hatlebakk, 2014; Bennett, 2013). Unfortunately the division of land in consecutive generations often results in smaller individual land areas, family disputes and gender and caste dimensions (Manjunatha et al., 2013; Deininger, Goyal and Nagarajan, 2013). GEN3 primarily attributed their advancement and optimism to the role of government schemes in their communities and express reliance on future government programmes.

Another insight was the debilitating role of alcoholism in the Kolli Hills. A common response from participants – particularly women – was about the major problem of drinking among the men, and the network of illegal alcohol shops on the plateau. Several times the facilitator was asked if MSSRF would lobby the government to close down the alcohol shops. Alcoholism has been identified as a public health issue in other parts of India (Barman et al., 2015; Kumar and Tiwari, 2016), particularly prevalent among ST communities (Kumar and Tiwari, 2016), but no reference exists to this issue in the Kolli Hills. This is an issue that could be addressed by government schemes, as alcohol abuse is a form of behavioral poverty trap that decreases productivity and impacts entire households. Further, the disproportionately negative impact on women is very concerning from a development and social perspective. In Wayanad, alcoholism was mentioned once during the FGDs and does not seem as large an issue. This factor could be partially due to the strict state regulation that allows alcohol to be sold only once a week in specified shops (Government of Kerala, 2016). Jeypore respondents did not indicate any issue with alcoholism in their communities.

To conclude, this chapter provides a qualitative understanding of the perspectives and experiences of the households within the three research sites of this dissertation. A hypothesis of optimistic wellbeing trajectories was accepted. This hypothesis will be explored quantitatively in the next chapter through empirical tests for poverty traps.

6.6 Key Messages

- Standard of living seems to be improving across project sites: fastest in Jeypore, then Wayanad then least in Kolli Hills. Alcoholism, natural disasters and distance from markets for agriculture are major depleting factors in the Kolli Hills site.

- Generational comparison indicates that older generations perceived migration for labour as the greatest contributing factor to poverty alleviation, while interim generations considered it to be land inheritance, and the current generation government schemes. Health problems and natural disasters are the most significant negative events impacting the communities across locations and generations.

- Land ownership was not a major contributing factor to optimism, as both landed and landless focus groups were on average similar in their outcome.

- The difference between ST and non-ST participants was not significant: both groups were relatively ambiguous in their expectation. However a complex blend of factors unique to ST in each research location – level of alcoholism, integration with Hindu from animistic culture; perspectives of state government, and distance from major centres – seemed to be the primary influence on the expectation of ST households.

7. RESULTS: UNCONDITIONAL POVERTY DYNAMICS

7.1 Chapter Summary

This chapter responds to the second research question by seeking the existence of unconditional[50] poverty traps using a novel semi-parametric MFP estimation technique. Using data from the DHED survey over four previous time periods, results from four different outcome variables are compared: income dynamics, expenditure dynamics, agricultural land asset dynamics and total household asset dynamics. Non-linear pathways are evident across various scenarios, but multiple equilibria poverty traps are not evident under any conditions, affirming the conclusion of some authors (Quisumbing and Baulch, 2013; Kraay and McKenzie, 2014). The comparison of various dynamic pathways that this chapter provides contributes to the literature by: 1) providing an econometric comparison of various approaches to poverty trap analysis; 2) providing insight on whether the identification of poverty traps is due to the outcome variable measured or analytical technique; and 3) presenting a more complete understanding of the non-linearity of poverty dynamic pathways through the use of the MFP approach.

7.2 Introduction

Persistent poverty among certain regions and populations within India (Census of India, 2011; World Bank, 2015b) is of great moral and economic concern to Indian policy-makers and the international community (United Nations Development Programme, 2016). Determining the driving factors of these conditions is important to implement an appropriate policy response. If households are transitionally poor, then they are slowly climbing to a higher level of wellbeing and government intervention strategies must focus on ways to increase this rate of change; if households are chronically poor and stuck in a self-reinforcing cycle, then governments should take a different, more direct

[50] Unconditional refers to a comparison of the same outcome variable over different time periods, where results are not “conditioned” on other covariates.

approach to push these households to higher positions on the development ladder (Barrett and Carter, 2013). The possible existence of self-reinforcing mechanisms that cause poverty to persist have led to research interest from both governments – with a mandate to enhance the wellbeing of their electorate – and the international donor community, who are motivated by moral, political and economic considerations (Azariadis and Stachurski, 2005; United Nations, 2000; United Nations Development Programme, 2016).

The different contexts (social, geographic, political or economic), outcome variables (income, expenditure or assets) or estimation methods (parametric, non-parametric or semi-parametric) are all components that have an impact on poverty traps and must be carefully considered in any poverty trap analysis. A substantial amount of research interest over the last several decades (Carter and Barrett, 2006; Barrett and Carter, 2013; Kraay and McKenzie, 2014) has failed to provide conclusive answers in this elusive quest to identify multiple equilibria poverty traps. The economic measurement of poverty traps has evolved over time with increasing sophistication, from single period income measures to dynamic asset approaches (Barrett and Carter, 2013). Much of the existing research is concentrated in sub-Saharan Africa and south Asia (Quisumbing and Baulch, 2013; Lybbert et al., 2004; Sen, 1976; McKay and Perge, 2013) and the most recent publications in this field of research have employed asset accumulation pathways to track poverty. Primarily due to statistical challenges, much of this analysis is done non-parametrically, where the outcome accumulation pathway is only compared between the outcome variable at an original period Y_t with a future period Y_{t+1}. The overall objective of these direct empirical studies is to search for a bifurcated dynamic pathway of the outcome variable – either income, expenditure or assets – that shows multiple equilibria with the 45 degree line where $Y_t=Y_{t+1}$.

The second research question addresses the issue of outcome variable choice in the search for empirical evidence of poverty traps. Employing the MFP estimation approach, the questions asks: *what is the shape of poverty dynamic pathways and do multiple equilibria poverty traps*

exist? To determine the importance of outcome variables in conclusions for policy, results from four different outcome variables are analysed and compared: income, expenditure, agricultural land area, and the total household asset index. Based upon ambiguous results in the search for poverty traps in south Asia (Quisumbing and Baulch, 2013; Hatlebakk, 2014; Rakib and Matz, 2015; Baulch and Davis, 2008) the hypothesis is that *unconditional poverty traps do not exist in these locations, in part due to India's diverse economic activities that provide alternative sources of livelihood opportunities.*

In this chapter data from the three research locations in South India is pooled. This research contributes to the poverty trap literature by using the MFP estimation technique to compare the standard measurements of poverty dynamics identified in the literature: income, expenditure, single asset and total household assets. The MFP technique brings an estimation advantage, by allowing non-linearity to be statistically determined in the econometric models. This approach also brings a higher level of objectivity to the dynamic pathway results. To my knowledge, this estimation approach has not been previously used in poverty trap literature.

This chapter is structured as follows: a summary is provided of the methodology and dataset used specifically in this chapter; results from the analysis will then be presented; and a discussion section will summarize and review the conclusions. Finally, a short highlights section will reinforce the major findings.

7.3 Data and Methodology

The dataset used in this analysis is derived from the DHED survey dataset. Combining the data from Jeypore (300 households), Kolli Hills (296 households) and Wayanad (300 households) provides a pooled sample size of 896 households. To track poverty dynamics over time, four different outcome (dependent) variables are analysed: income, expenditure, single

asset (agricultural land area) and an asset index (total household assets). All variables compared the current level (2014) with levels from previous time periods: one, five, ten and twenty years ago, collected through a historical recall approach (Mohapatra, Rozelle and Goodhue, 2007).

The units of measurement for income and expenditure levels are based upon 2014 rupee levels. Agricultural land area is recorded in acres, and the total household asset values are a composite index constructed using a principal factor analysis (PFA) that is comprised of continuous values of agricultural land area, livestock numbers, agricultural and transportation equipment numbers, and numbers of household assets such as furniture, appliances and jewelry.

The regression results from the MFP estimation are plotted and the resulting graph is examined for multiple equilibria poverty traps (see Figure 7-1). For ease of interpretation, a few guidelines are useful. First, any location where the fitted line is above and to the left of the 45-degree line indicates positions where assets in the later period are greater than the initial period – a "positive" position. The opposite is also true: locations below and to the right of the 45-degree line are positions where the future period assets are less than the initial period – a "negative" position (Azariadis and Stachurski, 2005). Second, equilibrium points are where the pathway crosses the 45-degree line. If a single equilibrium exists then there are no poverty traps; if a forward sloping s-shaped curve and three equilibrium points are evident: two of them crossing the 45-degree line from above (stable) at A^*_p and A^*_c, and one crossing the 45-degree line from below (unstable) at A^*_m, then there is a poverty trap. These points are "basins of attraction" (Carter and Barrett, 2006) where households to the left or right of these pathways will be drawn towards due to increasing or decreasing returns to assets. Third, households in positions to the right of the high-level steady state, A^*_c , will also face decreasing returns to assets and be pulled towards the steady state and maintain the development convergence hypothesis – that all household will converge to a single, steady state equilibrium point (Barrett and Carter, 2013; Zimmerman and Carter, 2003; Azariadis and Stachurski, 2005).

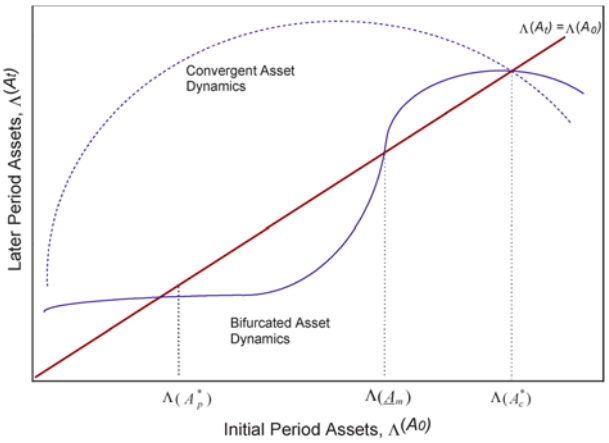


Figure 7-1. Hypothetical asset dynamic threshold and poverty trap (Adato, Carter and May, 2006).

The econometric analysis will be conducted using the MFP approach (Stata Press, 2014). Although one of the major advantages of this approach lies in its ability to incorporate covariates within models, it can also be used for univariate equations. Quantification of coefficients and standard errors for different functional forms provides valuable detail into the functional form and magnitude of the earlier period's outcome variable. All analysis in this chapter is conducted in the computer software package STATA 14 (Stata Press, 2015).

7.4 Results

7.4.1 Income Dynamics

Income is one of the most common methods by which to measure poverty dynamics (World Bank, 2015b; Carter and Barrett, 2006). Despite inherent limitations of income as a metric of poverty dynamics[51] (Carter and Barrett, 2006; World Bank, 2016) and a resultant shift in the literature towards more "reliable" measures – such as expenditure and most recently assets – income is still used in development and government literature as it is easier to quantify and is considered to serve as a proxy for more sophisticated

[51] Income is only one factor that allows for the consumption of goods, ignoring other factors such as access and availability (World Bank, 2016).

estimates that are more difficult and costly to measure. Therefore this search for poverty traps begins with this outcome measure.

Results from the MFP analysis on current (2014) levels of income versus income levels from previous years are provided graphically and with regression coefficients (Figure 7-2 and Table 7-1). A graphical representation is valuable first to understand the general shape of the income accumulation pathway. The black 45-degree line indicates the points where income today is equal to income yesterday – if the dynamic pathway is above that line that is a positive indication of wellbeing. If it is not, that is a negative indication. The coefficients provide information on the functional form, direction (positive or negative) and statistical significance.

Comparisons of income today with one year ago indicate that income has increased slightly but is similar to the previous years' level. The relationship is linear and does not change to a large degree. There is no intersection of the 45-degree line, which indicates no equilibrium points in this model. A comparison of the coefficients derived from the analysis support this conclusion, showing a high constant, positive and significant coefficient on the linear form of income one year ago (Table 7-1). This result provides a level of logical consistency with the analysis, as the minimal income increase between the two years shown in the graph (Figure 7-1) makes intuitive sense – household incomes do not on average increase drastically over short time periods.

Comparison of income today with five years ago shows a much less linear relationship (Figure 7-2). The income pathway remains above and increases away from the 45-degree line – indicating no evidence of poverty traps, and from an income perspective that conditions have improved quite dramatically from five years ago. A comparison of the coefficients derived from the analysis support this conclusion, showing two different functional forms, with positive signs with high coefficients in both forms (Table 7-1).

Comparison of income today with ten years ago shows another non-linear income pathway, but one that remains constant above the 45-degree line. The improvement observed in the previous time-periods remains. The coefficients derived from the analysis support this conclusion, reporting linear and squared functional forms that are initially highly positive and then remaining positive, but at a lesser degree (Table 7-1).

Finally, a comparison of current income levels with income 20 years ago shows a very similar pathway to that of 10 years ago. Income today is much greater than 20 years ago and things seem to be improving with no equilibrium point within the range of the data. The coefficients derived from the analysis support this conclusion, reporting only a linear functional form (Table 7-1).

Table 7-1. Semi-parametric MFP regression of income today versus income in four previous time periods.

Variable	**1 Year Ago**		**5 Years Ago**		**10 Years Ago**		**20 Years Ago**	
	Coeff.	**S/E**	**Coeff.**	**S/E**	**Coeff.**	**S/E**	**Coeff.**	**S/E**
Income	79,147***	6,089	169,069***	7,879	1.77***	0.11	1.74***	0.28
Income^2	64,432***	4,458	-32,009***	6,537				
Constant	62,507***	589	63,216***	1,053	58,823***	42.47	59,085***	2,121
N	528		516		456		327	
R^2	0.93		0.73		0.38		0.10	

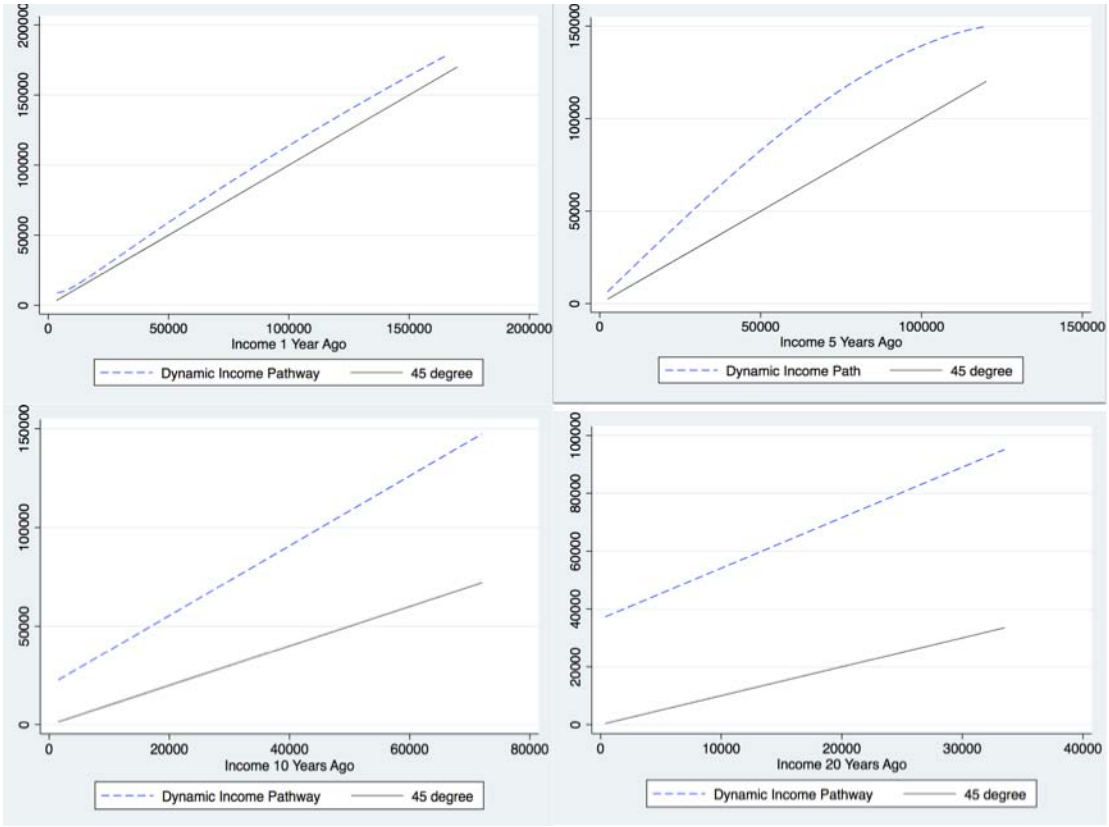


Figure 7-2. Dynamic income pathways of households in the three project sites over 4 different time periods (pooled data).

The overall results from this sub-section confirm that from an income outcome indicator perspective, the wellbeing of households in these three project areas seems to be improving over each time period. This is a positive conclusion for poverty analysis and is supported by the descriptive statistics and overall perceptions described in the FGDs.

7.4.2 Expenditure Dynamics

Expenditure measures are preferred to income by economists as a measurement of wellbeing. Consumption more closely captures the broader context of wellbeing as it captures questions of access and availability of items; it is easier to measure and record in poor sectors of society where income flows may be erratic, and may better reflect the ability to meet basic needs (World Bank, 2016).

Expenditure components were included in the DHED survey in order to capture those components of wellbeing. Current and historical levels of expenditure were recorded on a variety of items that comprehensively capture the major components in the households' daily life. These specific expenditures include: food, health, education, clothes and equipment, travel, communication and bills. Again, a historical recall approach was used to approximate previous expenditure levels. A MFP analysis was run on current (2014) levels of expenditure versus historical levels of expenditure and the results captured graphically and in a table format. The black 45-degree line indicates the points where expenditure today is equal to expenditure yesterday: if the dynamic pathway is above that line it is a positive indication of wellbeing. Below the line is an indication of negative wellbeing.

Comparisons of expenditure today with one year ago indicate that expenditure is non-linear and slightly higher than today's expenditure. A comparison of the coefficients derived from the analysis support this slightly non-linear conclusion, but as the results are a comparison of one year only, care must be taken in interpretation. The similarity between the income pathway at this same time period and close comparability with expenditure one year ago is affirmation of the consistency and robustness of this result (Figure 7-3).

A comparison of expenditure in the current period with expenditure five years ago shows a more linear relationship. The expenditure pathway remains above the 45-degree line at all levels and increases away from it at higher levels – indicating no evidence of poverty traps; rather, in terms of expenditure, the wellbeing of households has improved significantly from five years ago. A comparison of the coefficients derived from the analysis support this conclusion, showing only one linear functional form of the previous period expenditure coefficient (Table 7-2).

A similar trend is observed in comparison with expenditure in earlier time periods of ten and 20 years ago (Figure 7-3). Both exhibit linear dynamic pathways that only differ in the magnitude of expenditure difference between

the time periods: 20 years ago expenditure was less than it was ten years ago and even more so when compared to today. The coefficients derived from the analysis support this conclusion, reporting a positive and linear functional form (Table 7-2).

Table 7-2. Semi-parametric MFP regression of expenditure today versus expenditure in four previous time periods.

Variable	**1 Year Ago**		**5 Years Ago**		**10 Years Ago**		**20 Years Ago**	
	Coeff.	**S/E**	**Coeff.**	**S/E**	**Coeff.**	**S/E**	**Coeff.**	**S/E**
Expenditure	4,827***	261	1.64***	0.07	1.55***	0.17	1.89***	0.47
Expenditure^2	-1,706***	125						
Constant	47,052***	476	48,960***	683	52,154***	1,134	56,996***	1,745
N	354		305		245		134	
R^2	0.89		0.67		0.26		0.11	

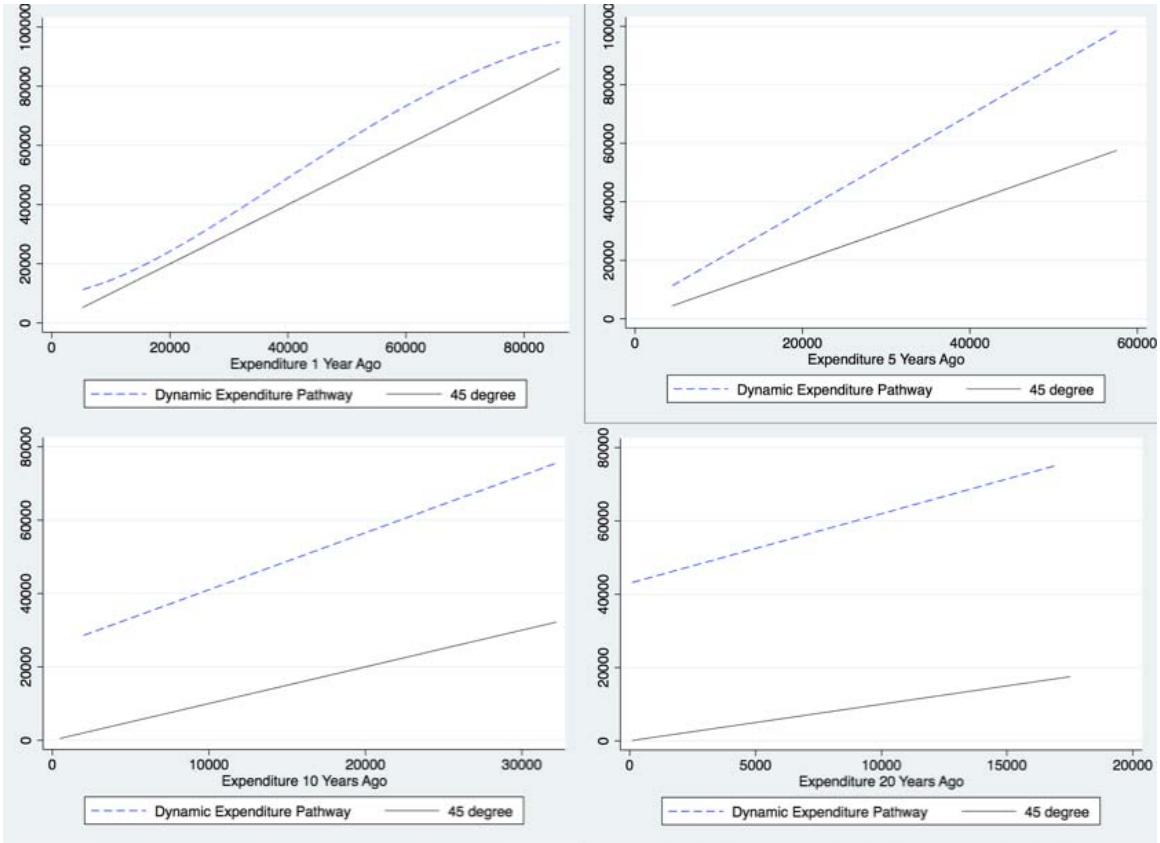


Figure 7-3. Expenditure pathways of households in the project sites over 4 different time periods.

7.4.3 Agricultural Land Dynamics

Neoclassical economic growth models discuss the rural urban transition in development: wanting a better future, rural poor from the formal agricultural sector move to the informal urban sector, and from there – hopefully – manage to attain employment in the formal urban sectors (Ray 1998). At a macro-level, India exemplifies this transition pathway (Nayak, Behera and Shillong, 2014; Deshingkar, 2010). However, in the predominantly rural area – still containing 30-40 per cent of the total population of the country – these households remain reliant upon agricultural income (Government of India, 2013). In a country with dense populations and rich agrobiodiversity, livestock is not the primary asset, thereby differing from regions like sub-Saharan Africa. Rather, it is land assets held that determine crop production levels, and are therefore a good indicator of wellbeing and poverty levels in rural India (Hatlebakk, 2014).

The agriculture industry is the primary source of income and economic activity for all three of the project locations. The agriculture practiced in these locations is land intensive, with rice and vegetable crops being grown, consumed and sold. This style of agriculture differs in context from other single asset agricultural studies where livestock is the primary asset source (Lybbert et al., 2004). As land is the primary productive asset in these communities (Pattison et al. 2013) outcome measure is used as the first empirical test for asset-based poverty traps.

The dominance of cultivated agriculture in India is evident in all research locations. Despite the occurrence – or perception among landed focus groups – that the youth are leaving the farm for “good jobs and lives” in the urban areas, most households remain reliant upon agriculture for their livelihood. In the research locations, 60.7 per cent of members were reliant upon agriculture for their primary employment. In Jeypore, 143 of the

households were reliant upon agricultural employment. In Kolli Hills, this was 245 – 82.8 per cent, and in Wayanad it was 160 households or 53.3 per cent.

Further, the issue of land division between generations plays a major role in the wellbeing within agricultural households across India (Manjunatha et al., 2013; Hatlebakk, 2014). Large (though decreasing) household sizes mean that not all children have access to land, and rural families with no other occupational experience must survive on smaller parcels of land. Several options exist: either merge with their parent's generation, or explore other occupations. Initial land inheritance can lead to households being caught in a poverty trap (Hatlebakk, 2014).

The area of agricultural land in acres was recorded for all households in the DHED survey over four time periods (Table 7-3). The size of land ranged from 0-20 acres in the current year, while 20 years ago it ranged from 0-40 acres; a decreasing trend in land area ownership over time is evident. Landless households made up approximately 30 per cent of household across time periods (Table 3-7). They are included in the sample for this analysis, thereby allowing us to determine the full impact of land on the analysis. This information is confirmed by FGDs responses that identified inheritance of land assets as a positive thing for GEN2 households – but less important for GEN3. Therefore from general descriptive statistics alone it is expected that the pathway may be different than previously seen in the income and expenditure approaches.

Table 7-3. Agricultural land area statistics (acres) pooled for households in the DHED survey across five time periods.

Variable	N	Median	Mean	SD	Min	Max	Landless (%)
Agland0	896	0.95	1.33	1.95	0	20.0	27.3
Agland1	896	0.98	1.35	2.09	0	24.4	27.3
Agland5	896	1.0	1.45	2.76	0	39.0	27.6
Agland10	896	1.0	1.52	3.13	0	40.0	27.7
Agland20	896	1.0	1.59	3.22	0	40.0	29.7

A MFP analysis of agricultural land today with land one year ago shows a convex asset accumulation pathway (Figure 7-4). The land asset pathway tracks the 45-degree line in lower levels of land ownership before crossing at approximately 15 acres. A comparison of the coefficients derived from the analysis support this conclusion: there is initially a positive linear coefficient, which then shifts to a positive squared functional form before changing to a negative coefficient in the cubic form (Table 7-4).

Comparison of agricultural land accumulation of five years ago shows a more s-shaped pathway that "bounces" along the 45-degree line, indicating that very little change has occurred in terms of land ownership between these time periods. At approximately nine acres this pathway distinctly crosses the 45-degree line. At the range between 0-10 acres the pathway tightly holds to the 45-degree line, indicating that land ownership levels have not changed at all between the two periods of time. The narrative is exactly repeated when comparing land assets from the current period and ten years ago (Figure 7-4).

When comparing current agricultural land area with the area households owned 20 years ago, there is a distinct concavity in the pathway and much of this curve exists below the 45-degree line. While this single low-level equilibrium indicates that things were generally better from an agricultural land area perspective 20 years ago than they were today, there is no trap evident (Figure 7-4 and Table 7-4).

Table 7-4. Semi-parametric MFP regression of dynamic agricultural land area pathways in four previous time periods (pooled).

Variable	**1 Year Ago**		**5 Years Ago**		**10 Years Ago**		**20 Years Ago**	
	Coeff.	**S/E**	**Coeff.**	**S/E**	**Coeff.**	**S/E**	**Coeff.**	**S/E**
Agland	8.62***	0.08	9.57***	0.10	8.91	0.15	8.54	0.25
Agland ^{2}	2.29***	0.10	-12.22***	0.18	-11.55	0.26	-1.17	0.14
Agland ^{3}	-3.46***	0.11	4.22***	0.11	3.98	0.15	0.55	0.09
Constant	1.28***	0.01	1.25***	1.24	1.31	0.03	1.49	0.04
N	896		896		896		896	
R^2	0.98		0.92		0.82		0.72	

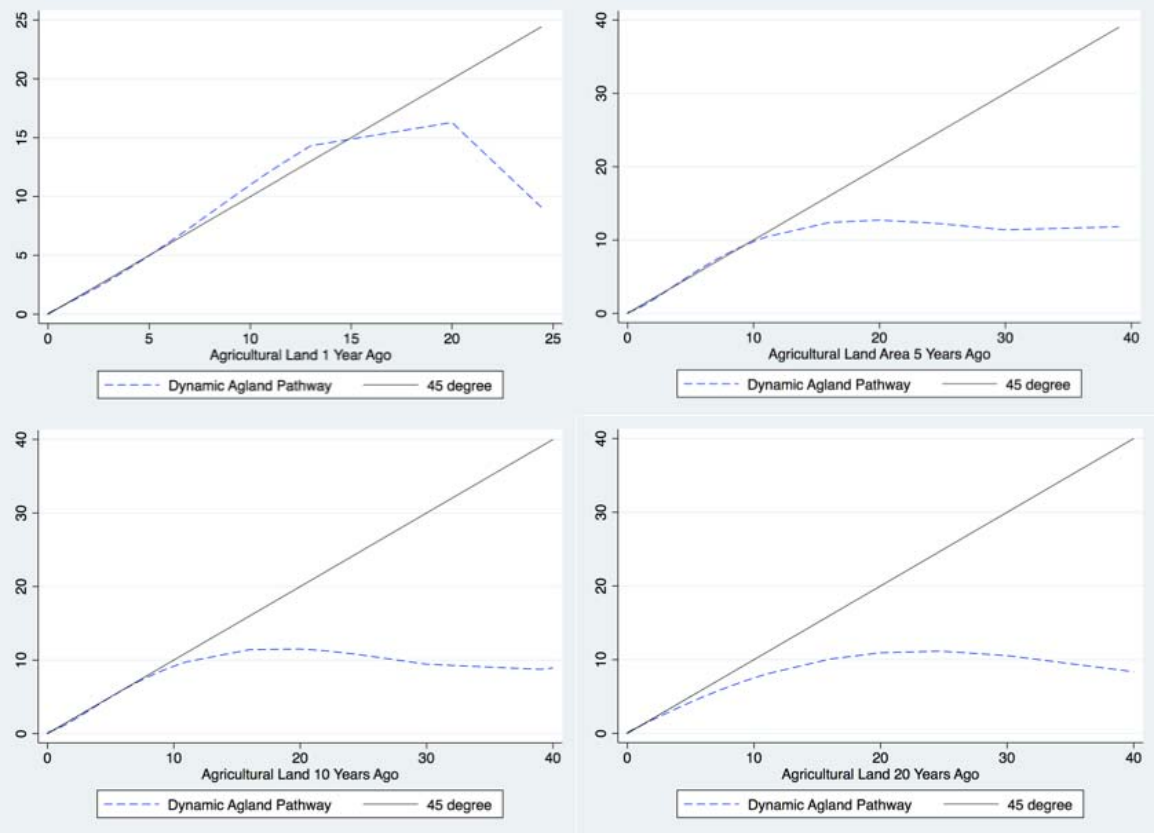


Figure 7-4. Agricultural land pathways of households in the project sites over 4 different time periods.

Results from the single asset measure of agricultural land area over time confirm the declining land assets identified in the descriptive statistical summary of these variables across time periods (Manjunatha et al., 2013). However despite the "tracking" of the asset pathway along the 45-degree line at low levels of land ownership, there is only a single equilibrium point for each time period. A multiple equilibria asset-based poverty trap does not exist in any of these cases.

7.4.4 Total Asset Dynamics

A comprehensive index of all household assets was created using the principal factor analysis approach described in Chapter 4. Assets in this index include agricultural land, livestock numbers, transportation and agricultural equipment numbers and household assets. Calculated as eigenvalues, the range in this data is from approximately -3-5. This index provides a larger sweep of assets and does not rely solely on a single asset such as

agricultural land, thereby conflating movement or loss of agricultural land as a decrease in wellbeing[52]. Of the studies using a comprehensive asset index, very few have found poverty traps (Michelson, Muñiz and DeRosa, 2013; Quisumbing and Baulch, 2013). However larger asset indices provide a more comprehensive narrative of the wellbeing of a household and can provide different insights to a single asset approach (Michelson, Muñiz and DeRosa, 2013; Moser and Felton, 2007; Booysen et al., 2008).

Comparison of total assets today with one year ago shows a slightly s-shaped non-linearity in the asset accumulation pathway, though the dynamics curve follows the 45-degree line very closely (Figure 7-5). The close alignment over this small time period is again a form of robustness test of the data – major differences in assets are unlikely to occur under such a short time period. Due to the proximity of the accumulation pathway and the 45-degree line, it is difficult to ascertain if any intersection occurs – other than where it crosses at approximately 2.3. A comparison of the coefficients derived from the analysis supports this conclusion, showing high positive coefficient, the magnitude of the squared functional form decreasing in size and then dropping to negative (Table 7-5). However, as in the earlier examples, this relationship is tenuous as may not mean a trap exists, only that the conditions are possible.

Comparison of total asset accumulation of five years ago continues to maintain the s-shape necessary to indicate a poverty trap, but only "bounces" off the 45-degree line and does not cross it from below, therefore not satisfying the conditions necessary for a multiple equilibria poverty trap (Table 7-5). Total household asset accumulation from ten years ago mirrors the overall shape from the five year comparison. Again, at low levels the pathway touches the line, but does not cross it, almost "bouncing" off it before increasing to cross the line at an asset index of approximately two. No multiple equilibria poverty trap exists in this scenario, though the relatively low-level equilibrium from the ten year scenario of all household assets can

[52] Annex 5 shows results of the same analysis, but with agricultural land area removed from the total asset index. The results are similar.

be considered a strong representation of the asset accumulation pathway in the village over time – affirmed by the five year time period, and yet more statistically reliable than the 20 year time period.

Information on total assets from 20 years ago is much more erratic than the earlier time periods and has a very low R-squared value (Table 7-5). The characteristic s-shape curve does remain, but it has a much lower equilibrium point (Figure 7-4). Caution must be taken when drawing conclusions from this time-period comparison due to expected degradation in the precision from such a distant time period.

Table 7-5. Semi-parametric MFP regression of total household asset dynamic pathways in four previous time periods (pooled).

Variable	**1 Year Ago**		**5 Years Ago**		**10 Years Ago**		**20 Years Ago**	
	Coeff.	**S/E**	**Coeff.**	**S/E**	**Coeff.**	**S/E**	**Coeff.**	**S/E**
Total Assets	1.12***	1.12	0.41***	0.03	0.35***	0.03	-39.02***	3.28
Total Assets ^{2}	0.07***	0.01	-0.40***	0.04	-0.32***	0.04	39.06***	3.12
Total Assets ^{3}	-0.03***	0.01	0.10***	0.11	0.08***	0.01	-36.29***	3.21
Constant	1.19**	0.01	0.02***	0.02	0.04***	0.03	-0.15***	0.03
N	896		896		896		896	
R^2	0.96		0.82		0.68		0.19	

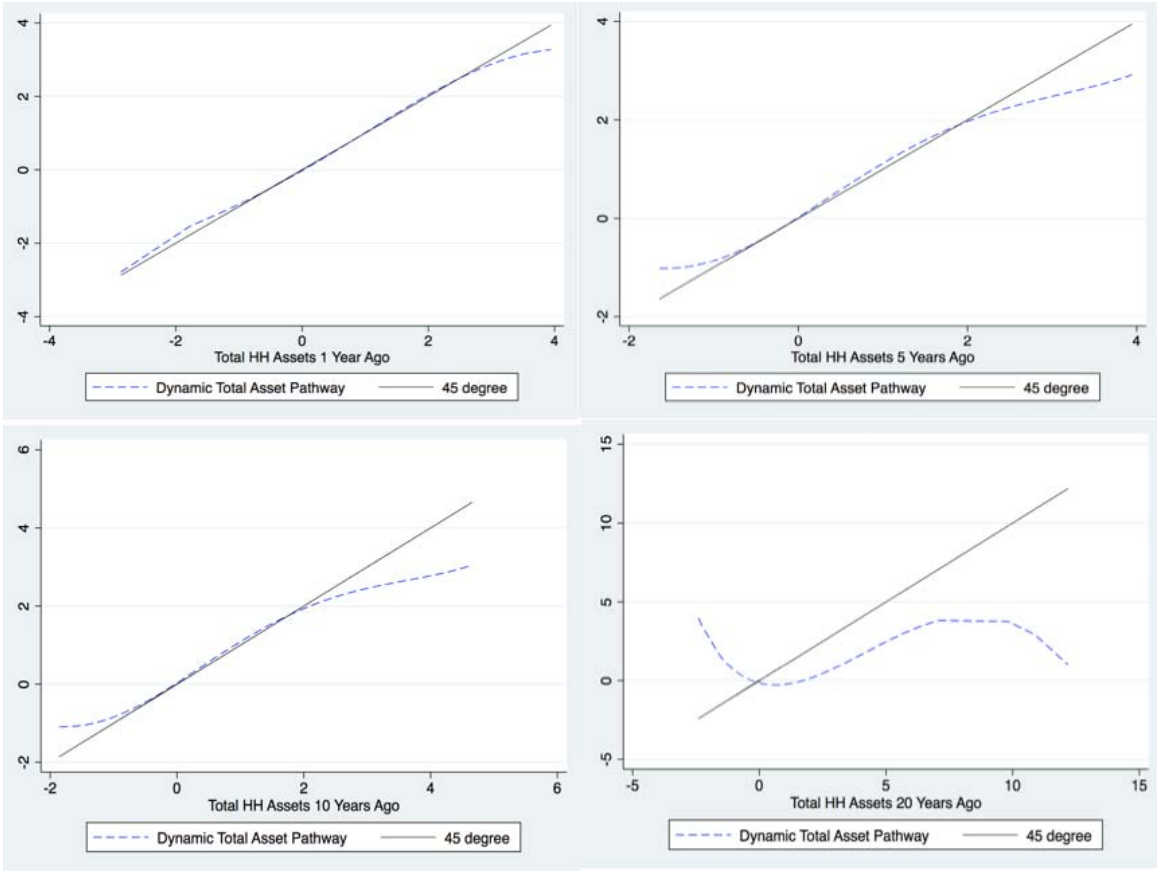


Figure 7-5. Total household asset pathways of households in the project sites over 4 different time periods.

Overall, the total asset index scenarios support the *shape* of the asset accumulation pathways found in the single asset results, but despite the dynamics curve and 45-degree line nearly touching, there is no clear crossing from below and therefore one cannot assert that multiple equilibria poverty traps exist in these locations. The strongest possible affirmation of this condition is found within the five and ten year comparisons, which support each other and are of a clearly understandable time period for the recall approach.

7.5 Discussion and Conclusion

The unconditional poverty dynamic analysis from this chapter provides information on the asset accumulation pathways of households in the research locations. The conclusions rely primarily on the shape of the

dynamic outcome pathways and are based upon the conceptual foundations of multiple equilibria poverty traps found in Azariadis and Stachurski (2005). Comparison between different outcome variables over different time periods provides robust evidence that no multiple equilibria poverty traps exist in the three research locations. While some conditions – such as the s-shaped curve – necessary for such traps are met in certain comparisons, these results are not sufficient to confirm the existence of multiple equilibria poverty traps as the dynamic pathways never cross the 45-degree line from below. Therefore the conclusion from this analysis is that the households in these research sites are on a slow pathway out of poverty towards higher levels of wellbeing, though the relatively low single equilibrium point indicates that support from government – such as ongoing infrastructure development, asset and food provisions and educational support – should exist to raise it and elevate the status of these households; they may not exist in poverty conditions, but still are relatively poor.

The comparison between analytical outcome measures is important in understanding the poverty dynamics in these locations and highlights the complexity of poverty trap analysis in general – as Carter and Barrett (2006) suggest, different measurements for wellbeing provide may not support each other. Specific results from this chapter can be broadly discussed along the following themes: contribution of the MFP methodological approach, differences between outcome variables employed, and differing policy implications.

First, the contribution of the MFP approach to the poverty trap analysis and literature is useful[53]. Traditional dynamic models use non-parametric techniques such as kernel regressions or LOWESS smoothing to understand the relationship between the outcome variables today and yesterday. While information derived in the LOWESS analytical approaches provide a clear

[53] Although the MFP approach is useful in bivariate, non-parametric analysis, its full usefulness will be highlighted in the covariate analysis in Chapter 8.

picture of the dynamic pathway itself[54] – including the shape (non-linearity) and points of equilibrium[55], it does not provide detailed information on the significance of the results or the magnitude of the non-linear shapes. The MFP provides both a graphical representation of the pathway and the regression results with functional forms, coefficients and the signs, thereby assisting to provide a more detailed understanding of the dynamic accumulation pathway – whatever the outcome variable chosen.

Second, while the overall narrative of increasing wellbeing and no poverty traps was maintained across outcome variables, income and expenditure showed a much less nuanced understanding of development pathway than either of the asset approaches – as suggested by Barrett and Carter (2013). Results from income and expenditure approaches show a high and mostly linear relationship between different time periods. More importantly, they show no evidence of convergence between income or expenditure outcomes at the time-scale identified by the data. Conceptually, the steady-state equilibrium point is somewhere higher than the data indicates.

The asset-based approaches, however, follow an s-shape, non-linear pattern. With agricultural land, there are fewer land assets among individual households than in the past, though the dynamic pathway closely followed the 45-degree line. This "positive" result of no multiple equilibria is seemingly contradictory to the "negative" result of decreasing maximum and mean areas of land holdings among households described in the descriptive statistics. An explanation for these results is found in the FGDs where positive perceptions on agricultural land ownership and negative perceptions of land fragmentation over generations were raised by participants. In the former perspective, participants discussed higher quality seed varieties, new mechanized technology and fertilizer provision as reasons for a positive agricultural and land outlook. In the latter perspective, several participants in the landed

[54] Annex 2 summarizes the results of a LOWESS analysis on the same variables analysed in this chapter and supports this conclusion.
[55] Annex 4 contains results from a LOWESS analysis that is similar to the MFP results.

FGDs lamented a trend of decreasing reliance upon agriculture for rural youth, as they choose to move to urban centers or migrate for employment. This occurrence was thought to be due to fragmentation of land and an inability to pass on sizeable portions to maintain a sufficient livelihood, and therefore the younger members of the households would move to urban centers for work, thereby freeing up land resources for the rural members of their household. Several participants also indicated that there were many schemes available for ST households, but much fewer for agricultural landed households, and they were therefore suffering as a result.

Contrary to suggestions in the literature (McKay and Perge, 2013; Kraay and McKenzie, 2014; Quisumbing and Baulch, 2013) that single and multiple asset indicators may lead to different results, the narrative from the single asset analysis is supported by the results from the total asset index analysis as both asset measures also exhibit a single steady-state equilibrium point. This information could be an indication that household members are not as reliant on personal land ownership [56] as a source of asset accumulation. No trap is evident in this outcome analysis, as the asset accumulation pathways simply touch at lower levels before increasing again before finally crossing the 45-degree line. While there are positive signals from FGDs on the long-term wellbeing outlook, and the income and expenditure pathways complement those narratives, the information from the asset dynamic pathways indicates that households within these communities are still quite poor.

The importance of these results in the context of policy design and recommendations is significant. First, it exposes how the choice of outcome variable can influence the results. If a policy decision is made based upon the easily measurable and less costly measures of income or expenditure, the conclusion that the households in these communities are slowly transitioning towards an as-yet-unknown high equilibrium point can be made. These

[56] To confirm that the agricultural land asset is not driving this result, an analysis was conducted on an asset index using all the same assets except agricultural land, and the results were the same (see Annex 3).

conclusions would support a positive story of development, affirm traditional growth models, and the resultant government policy supporting future growth could take a more long-term approach to stimulating development to promote wellbeing.

However, if the more costly and difficult to measure asset approach is used, a different story unfolds. In these scenarios, s-shaped curves and a low equilibrium point are evident. As a result, a more immediate and direct policy approach may be required to stimulate wellbeing advancement than what would be recommended by the narrative described in the income and expenditure results (Barrett and Carter, 2013).

In conclusion, there is value to considering all four approaches to measuring poverty outcomes in concert. This multiple outcome approach, enhanced by the MFP analysis, tells a more complete story about the poverty dynamics of these marginalized mountainous communities than any single outcome variable on poverty dynamics. It supports the conclusion that multiple equilibria poverty traps may be a phenomena of single-asset households and affirms the assumption that economically diverse south Asian communities are less prone to multiple equilibria poverty traps (Quisumbing and Baulch, 2013). Further, these results highlight the importance of obtaining primary information from communities to guide government policy decisions, as the strategy to assist those in either transitory or chronic poverty may be different. This information will be presented in Chapter 9.

7.6 Key Messages

- No multiple equilibria poverty trap exists when considering income dynamics and there is a positive difference between income today and in all previous periods. No equilibrium point is evident at the scale of the data employed in the analysis.

- No multiple equilibria poverty trap exists when considering expenditure dynamics and there is a positive difference between expenditure today and expenditure in all previous time periods. No equilibrium point is evident at the scale of the data employed in the analysis.

- When considering both the single asset and multiple asset dynamic pathways using a total household asset index (including agricultural land), there is evidence of s-shaped curve and a single equilibrium point, but no distinct intersection of the 45-degree line from below. Therefore the primary requirement for a multiple equilibria poverty trap is not met.

- These results highlight the differences conveyed by different outcome variables in an unconditional analysis. Income and expenditure stories are positive and linear, while assets are more nuanced and s-shaped. This more nuanced result affirms the use of asset approaches to analyze household wellbeing over time.

8. RESULTS: WOMEN'S POWER AND COVARIATES

8.1 Chapter Summary

This chapter responds to the third research question by exploring the impact of determining factors – such as household demographic conditions, significant events and access to government programmes generally, and women's intra-household bargaining power specifically on asset accumulation. The emphasis on women's empowerment is motivated by moral and economic concern over the marginalization of women in rural India (Government of India, 2007, 2013) and a desire to understand how changing power of a female spouse can influence household asset accumulation. A conceptual and empirical model for asset accumulation is created that includes demographic, location, shock and female bargaining power covariates. The total household asset index for the current period and ten years ago is used and estimation is conducted with the MFP approach. This specific outcome variable and time period were chosen it represents the full range of assets and because it is the mid-point from our historical data on household asset ownership. As concluded in the previous chapter, no poverty trap is evident in this analysis, but the coefficients and functional form (non-linearity) of the covariates provides useful insights for targeted policy development. Particular emphasis is placed on spousal decision-making power, as measured by female control over the purchase of household assets. Covariates such as ST membership and household size were found to have a significant, negative linear influence on asset accumulation, while covariates such as age, education, land ownership and positive events had a significantly positive linear influence. Specifically focusing on women's empowerment, there is evidence of non-linearity in spousal decision making-power, providing an alternate hypothesis to the standard development economic theory that assumes a positive and linear relationship between female spousal power and household wellbeing. This evidence is a contribution to the development economics and intra-household bargaining literature; to my knowledge it is the first time spousal power over asset decisions has been empirically quantified and incorporated into the asset poverty trap literature.

8.2 Introduction

Global narratives on poverty reduction are strikingly positive. In 1990 approximately 40 per cent of the world's population and 47 per cent of people living in developing countries were living in a state of extreme poverty – defined in monetary terms as people living on less than $1.90 US per day[57] (United Nations, 2015). The global number of people living in extreme poverty in 1990 was 1.9 billion, and despite global population growth this figure dropped to 836 million in 2015. Millennium Development Goal #1: *eradicate extreme poverty and hunger* is considered to be a relative success with the global number of extreme poor and the proportion of undernourished people declining by more than a half since 1990 (United Nations, 2015). Statistics on South Asia support this trend, with poverty figures dropping from 40 per cent of the population in 1990 to 13.5 per cent in 2015 (World Bank, 2015a). Indeed the results from the previous chapters also support these trends: perceptions of wellbeing are generally positive, income and expenditure levels are up, and no multiple equilibria poverty traps exist in the three South Indian research locations.

Despite these statistics, large numbers of people across the world remain in poverty, and the greatest number are concentrated in highly populated, middle-income countries (Sumner, 2012). India exemplifies this situation. Recently graduated from low to middle income status, the nation is richly endowed with natural resources[58] and human capital that have made the nation a rising economic power on the global stage (Statistics Times, 2015). Rapid rates of economic growth since 1990 have contributed to a decrease in poverty levels (World Bank, 2015a). Yet the poverty statistics within India continue to identify large numbers of people living in conditions of

[57] Extreme poverty is a condition characterized by deprivation of basic human needs, including food, safe drinking water, sanitation facilities, health, shelter, education and information. In monetary terms it is defined as individuals who live on less than $1.90 US per day (World Bank, 2016).

[58] India has the largest population of any country and has vast resources in agrobiodiversity found in places such as the Western Ghats, a global agrobiodiversity hotspot (Pattison et al., 2014; Fisher and Christopher, 2007).

poverty. The World Bank (2015a) estimates that 231 million people in India remain below the global poverty line and 191 million people are undernourished across the country (FAO, IFAD and WFP, 2014).

Development professionals maintain that there are moral and economic reasons to alleviate poverty (Carter and Barrett, 2006), and as a result a vast literature exists to understand root causes and inform policy responses to poverty (Ferreira and Ravallion, 2008; Ray, 1998; Brady and Burton, 2016; Addison, Hulme and Kanbur, 2013). Following the disciplinary standard of development growth models with diminishing returns to capital (Samuelson and Solow, 1956; Azariadis and Stachurski, 2005; Ray, 1998) the current consensus among development economists is to use household assets to seek the existence of multiple equilibria poverty traps (Quisumbing and Baulch, 2013; McKay and Perge, 2013; Hatlebakk, 2014; Lybbert et al., 2004; Naschold, 2013; Azariadis and Stachurski, 2005; Barrett and Carter, 2013). Based upon microeconomic growth principles of convergence (Ray, 1998), this literature compares assets over time to determine trends and convergence points in asset accumulation. Most studies use non-parametric approaches with single assets (Lybbert et al., 2004; Carter and Barrett, 2006; Quisumbing and Baulch, 2013) while some studies use semi-parametric approaches to delve deeper into understanding these dynamics (Naschold, 2012). The semi-parametric estimation approach provides a greater understanding of the role of covariates within the traditional non-parametric models (Naschold, 2013), but is only beginning to be explored in the literature[59].

Certain sub-groups suffer greater discrimination and must work harder to escape poverty than others. In this chapter the influence of various factors – such as ST membership and significant events – on asset accumulation is explored, but the focus is placed on women as a marginalized group within South Indian society. Women are represented at all levels of society and

[59] A more detailed review of this literature is provided in Chapter 2 and may be referred to for more information.

chronically suffer greater discrimination in income, employment and social status than their male counterparts (Chant, 2011; Government of India, 2007, 2013). In India women are over-represented among the rural poor and hold a disproportionate number of marginal agricultural jobs with low wages (World Bank, 2015a) and the National Health Survey asserts that many indicators of development - such as literacy, nutritional levels and health - are lower among women (Government of India, 2007).

Development professionals assert that promoting the rights of women has the dual benefit of enhancing individual women's wellbeing and the wellbeing of her entire household (Chant, 2011; Duflo, 2012)[60]. A branch of economic literature exploring this subject has determined that men and women typically have different preferences on what sort of items to purchase. Men statistically tend to spend more money on "status items" while women have more "benevolent" preferences and are more likely to spend their money on items that will directly benefit their family – such as nutritious food, education, or childcare (Doss, 2013; Felkey, 2013; Alderman et al., 1995; Allendorf, 2007; Haddad et al., 1997; Chant, 2011). Based upon these results, they conclude that development aid directed towards a female spouse will have a greater positive impact on household wellbeing than a subsidy that is directed to a household in general. Gendered policies thus not only can help improve the plight of women[61] but also contribute to poverty alleviating more generally if they can exploit women's greater preferences for goods that contribute to development (Felkey, 2013; Haddad et al., 1997; Doepke, Tertilt and Voena, 2012). Informed by this information and directed by the Indian Constitution[62], policymakers have created a number of schemes and self-help groups (SHGs) that designate aid for women[63] (Narang, 2012).

[60] As such, the post-2015 sustainable development agenda aims to achieve gender equality and empower all women and girls (SDG5) (Loewe and Rippin, 2015).
[61] Women's equality is a human right (United Nations, 2015)
[62] Article 15(3) of the Indian Constitution states: *nothing in this article shall prevent the State from making any special provision for women and children*.
[63] Some of these schemes include: the Rashtriya Mahila Kosh (National Credit Fund for Women), the Mother and Child Tracking System (MCTS), the Rajiv Gandhi Scheme for Empowerment of Adolescent Girls, the Indira Gandhi Matritva Sahyog Yojana Conditional Maternity Benefit plan (CMB) (Government of India, 2016d).

Closely linked with gender preferences is the ability of women to make decisions within the household. Known as intra-household bargaining power – the negotiation that occurs within a household over the purchase of different items (Friedberg and Webb, 2006) – this relationship is an integral pre-requisite for a woman to be able to act upon her benevolent preferences (Basu, 2006; Felkey, 2013). If a woman is completely subordinate to her husband, then his preferences will dictate the household expenditure patterns and wellbeing will not increase. Research on the subject asserts that a positive and linear relationship exists between enhancing women's bargaining power and household wellbeing (Khandker, 2005; Osmani, 2007; Haddad et al., 1997; Duflo, 2012)[64].

More recently, some authors have questioned the global linearity of this relationship in models (Felkey, 2013). They provide evidence that non-linear relationships exist when increasing a woman's intra-household bargaining power does not always lead to higher wellbeing outcomes for the household - but that these possibilities are relatively unexplored in the literature (Felkey, 2013; Basu, 2006; Lancaster, Maitra and Ray, 2006). Felkey (2013) suggests that a possible reason for the dominance of the linear assertion is that case studies on household expenditure and women's power are typically conducted in locations where women are distinctly subordinate to men. As such, women have very low levels of power and therefore *any* increase in women's power tends to result in a positive outcome both for the woman and for the household (Felkey, 2013). However, it also means that only a small part of the relationship between female power and expenditures on household public goods has been explored – and that at higher levels of female power this monotonic and positive relationship may take concave or even u-shaped forms (see Figure 8-1) – and provides the evidence to support this conclusion from a case study in Eastern Europe.

[64] A longstanding issue to overcome in the intra-household bargaining power literature is correlation versus causation (Doss, 2013). While causation can be difficult to confirm from statistical results, quantitative results indicating correlations can be enhanced to consider causation using qualitative data.

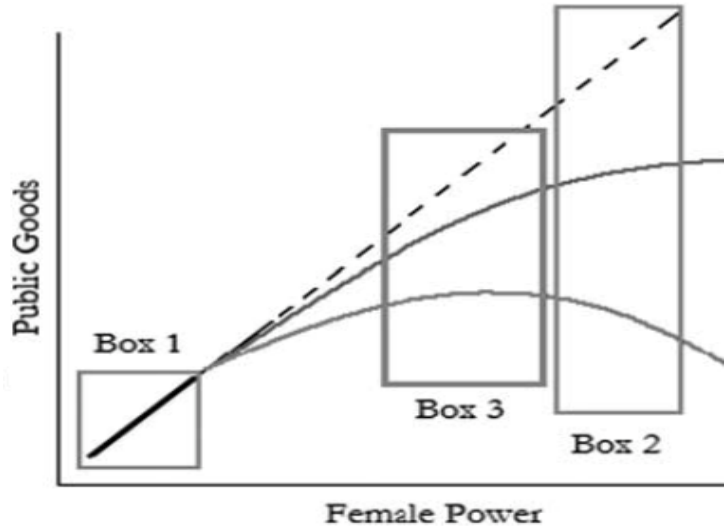


Figure 8-1. Female power effects discussed in Felkey (2013).

Her conclusion has important policy implications. First, it suggests that household subsidies directed towards women are not always the most effective use of financial aid to achieve development outcomes. When household subsidies are directed only towards more powerful women there is a point when the household expenditure on public goods actually decreases wellbeing (Felkey, 2013). While this may seem counterintuitive to prevailing development agendas (United Nations Development Programme, 2016), there is supporting evidence from social anthropological research that asserts that dynamic – and not always linear - outcomes occur in a household when spousal power relationships change (Ferraro and Andreatta, 2014). These outcomes may be endogenously determined – the husband or wife may prefer to not work for income as a cultural status symbol – or exogenously determined – local social customs may discriminate against women. Understanding the level at which female power begins to have a negative impact on household public good expenditures can allow policy makers to direct aid towards the specific spouse that will have the greatest positive impact on the household (Felkey, 2013).

I hypothesize that a similar relationship may exist when considering asset accumulation. While spousal ownership or control of assets have been used as a proxy for bargaining power in the intra-household literature

(Quisumbing, 2011; Dillon and Quiñones, 2010; Quisumbing and de la Brière, 2000; Doss, 2013; Doss, Meinzen-Dick and Bomuhangi, 2014; Beegle, Frankenberg and Thomas, 2001; Friedberg and Webb, 2006) and some poverty trap studies explore gender, asset dynamics and empowerment (Meagher, 2010; Dillon and Quiñones, 2010), the literature on multiple equilibrium poverty traps has not integrated women's intra-household bargaining power within the models. Further, to our knowledge studies within the body of multiple equilibria poverty trap literature that move beyond the conventional wisdom on positive, linear female bargaining power do not exist.

The overall goal of this chapter is to conduct econometric analysis to fill this gap in the literature by building an empirical bridge between the asset dynamics and intra-household bargaining power literature. Two primary objectives are set. First, a semi-parametric empirical model of asset accumulation will be constructed to include covariates, including individual and household demographics, women's influence, significant events and access to government services. This model will be used to identify the relationship between each of these variables and asset accumulation, and plotting this conditional asset accumulation pathway will also establish whether multiple equilibrium poverty traps exist when covariates are captured semi-parametrically and isolated in the model (versus the unconditional approach in Chapter 7). The second objective is to determine if women's intra-household bargaining power has non-linear impacts on household asset accumulation; does increasing a spouse's bargaining power will always have a positive and linear increase on assets accumulation? Our model will include three covariates on women's spousal influence: asset wealth of the female spouse, percentage share of household income, and decision-making control over asset purchases. While all three covariates are accepted proxies for bargaining power (Doss, 2013), asset decision-making control is the chosen proxy for bargaining power in this thesis.

This chapter will contribute to the literature in several ways. First, it will empirically add to the multiple equilibria poverty trap literature by testing for them in South India. At the outset there are few empirical studies of this form

conducted in South India – most of them to date have been explored using single asset households in sub-Saharan Africa (Adato, Carter and May, 2006; Lybbert et al., 2004; McKay and Perge, 2013). More important than the research context, however, is the use of the MFP semi-parametric estimation method. Most poverty trap analyses are estimated by separate non-parametric (assets only) and parametric (covariates) regressions conducted in parallel (Adato, Carter and May, 2006; Lybbert et al., 2004; McKay and Perge, 2013; Quisumbing and Baulch, 2013). Only two studies in the literature (Naschold, 2012, 2013) employ a semi-parametric approach, but the estimation approach they use requires the standard covariate selection approach based upon the literature and field experience. The advantage of the MFP estimation approach is that it allows the combination of parametric and non-parametric approaches in a single semi-parametric model, and can statistically select the functional form for designated covariates, thereby imbuing greater objectivity in the selection, significance and functional form of covariates (Royston and Sauerbrei, 2007).

Second, this study will contribute to the asset accumulation literature by including a suite of covariates – including women's intra-household bargaining power – in the model. Several authors have studied what kind of assets men and women prefer (Dillon and Quiñones, 2010; Quisumbing and de la Brière, 2000) and other authors have determined how they accumulate assets (Quisumbing, 2011), but to my knowledge no studies have included a women's bargaining power covariate in any asset accumulation models. Scholars assert that bargaining power between spouses can have significant impacts on household wellbeing (Duflo, 2012; Kanbur, Haddad and Haddadt, 1994; Haddad et al., 1997; Allendorf, 2007), so this omission is an important oversight that limits the importance of the existing literature on asset poverty traps. Using the MFP approach, the sign and significance of this covariate is determined.

Third, most intra-household bargain research assumes a linear relationship between women's empowerment and household wellbeing (Doss, 2013; Haddad et al., 1997; Osmani, 2007; Doss, Meinzen-Dick and

Bomuhangi, 2014). The MFP estimation approach allows the exploration of non-linear effects between women's intra-household bargaining power and asset accumulation, thereby contributing to the emerging positions in intra-household bargaining literature that suggests other functional forms may exist at different levels of female power (Felkey, 2013; Lancaster, Maitra and Ray, 2006; Basu, 2006). Determining the existence for such non-linear relationship is an important contribution to the literature and development policy schemes. Overall, this research provides a novel contribution to the literature by using a novel semi-parametric estimation technique to incorporate a woman's intra-household bargaining power covariate – with possible non-linear functional forms – in a multiple equilibria poverty trap model.

The chapter will be organized as follows: first, a review of relevant asset dynamics and female empowerment literature is provided. Then, an overview of the dataset employed and the empirical econometric model is presented. Third, the econometric results of four variations of an asset accumulation model are presented and the influence of covariates is identified. Fourth, the influence of women's power is identified and isolated from the other covariates to determine functional form and the impact different levels of spousal power have on asset accumulation pathways. Finally, a discussion and policy implications section concludes the chapter.

8.3 Data and Methodology

8.3.1 Data

The data used in this analysis is from the pooled DHED survey (N=896) from rural households in the Western and Eastern Ghat ranges of South India - Odisha (Jeypore), Tamil Nadu (Kolli Hills) and Kerala (Wayanad). A total household asset index is constructed using principal factor analysis (PFA), and is comprised of continuous values of agricultural land area, livestock numbers, agricultural and transportation equipment numbers, and numbers of household assets.

The total household asset comparison was based upon assets today and assets 10 years ago. This asset index was chosen over other outcome variables (income, expenditure or agricultural land) discussed Chapter 7 because it is considered to be most comprehensive indicator of household wellbeing. Ten years was the chosen time period because it was considered to be a good "intermediate" range of time to observe changes. One and five years are quite recent, and while twenty years ago suffers from greater recall bias; therefore statistical conclusions drawn from those results would be less rigorous.

As there is no explicit variable for intra-household bargaining power, the literature typically uses a proxy to capture this relationship. Common proxies are shares of shares of household income, educational status or primary purchasing control over an array of assets (Doss, 2013). While the DHED survey captures several of these proxies – including the value of assets in the female spouse's name and her percentage of income – for this analysis an index of female purchasing power over assets is used. The reason this covariate was selected over the other proxies is because our data for this covariate captures both female and male components, while the other variables only capture the female component. Question 23 of the DHED survey asks the female spouse about the purchasing decisions of household assets: "if a decision was to be made on the purchase of a designated asset, would you or your husband be the primary decision-maker?" Five alternative responses were allowed and coded:

1 - (Female spouse) makes the decision

0 - My spouse (husband) makes the decision

1 - We make the decision together and I am the primary decision-maker

0 - We make the decision together and my husband is the primary decision-maker

0 - We make the decision together and both share authority equally

If the female spouse has primary decision-making power – she makes the decision alone or is the primary decision-maker after consultation with the husband - then she gets a score of 1. There are 18 possible assets where this question is asked and a binary score of 1 or 0 is provided for each[65]. This total score is then divided by 18 to provide a continuous indicator of female spousal decision-making power for ease of interpretation. Thus the larger the number (closer to 1) the more power the spouse has; the closer to 0, the less power.

8.3.2 Econometric Model

The standard approach to estimate an asset accumulation equation is to use a univariate non-parametric method (Barrett and Carter, 2013; Lybbert et al., 2004; Quisumbing and Baulch, 2013; Azariadis and Stachurski, 2005) that compares assets across two time periods. This approach assumes the relationship between current assets and lagged assets must be estimated by fitting a function *f* through a scatterplot without making assumptions about its functional form (Naschold, 2013; McKay and Perge, 2013). The key assumption of this approach is that *f* is "smooth" and that the covariate (A_t) is uncorrelated with an error term with a normal and identical distribution of zero (Naschold, 2013). Mathematically, household assets in the future (A_{t+1}) are a function of household assets in a previous period (A_t), such that:

$$A_{t+1} = f(A_t) + \varepsilon_{t+1} \qquad (1)$$

$$\varepsilon_{t+1} \sim N(0, \sigma^2_{\varepsilon})$$

We operationalized this standard non-parametric approach in Chapter 7 using the multivariable fractional polynomial (MFP) estimation technique in our search for multiple equilibrium poverty traps under different outcome variables (income, expenditure and single and multiple assets). However, the full strength of the MFP estimation approach is in its ability to include multiple covariates in a non-parametric framework, thereby combining the strengths of

[65] The 18 assets included were: cooker stove, gas appliance, refrigerator, radio, tape recorder TV, DVD player, fixed phone, mobile phone, computer, mixer grinder, sofa set, sewing machine, furniture, mosquito nets, water pump, cable dish and water tank.

both non-parametric and parametric estimation techniques in a semi-parametrically manner.

Mathematically, a multivariable fractional polynomial function of degree $m \geq 1$ is an extension of a conventional polynomial that can be written as:

$$\text{MFP } m(x) = \beta_0 + \beta_1 x^{p1} + \ldots + \beta_m x^{pm}$$

where p is the power (functional form) such that $p_1 = 1$, $p_2 = 2$, … $p_m = m$. An MFP function is derived by generalizing the powers p_a, …, p_m to a certain fractional and non-positive value so that each p_j for $j = 1,\ldots m$ belongs to the set $S = \{-2, -2, -0.5, 0, 0.5, 1, 2, 3\}$ rather than a set of integers $\{1, \ldots, m\}$ (Royston and Sauerbrei, 2007). For a given outcome variable, the best fitting powers are selected by maximizing the likelihood of the above model over all the combinations of powers in S. When conditioned on powers, the model is linear in the transformed x's. Maximizing the likelihood is done by enumerating the models generated by all possible combinations of powers, fitting each of them in a conventional manner, and then evaluating the likelihood function of each (Stata Press, 2014; Royston and Sauerbrei, 2007).

The MFP approach is an established statistical procedure to select variables for inclusion in regressions (Sauerbrei, Royston and Binder, 2007; Stata Press, 2014) and this method is employed as the semi-parametric estimation approach for two major reasons. First, MFP statistically selects important covariates in the regression through backwards elimination of variables, using conventional statistical testing of p-values. Even with a substantial background knowledge of the literature and the local context, researchers constantly face challenges of selection of variables for regression models; this approach provides statistical assistance to this process (Royston and Sauerbrei, 2007). Second, the MFP approach checks the linearity assumption using maximum-likelihood estimation (MLE) of various models and chooses the best fit for functional form based upon pre-specified degrees of freedom. Although the MFP approach cannot entirely solve the problems

of functional form selection and omission bias, by bootstrap resampling it can find stable multivariate models to reduce this problem (Royston and Sauerbrei, 2007).

Our econometric model in this chapter therefore differs from both standard univariate asset models and the MFP model in Chapter 7, as covariates are now included semi-parametrically within the regression. Using the strengths of the MFP model, the assumption is made that assets are normally distributed with constant variance, and for each household *i*, the following expected asset function is specified:

$$E\,(A_{t+1}|.) = \alpha_0 + f_A(A_t) + f_\lambda(\lambda) + f_X(X) \quad (2)$$

where α_0 is intercept term, λ denotes a measure of female spousal power in the household, and X denotes a set of control variables such as age and education of household head. The f_j's are smooth functions that link the covariates to expected future assets. These are non-linear counterparts of coefficients in a linear regression, and f_j are estimated from the data using the multivariate fractional polynomial (MFP) approach (Stata Press, 2014).

MFP models are estimated through a statistical algorithm that processes the selected covariates in sequence (Stata Press, 2014). Initially, the covariates are treated linearly and arranged in order of decreasing statistical significance (based upon p-values), to identify the relative importance of each covariate. After this, the best fitting function for the first covariate is determined, and all other variables are assumed to be linear. Retaining the most significant functional form for the first variable, this same process is repeated for each consecutive covariate in turn and this first iteration of the model is only complete when all the covariates have been processed in this way (Stata Press, 2014). The next iteration is done similarly, except that the functional forms from the initial cycle are retained, except for the one currently being processed. This process continues for each functional form until the functions and variables included in the overall

model do not change – or “convergence” is achieved (Stata Press, 2014); this is often achieved within 1-4 cycles, depending upon the model.

In summary, in this research the asset variable is statistically permitted to appear non-linearly, and the MFP approach statistically selects the functional form in the asset accumulation pathway (Royston and Sauerbrei, 2007). This estimation has several advantages: 1) simultaneous inclusion of multiple explanatory variables; 2) individual covariates are able to nonlinearly influence the outcome variable; 3) the degree of non-linearity in the model is not imposed, but determined from the data using a backward algorithm based upon statistical tests; 4) MFP is considered to provide a better fit from expected to actual outcomes than conventional polynomial models; and 5) allows for non-parametric assumptions within a parametric model, using maximum likelihood estimators (MLE) (Sauerbrei, Royston and Binder, 2007). To our knowledge this approach has not been used in the poverty trap literature and has great potential to assist in identifying the determining factors of poverty.

8.3.3 Empirical Specification

Selection of appropriate covariates and their influence on asset accumulation provides the basis of the empirical model. In this subsection each covariate included in our model is reviewed and the expected signs based upon the literature are given to give legitimacy and comparison for the results. Rationale for the selection of the covariates is explained in the context of established development literature and fieldwork experiences. Four categories of covariates are included in the model: initial asset levels, household characteristics, female empowerment, and significant events. The descriptions, summary statistics, and expected signs are summarized in Table 8-1 below.

The first determinant of asset accumulation is the initial level of household assets. As previously explained, due to statistical estimation

challenges (Barrett and Carter, 2013; Naschold, 2013) initial period assets are often the sole determinant of asset accumulation considered in previous non-parametric analyses. In our data the mean value of the asset index[66] 10 years ago is 0.01 with significant variation around the mean across observations. We expect that initial household assets 10 years ago will have a positive influence on current asset accumulation. This conclusion is supported by the existing asset accumulation literature (Hatlebakk, 2014; Barrett and Carter, 2013; Quisumbing and Baulch, 2013; Lybbert et al., 2004) and also our results from Chapter 7.

Household characteristics are standard covariates to include in regression analysis, and have been found to parametrically influence asset accumulation in previous studies (Carter and Barrett, 2006; Quisumbing and Baulch, 2013). The first sets of household variables considered are structural characteristics of the household. First, household size is analysed. In this sample there is an average of 4.6 individuals per household, and this covariate is expected to have either positive or negative signs, based upon the literature. Nayak, Behera and Shillong (2014) find that household size can have different impacts on the household poverty dynamics, as more members can either add to the general level of assets or consume more than the family has available. Second, STs status of the household is analysed. 62 per cent of the sample household are STs, and literature tells us that this variable should have a negative sign in the regression, as multiple studies have shown that the marginalization of STs has led to a much lower level of assets than non-ST households (Haseena, 2015; Mohapatra, 2011; Deininger and Liu, 2013). We also include dummy varibles for the site locations: 34 per cent of households are from Jeypore, 34 per cent are from Wayanad and the remainder is from Kolli Hills. Our expectation of signs for these variables depends on our source of background information. Based upon the state-level literature on wellbeing where these research sites are located, Wayanad is expected to have a positive sign, Kolli Hills to be neutral, and Jeypore to be negative (Wayanad District, 2016; Odisha Government, 2016; Narasimhan,

[66] Recall this index is calculated through the PFA approach.

2012). However, if the expectation is based upon district level data and FGD information, Jeypore will have a positive influence on asset accumulation, and Kolli Hills will have a negative sign due. As these are dummy variables in the regression, Kolli Hills is statistically considered the base and the other locations are relative to this base level.

The second set of household variables included is characteristics of the household head. Years of education is expected to positively influence asset accumulation, based upon the importance of human capital growth in the development literature (Ray, 1998) and empirical studies showing that higher education levels decrease levels of poverty (Santos, 2009). The average years of education for household heads in this sample is relatively low at 2.9 years. We also consider age of the household head. The average age in our sample is 47.2 years, with a high standard deviation. Literature tells us that this variable could have either positive or negative signs: older household heads may be less willing to engage in new opportunities, but they have experience that generally increases the wellbeing of the household (Moore, 2001; Gale and Scholz, 1994). In this model, however, it is expected to be positive as the older household heads should have more experience and time to accumulate assets (Moore, 2001). Finally, gender of the household head is analysed. Females head 15 per cent of households in this sample, and this covariate is expected to have a negative influence on asset accumulation. The lower status of women in Indian society and fewer (and lower) income earning opportunities for women identified in other studies (Quisumbing, 2011; Adato, Carter and May, 2006; Government of India, 2007) lead us to this expectation.

The third category of variables included in the model is related to women's influence in the household. Three variables capture this influence: women's value of personally owned assets, percentage contribution to household income, and bargaining power, measured as the number of household assets that a female spouse has the primary purchasing decision

power over[67]. The average wealth of assets in the woman's name in our sample is 42,643 INR with a large variance across observations. We expect that women's wealth will have a positive sign, as literature indicates household wellbeing increases when women are more wealthy they will spend more on the family (Chant, 2011; Haddad et al., 1997; Alderman et al., 1995). Spousal share of income is measured in our analysis and the average contribution of the female spouse to household income is 20.6 per cent. A positive impact on asset accumulation is intuitively expected, as literature shows that income from a female spouse is often directed towards household expenditures that will benefit the household wellbeing (Doss, 2013; Haddad et al., 1997); however a negative relationship may also occur based upon lower earning possibilities for women. That is, if the husband is unable to work and the woman is not able to earn as much for her labour, then the entire household will have lower wealth to accumulate assets (Chant, 2011). Finally, intra-household bargaining power is explicitly determined – our "covariate of interest" – as the level of household assets that a woman has primarily decision-making power over. In our sample, women have an average primary decision-making power over 11 per cent of assets within the household. Based upon conventional insights from the intra-household bargaining literature (Doss, 2013), this covariate is expected to have a positive influence on household asset accumulation due to the benevolent preferences of women that focus on child health and education – as their power increases they will be able to have greater influence over the household decisions that will lead to these outcomes. However, the possibility that a non-linear relationship may exist is considered, similar to the power relationship with household expenditures found by Felkey (2013) and Lancaster, Maitra and Ray (2006).

Finally, covariates on significant events and government assistance are included. First, significant *positive* events occurring in the last 10 years are captured, and the data indicates 53 per cent of households have experienced

[67] The use of decision-making power over asset purchases is a proxy for women's power affirmed and discussed by Doss (2013) in a review of the economic intra-household bargaining power literature.

such events in the last decade. These events include inheritance of assets (land or livestock), new crop production technologies, government scheme assistance or migration for labour. In contrast, 45 per cent of households have experienced negative events during the same period. These events primarily include climatic shocks (droughts or floods) or health problems (death or illness) experienced by any members of the household. The expected signs on these variables are intuitive: positive significant events (shocks) are expected to have a positive influence on asset accumulation (Santos et al., 2011), while negative events are expected to have a negative influence (Santos et al., 2011; Gaiha and Imai, 2004).

Government assistance is captured by participation in MGNREG and a count of public services available to the household. Employment in the MGNREG government scheme – a form of positive shock – is expected to have a positive sign (Mann and Pande, 2012). However, only 29 per cent of household heads have participated in MGNREG and so this covariate may not have a strong influence on asset accumulation. A count of the number of public services available to the household is also included in the model. Access to such services is expected to have a positive sign. Out of 15 possible services provided by the government 10 years ago - such as health center, schools, libraries, fire departments, etc. – households on average had access to 13.1 of the total possible, with small variation.

Table 8-1. Variable definitions, descriptive statistics and predicted signs of covariates within the asset accumulation model.

Variable	Mean	SD	Predicted Sign	Variable Description
Asset Index 0	0.014	1.01	+	Index of total household assets in the current year
Asset Index 10	0.01	1.01	+	Index of total household assets 10 years ago
Age of Head	47.12	14.03	+/-	Age in years
Education of Head	2.85	1.94	+	Highest education level achieved by the household head
Female Head	0.15	0.35	-	Dummy variable; 1 if head is female

Tribal	0.62	0.49	-	Dummy variable; 1 if household is ST
Landed	0.07	0.25	+	Dummy variable; 1 if household is landed
HH Size	4.61	1.85	+/-	Number of household members
Women's Wealth	13,103	30,032	+	Value (INR) of household assets in woman's name
Spousal Share of Income	20.60	24.26	+	Percentage of income owned by the female spouse
Women's Power	0.11	0.29	+	Composite index; 1 if woman has complete control over purchase of household assets
Jeypore	0.34	0.47	+/-	Dummy variable; 1 if household was from Jeypore
Wayanad	0.34	0.47	+/-	Dummy variable; 1 if household was from Wayanad
Positive Shock	0.53	0.49	+	Dummy variable; 1 if household experienced a positive shock in the last decade (base = Kolli Hills)
Negative Shock	0.45	0.49	-	Dummy variable; 1 if household experienced a negative shock in the last decade
MGNREG	0.29	0.46	+	Dummy variable; 1 if household has members using MGNREGA
Public Services	13.1	1.9	+	Count of the total number of public services available 10 years ago (15 possible)
N	866			

8.4 Empirical Results

This section provides the regression results from our empirical model. First, four different models are described; the signs and significance of each covariate are discussed. Second, the graphical form of the relationship derived from Model 2 (women's influence model) is presented and the conditional and unconditional asset accumulation pathways are compared. Third, the relationship between the female bargaining power variable and asset accumulation is explicitly modeled. Each section focuses on results and interpretation that will be used to inform the discussion at the end of the chapter.

8.4.1 Covariate Results

Four different specifications of the model are provided as a robustness test for our conclusions – that is, to determine whether the same signs and

significance occur across the models when additional covariates are added. Model 0 is the preliminary unconditional model that includes only previous period assets; Model 1 is expanded to include control variables on household demographics and locations; Model 2 is expanded to include women's influence variables and household bargaining power; and Model 3 is expanded further to include household shocks and government provisions. All analysis for this section was conducted in the computer software package STATA 14 (Stata Press, 2015).

Results from the four model specifications are provided in Table 8-3. All four models include previous period assets as the first covariate in the regression. The coefficients on this variable across all models confirm that initial assets have a highly significant relationship on future assets. Further, the MFP estimation indicated linear, squared and cubic forms in Model 0, and retained the linear and squared functional forms in the consecutive models; the linear form showed a positive coefficient, and a negative coefficient was found for the squared form. Intuitively, this tells us that previous period assets have a large influence on asset accumulation initially, but that this influence diminishes as asset levels get higher. These results are consistent with the non-linear outcomes identified in the unconditional analysis presented in Chapter 7, but shows no evidence multiple crossing of the 45-degree line, as required for the existence of a multiple equilibria poverty trap (Figure 8-3).

Table 8-2. Covariates and their statistical relevance to asset accumulation pathways in three MFP regressions conducted on the pooled data from research sites in Jeypore, Kolli Hills and Wayanad.

Variable	**Model 0: Unconditional**		**Model 1: Demographics**		**Model 2: Women's Influence**		**Model 3: Significant Events**	
	Coeff.	**SE**	**Coeff.**	**SE**	**Coeff.**	**SE**	**Coeff.**	**SE**
Constant	0.055**	(0.026)	0.215***	(0.053)	0.157**	(0.080)	0.135***	(0.084)
Asset 10 Yrs. Ago	0.352***	(0.031)	0.227***	(0.019)	0.221***	(0.019)	0.217***	(0.019)
Assets 10 Yrs. Ago Squared	-0.328***	(0.037)	-0.025***	(0.003)	-0.024***	(0.003)	-0.024***	(0.003)
Assets 10 Yrs. Ago Cubed	0.079***	(0.011)						
Age of Head			0.003**	(0.001)	0.003**	(0.001)	0.003*	(0.001)
Education of Head			0.048***	(0.010)	0.043***	(0.010)	0.042***	(0.010)
Female Head			0.128**	(0.051)	0.266***	(0.058)	0.257***	(0.058)

Tribal Membership	-0.193***	(0.043)	-0.175***	(0.042)	-0.164***	(0.042)
Landed	0.084	(0.067)	0.077	(0.065)	0.099	(0.064)
Household Size	-0.417***	(0.114)	-0.423***	(0.112)	-0.423***	(0.112)
Jeypore	0.268***	(0.048)	0.180***	(0.049)	0.065	(0.068)
Wayanad	0.644***	(0.055)	0.454***	(0.062)	0.347***	(0.076)
Women's Wealth			0.362***	(0.133)	0.346***	(0.132)
Women's Wealth Squared			-0.877***	(0.133)	-0.843***	(0.133)
Women's Wealth Cubed			0.472***	(0.101)	0.448***	(0.101)
Women Share of Income			-0.001	(0.001)	-0.001	(0.001)
Women's Power			10.074**	(4.204)	9.951**	(4.189)
Women's Power Squared			-10.250**	(4.254)	-9.969**	(4.239)
Women's Power Cubed			15.246***	(5.357)	15.070***	(5.336)
Positive Shock					0.176***	(0.050)
Negative Shock					-0.020	(0.044)
MGNREGA					-0.018	(0.041)
Public Services 10 Yrs. Ago					-0.002	(0.130)
N	866	866	866		866	
R2	0.693	0.770	0.789		0.792	

Model 0 is the introductory univariate model that is similar to the non-parametric models conducted in the existing literature (Quisumbing and Baulch, 2013; Hatlebakk, 2014; Adato, Carter and May, 2006; McKay and Perge, 2013; Lybbert et al., 2004). The only determining variable for asset accumulation is assets at the initial period 10 years ago. The regression retains significant non-linear functional forms on the previous period assets, resulting in an s-shaped curve but no multiple equilibria. This covariate is retained across all models in this regression and maintains its significance across the linear and squared functions forms; however the cubic form is not retained in the models with more covariates.

Model 1 establishes the impact of demographic and household characteristics on the asset accumulation pathway. The coefficients of age and education levels of the household head suggest that there is a significant

positive relationship between these variables and asset accumulation. Age was determined to be positive, significant and linear; those homes that have an older head have a higher level of assets than households with a younger head. Scholars have suggested that a reason for this response is that older individuals have had more time to accumulate assets, are risk-averse and more ready to save financially (Manjunatha et al., 2013). In terms of education, our results are similar to other literature that shows empirical evidence that education (human capital) is a driver of development (Ray, 1998; Santos, 2009). The coefficient on female headship also indicates a significant and positive relationship on asset accumulation. This result is different than expected based upon the literature, which generally concludes that female headed homes in India face greater discrimination and fewer opportunities (Government of India, 2007, 2013; Meenakshi, Ray and Gupta, n.d.; Chant, 2011).

Household level indicators, such as household size and location, also indicate a significant relationship with asset accumulation. Household size has a negative, significant and linear impact. The literature tells us that the sign could be either positive or negative on this variable – sometimes members contribute more than they take away (Holvoet, 2005) but in these research sites larger families exert a negative and significant influence on asset accumulation. Dummy variables for research location indicate households in Jeypore and Wayanad have a significantly positive and linear relationship to asset accumulation than households in Kolli Hills – the base site. This result affirms our expectations derived from the FGD results and is more in keeping with district level data, but contradicts the state-level literature where the research sites are located: Tamil Nadu (Kolli Hills) is better off than Odisha (Jeypore) (Government of India, 2013).

Finally, marginalized status is considered. Households from STs have a significant negative impact on asset accumulation. This was an expected sign and is similar to the national level census data and research studies across India that indicate the social and economic discrimination of these communities is keeping them within poverty (Census of India, 2011; Nithya,

2014; Sahoo, 2011; Kirubakaran, 2013). In all three models described in Table 8-3 above, the signs and significance of these demographic and household covariates is remains consistent, affirming the robustness of these results. Landed households do have a positive influence on asset accumulation, but it is insignificant across all models.

Model 2 builds upon the household covariates identified in the first analysis by incorporating the three variables of women's influence. The first covariate, women's wealth (value of assets in the female spouse's name) has a significant and non-linear impact on household asset accumulation: linear, squared and cubic functional forms were retained in the MFP estimation. This result tells us that initially, women's wealth has a positive relationship on asset accumulation. However, as the women's asset wealth increases, there are diminishing returns and a negative squared functional form; intermediate levels of asset wealth do not enhance household asset accumulation. However, at higher levels of personal asset wealth this functional form changes to cubic and positive, indicating that once a woman has more asset wealth the household again benefits. This result may reflect different gender preferences in asset selection, and that possibly the type of assets a female spouse owns at different levels of power has a direct impact on household wellbeing (Quisumbing, 2011).

The second covariate within this model is the female spouse's contribution to household income. Counter-intuitively, a negative and linear relationship was identified between increasing female income contribution and asset accumulation. This result should not be interpreted as a signal against women increasing their relative share of income, but could reflect a common situation in these contexts where employment and wage earning opportunities for women is lower than men (Government of India, 2013). As a result, higher contributions of female spousal income may reflect a local situation where the a husband is not able to work and the wife earns a higher percentage but the overall household income is lower (Doepke, Tertilt and Voena, 2012; Chant, 2011; Breitkreuz et al., 2014). However, this result is insignificant across both

Model 2 and 3, thereby limiting the impact of any conclusions drawn from this analysis.

The covariate representing women's bargaining power also had a significant and non-linear influence on household asset accumulation. The initial linear form is positive and significant, supporting the literature that asserts women's intra-household bargaining power has a positive influence on household wellbeing at early stages of development (Doss, 2013). However, the squared functional form retained by the MFP estimation indicates a significant, negative relationship at intermediate levels of women's power. Finally, the estimation retained a significant and positive cubic functional form at higher levels of women's power. This non-linearity affirms similar u-shaped and "decreasing returns to power" evidence from other scholars on expenditure on public goods (Lancaster, Maitra and Ray, 2006; Basu, 2006; Felkey, 2013). Empirically identifying this non-linearity with respect to asset accumulation is unique. This relationship will be explored in more depth in the follow section. The significance, signs and non-linear functional forms for this covariate are retained in Model 3.

Finally, Model 3 is estimated to both test the robustness of previous models and provides additional insight on the influence of significant events and access to public services to asset accumulation. Dummy variables for positive (inheritance, government programmes, new crop varieties) and negative (health or climatic disasters) shocks experienced over the last decade were included. As expected, positive shocks have a positive, significant and linear impact on the asset accumulation trajectory. Negative shocks have a negative sign, but are not statistically significant. MGNREG participation has a negative sign, but the impact of this result is limited by the lack of statistical significance. The number of public services available to the household was unexpectedly found to be negative and linear, but is statistically insignificant.

8.4.2 Dynamic Asset Accumulation Pathway

The dynamic asset accumulation pathway from the MFP analysis provided above is graphically presented in Figure 8-2. The current assets are modeled on the y-axis, and the previous period assets (ten years ago) are on the x-axis. The black 45-degree line again indicates points where these two values are the same - above the line is where assets are greater than previous periods and below the line is where they are less. Two pathways are presented in the analysis: an unconditional pathway when the only covariate included is previous period assets, and a conditional pathway when influence of all the other covariates have been excluded from the pathway. Several insights are evident.

First, the “unconditional” pathway of asset accumulation based only upon previous period assets shows a clear s-shaped line. A single equilibrium point is evident at a previous period asset index of approximately 2, and at lower levels of the asset index the line almost touches the 45-degree line. However it only crosses once and therefore the conclusion is that no multiple equilibria poverty traps exist.

Second, the “conditional” pathway of asset accumulation derived from Model 2 indicates the relationship when the influence of covariates has been removed and accounted for in the MFP results. This pathway continues to show an s-shaped curve with one equilibrium point. While no multiple equilibria poverty traps are evident, the pathway is much more smooth than the unconditional pathway, which is expected as the conditional pathway removes the influence of covariates from the household model and retains them in the coefficients of the MFP model. Therefore the single equilibrium point is lower, at approximately 0.2, suggesting that for the average household poverty levels are lower than what is suggested by the steady equilibrium point indicated in the unconditional model that only provides the influence of previous period assets.

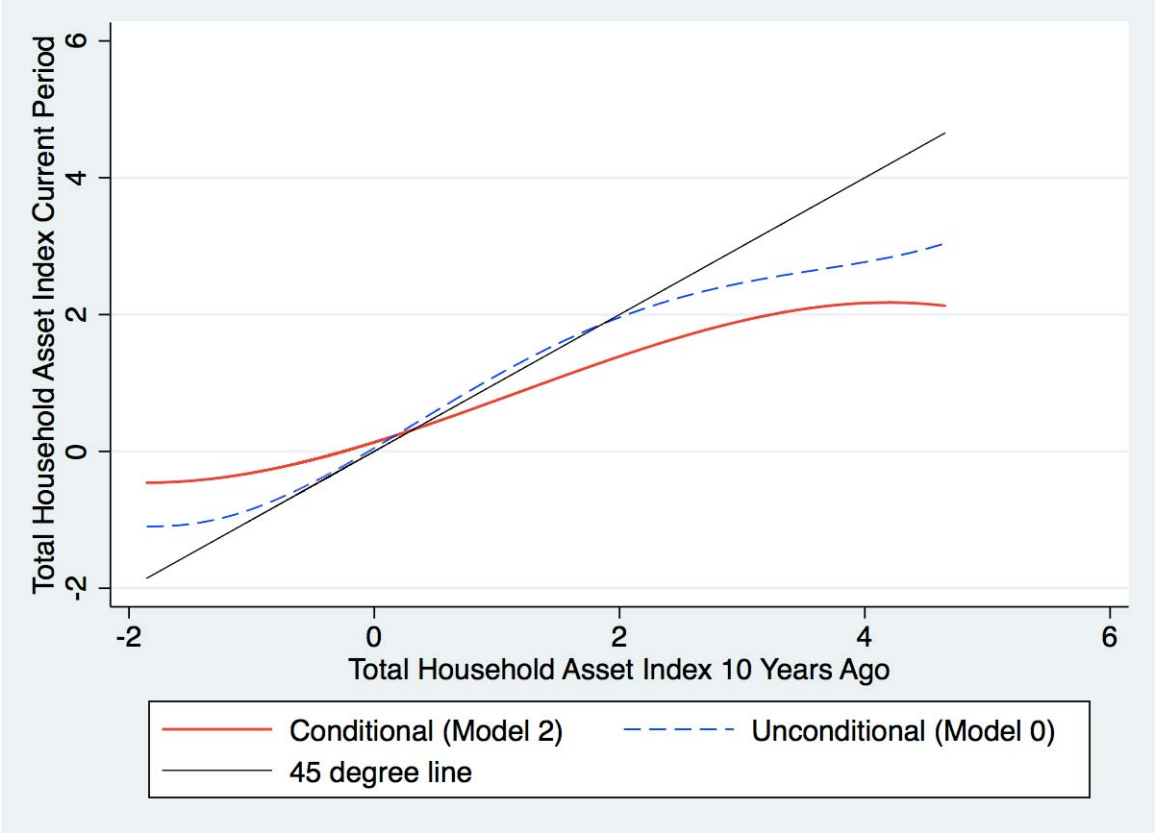


Figure 8-2. Total household asset accumulation pathway conditioned upon covariates and derived from pooled data from research sites in Jeypore, Kolli Hills and Wayanad.

8.4.3 Female Power Dynamics

One of the objectives of this chapter is to enhance our understanding of the role female intra-household bargaining power has on asset accumulation. Therefore in this section the influence of women's empowerment – the covariate $f_{\lambda,}$ – is isolated and analysed. A partial predicted value is determined that represents expected total household assets (holding other covariates constant) and plot it against the women's power variable to graphically observe the non-linear effects reported in Table 8-3. For the theoretical shapes of the expected asset function, the conceptual hypothesis provided by Felkey (2013) regarding the nature of female power effects on household public good spending (Figure 8-1) is used as a framework but applied to asset accumulation.

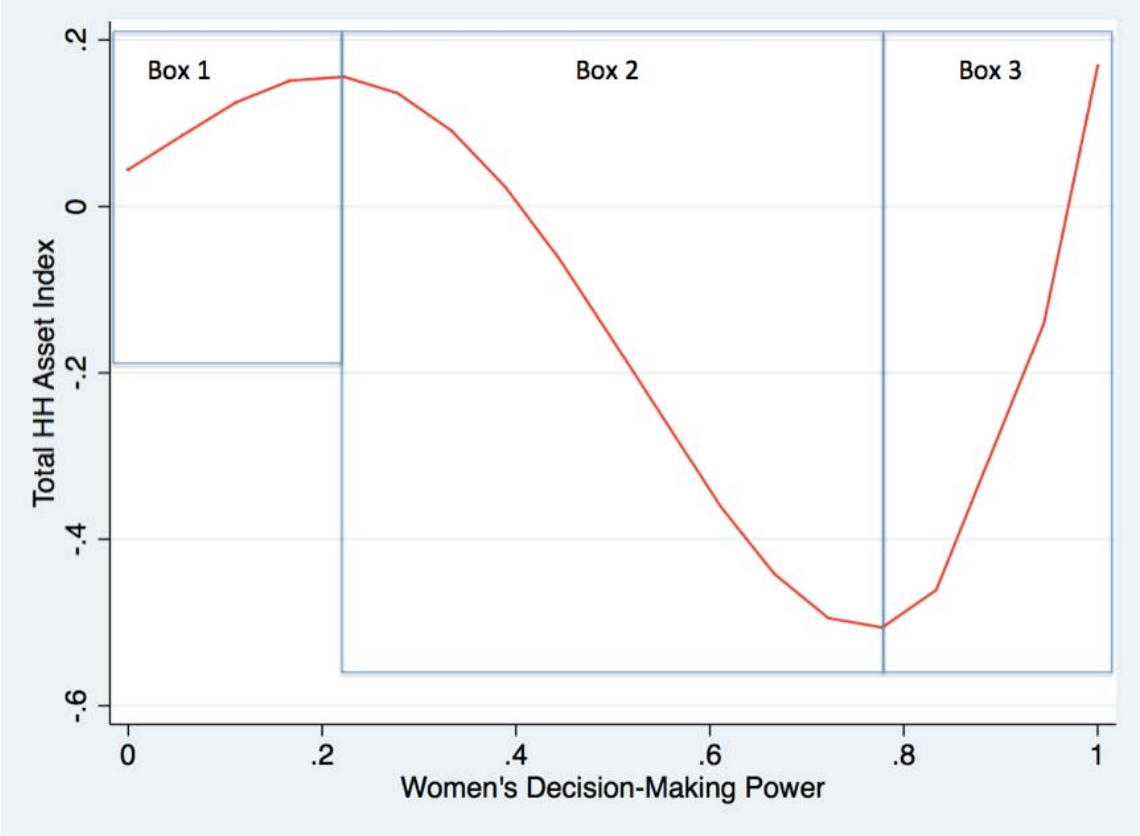


Figure 8-3. The relationship between women's decision-making power and household asset accumulation.

A distinct non-linear shape is evident in Figure 8-3 that clearly shows the impact of changing women's power on asset accumulation in the current period. The influence of women's power shows positive and depressing effects on asset accumulation depending on the level of power the female spouse has relative to the husband. Breaking down the graph into three "boxes" that represent the different functional forms assists in interpreting this dynamic relationship. Box 1 represents household conditions where a female spouse moves from zero to very low decision-making power – possibly the difference between being married to a socially conservative husband or to a socially progressive husband. During this stage the linear assumption of development models holds: the overall asset accumulation pathway and wellbeing of the household increases. Then the curve peaks and inflects downwards in Box 2. This possibly represents a progressive family living a village that is remote and socially conservative. While the wife retains the

power in the household, she cannot contribute economically to the household in the same way as before and the asset levels drop. This situation holds until women reach a higher level of power and become “immune” to the local conservative customs. At approximately 0.8 there is an inflection point where the relationship shifts back to a positive relationship between increased levels of power on household asset accumulation (Box 3). The family has been in the village long enough to gain the social status to refute social norms: she does not need to worry about the social implications of being involved in activities traditionally associated with males - such as teaching or running her own business – and can therefore bring a positive contribution to the household’s asset accumulation.

8.5 Discussion

The conditional poverty dynamic analysis in this chapter has provided insights to respond to the third research question of the thesis – the effect of covariates on household asset accumulation in general and specifically the role of spousal bargaining power. This deeper understanding of the roles, magnitude and functional form of various covariates allows for clearer understanding of the factors influencing wellbeing development in these regions, and provides a foundation for more precise policy design approaches to alleviate poverty. Several major implications can be drawn from the results: 1) contribution of the MFP methodological approach; 2) the influence of various covariates on the asset accumulation pathways; 3) the influence of spousal bargaining power; and 4) new insights for policy design.

The semi-parametric analysis is based upon the multivariate factorial polynomial (MFP) estimation approach. The ability of this econometric technique to incorporate multiple explanatory variables into the asset accumulation pathway is invaluable, as it not only explains the magnitude, significance and direction of influence (positive or negative) of the covariate in question, but it also selects the non-linear functional forms based upon statistical significance and not simply previous literature insights. MFP

therefore allows a level of impartiality – or letting the data tell researchers what is going on – that is not found in other approaches (Sauerbrei, Royston and Binder, 2007). It is my belief that this semi-parametric approach could be employed in place of other parametric, non-parametric (LOWESS) or even semi-parametric approaches that are currently in the literature as it combines the advantages of all three with greater statistical objectivity.

The influence of these covariates on asset accumulation in general is observed in the graphical results of the model. In comparison with the unconditional model where heterogeneous household are grouped together, when covariates are included in the analysis – creating a more homogenous group of households with similar determinant features – there is a "flattening" of the dynamic asset accumulation pathway and a lowering of the equilibrium point.

Specific covariate results are also important and affirm much of the development literature. Education was found to be positive, significant and linear (Santos, 2009) and affirms government support to enhance education in these areas – especially as there is such a high rate of illiteracy among the three research sites. Age is also positive, significant and linear. This result could be a function of careful accumulation of assets over time, or land inheritance in GEN2. Shrinking land inheritance and youth moving to the cities for employment may change this outcome in the future. Increasing household size has negative and significant relationship, indicating that the collective provision of income or assets is not proportional to the number of people in the household – and that government schemes to assist larger families through house provision, employment opportunities or childcare could have a positive impact.

Membership in the ST population results in a linear and negative correlation with asset accumulation. This result affirms the stigma and social disempowerment discussed in (Gang, Sen and Yun, 2008; Mosse et al., 2002) and evidenced in the most recent national data (Census of India, 2011). Focus group discussion insights also affirm this result – in particular in the

Kolli Hills where almost the entire population is ST. One particular issue that rose again and again in those focus groups was the severe negative impact of alcoholism on the ST populations. Although confined to government shops, participants claimed a large black market of alcohol was rampant in the Kolli Hills and was destroying the husband's ability to work and leading to domestic abuse, lack of funds and ultimately descent back into poverty.

One of the most powerful results from this analysis is the relationship between spousal decision-making power and asset accumulation. The u-shaped, non-linear relationship between women's power and asset accumulation is different to the standard assumptions in the literature (Haddad et al., 1997; Chant, 2011) and more similar to the alternative non-linear position explored by other scholars (Felkey, 2013; Basu, 2006; Lancaster, Maitra and Ray, 2006). This distinct non-linear relationship between women's power and household asset accumulation is shown econometrically in the models. The MFP regression results for women's power in Table 8-2 reports linear, significant squared and cubic functional forms with positive, negative and positive coefficients, respectively. It is empirical evidence that increasing women's power has a dynamic relationship with wellbeing could be used to maximize the potential of poverty alleviation schemes. Although this conclusion has been posited by gender researchers, they have explored this effect primarily from a qualitative position (Chant, 2011; Felkey, 2013) and the empirical backing from this research is important.

Interpreting these results and the situations where they occur is aided by previous literature and informed by my experiences in the FGDs. Women in each location gave responses indicate varying levels of power over time that provide insight into reasons for the non-linearity and represent the different Boxes shown in Fig. 8-3 and described in section 8.4.3 above. In Wayanad, several women expressed that their husbands made all the decisions in the household; these women represent Box 1. Therefore government schemes that promote women's access to assets actually would increase their ability to contribute to the household, thereby enhancing the wellbeing of the household. In Jeypore, a STG1 woman spoke of the loss of

power resulting from the patriarchal influence of non-ST settlers in the area. A women in her household and community typically held a similar level of power to her husband, but due to external social influences women's contribution to household asset accumulation had decreased; this situation represents Box 2. Finally, in Kolli Hills and Jeypore there were several women who had their own businesses and had significant power in the home. Although there were strong social barriers preventing women in their communities, they were not influenced by these factors and their household asset accumulation could rise unfettered. This situation represents Box 3.

From these FGD insights, an example of a hypothetical couple provides an intuitive understanding of the shape of these graphs and how they provide a new understanding of the correlation – and possible causation – between women's power and asset accumulation. Consider a woman who is married to a very socially conservative man (Husband A) who holds all the decision-making power in the household and does not allow her any influence over household decisions. Due to her lack of freedom to exercise her benevolent preferences, her productivity is limited and therefore the household's productivity is limited. This is a common occurrence in many parts of South India (Government of India, 2007). Conversely, consider the same women married to a different husband (Husband B) who is progressive, values gender equality and shares decision-making in the household. As the woman can now exercise her preferences, her individual productivity and that of the entire household increases. The husband may support and encourage her to seek employment outside the home – possibly starting teaching in a local school or college. The wellbeing of the household increases.

Suppose this same woman and Husband B live in a community that is socially conservative and very remote. In this context, she is unable to find work outside of the home du to social customs and limited diversity of employment opportunities. While she still holds more power within the household, she has less ability to contribute to the household wellbeing, and asset accumulation declines. However, over time this family has lived in the village long enough to obtain a higher social status in the community, and

their actions are less determined by social customs. In this scenario, the woman is able to refute local customs begins to exercise her power again outside of the home – possibly in the same teaching profession before. The wellbeing of the household again increases.

This example is a way to interpret the non-linear graphs of women's power where household asset accumulation on the x-axis and women's power on the y-axis. When the woman is married to Husband A, she has low power and the household has few assets. When the woman is married to Husband B then her power increases and the graphical relationship will be positive and more vertical (Box 1). However, if they move to a conservative village, then the asset accumulation relationship will be negative and downward sloping (Box B). Finally, when she increases her social status – or time and external factors have made the community is more progressive – then the slope becomes positive and upward sloping again (Box C).

The impact of such non-linear results also has significant policy design implications. For these households policy schemes that continue to provide direct subsidies will likely lead to higher asset accumulation and wellbeing outcomes (Felkey, 2013). However the awareness that dynamics shift as power shifts is essential to comprehend in order to *continue* to enhance household wellbeing. Once most of these households reach the 0.2 inflection point and enter into "Box 2" different policy approaches will be necessary. These policy actions will also need to be informed by the cause of this negative influence. Endogenous factors will require different responses than exogenous ones. For example, if the exogenously determined social and cultural norms of an area do not consider women engaging in financially lucrative work outside the home be socially acceptable (Chant, 2011) then government education programmes targeting women may assist to promote wellbeing. If there are endogenously determined factors where a husband does not want to have his wife to be working outside the home – it could be perceived as a signal that he cannot provide for his family (Meagher, 2010; Chant, 2011) – then alternate strategies may be more appropriate. Further understanding and exploration of the causal factors for sharp increase of

asset accumulation in Box 3 is important. Does the wife now have enough influence to overcome the social barriers and establish her own business? Any policy that is focused on the power of women needs to be aware and compensate for this changing role of women, and encourage more community level women empowerment and access to business and industry.

A final point to consider are the gender power differences between non-ST and ST households. In FGDs it was evident that ST households traditionally had a strong concept of equality and respect for women. One example of this the common use of the bride-price system within ST communities, where the man had to pay the woman's family upon marriage (Goody and Tambiah, 1975). It was not until the non-ST population settled and expanded in the marginal mountain communities traditionally occupied by the ST that this long-held equality was challenged and the dowry system was encouraged (Xaxa, 2004; Anderson, 2007). Thus the power of women in the household decreased.

8.6 Conclusion

Overall, the information provided in this chapter contributes to the asset-based poverty trap literature, bridges the asset literature with the intra-household development literature and provides some important insights to poverty alleviation strategies of the Indian federal, state and local governments. It must be emphasized that the spousal bargaining dynamic is complex and that results drawn from our proxy – power over the purchasing of assets – must be taken as an indication of a trend and not as a hard rule[68] –. Better proxies should be employed in future research. However it is an indication that the general assumption in the economic literature that empowering women has a significant, positive and linear relationship at all levels of female power is not true in call cases (Felkey, 2013; Basu, 2006). Further discussion of these conclusions and limitations to the analysis will be provided in the concluding chapter of this thesis.

[68] While the conclusion from purchasing power over assets is not ideal, it is supported by the results from the women's wealth covariate.

8.7 Highlights

- MFP provides an innovative semi-parametric solution to combine the traditional parametric and non-parametric approaches of identifying the factors to poverty alleviation.

- ST membership is observed to have a negative, linear and significant influence on asset accumulation. More targeted schemes and institutional transformations may be necessary to assist these marginalized segments of the Indian population, particularly in these remote mountainous areas. Evidence from FGDs indicates that the locations suffering the most in this regard are Kolli Hills and Wayanad, while Jeypore seems to have a better outlook for ST households.

- Non-linearity observed in women's power, showing a trend of positive, negative and then increasing influence on asset accumulation. This result challenges standard economic assumption of female power in developing countries that assumes a linear and positive relationship. The policy implication is that schemes to promote women's empowerment and poverty alleviation will influence households differently depending on the context of the household and if women's power is limited by endogenous household factors or exogenous social factors.

9. RESULTS: POLICY PERSPECTIVES

9.1 Chapter Summary

This chapter extends the discussion of the previous chapters by exploring the perceptions among focus group and survey participants regarding government schemes. Specific government schemes were identified through a critical ethnographic approach from FGDs and a review of the pertinent literature. Responses were thematically grouped and complemented by questions from the DHED survey. Results indicate that despite challenges in implementation (such as corruption, delayed distribution time and lack of awareness) government support via an assortment of schemes has been a major driver of wellbeing advancement in all research locations. Schemes of significant importance include the housing scheme Indira Awaas Yojana (IAY), Mahatma Gandhi National Rural Employment Guarantee Scheme **(**MGNREG) and the Public Distribution System (PDS). Other schemes that have played a significant yet more discreet role include the Pradhan Mantri Gram Sadak Yojana (PMGSY) road scheme and electricity provision schemes. Lessons for enhancing effectiveness revolve around fair access to schemes, faster rollout and expansion of existing schemes, particularly IAY.

9.2 Introduction

Government policies often play a significant role in assisting communities, households, and individuals to escape poverty. The responsibility of governments to care for their citizens has both the moral and economic (Barrett and Carter, 2013) incentives identified in the Chapter 1. Despite its recent economic growth, India has the largest number of poor and malnourished people of any country on the planet (FAO, IFAD and WFP, 2014). In response, India has established a large array of universal and targeted government schemes to ensure basic levels of wellbeing and promote elevation from conditions of poverty (Government of India, 2016d).

The response to the poverty trap and trajectory insights derived from the analysis relies primarily upon government response. A motivation driving this study is that government representatives at all levels in India may use these results to inform their policy alleviation strategies. An important part of communicating this message to government is the ability to provide a baseline understanding of the effect the *existing* government schemes have had on the local populations. Therefore the final research question of this thesis is: *what is the perceived impact and lessons of effectiveness of government schemes to raise wellbeing over time?* These perceptions are further explored based upon household characteristics such as agricultural land ownership, ST membership and state context.

Policy interventions to prevent and remove limiting conditions to poverty range from targeted micro-level approaches to "big push" macroeconomic models (Kraay and McKenzie, 2014). However, the high cost and complexity associated with implementing such programmes requires ongoing evaluation to ascertain the impact on the recipients. A review of the policy evaluation literature and information obtained from preliminary FGDs in the research areas highlighted five federal poverty alleviation schemes that are considered to have a major impact in all three research locations[69]: PDS, MGNREG, Backward Regions of India Fund (BRGF), the Pradhan Mantri Gram Sadak Yojana (PMGSY) or "All India Roads Scheme", and IAY. These schemes are considered important tools to alleviate poverty (Government of India, 2016d; Breitkreuz et al., 2016; Deininger and Liu, 2013; Jha et al., 2013) and are summarized in Annex 6.

The evaluation of the efficacy of policy schemes often relies primarily on the opinions of implementers or the quantitative number of participants. However, a strategic policy evaluation and design need to be informed by in-depth qualitative FGD interviews that offer insight into policies from the perspectives and experiences of local people in local sites (Breitkreuz et al., 2016; Novotný, Kubelková and Joseph, 2013). This component of the

[69] Identified in consultation with local authorities and the literature.

research is primarily informed by qualitative data from selected households from the project sites and will provide a resource for informing and communicating policy design recommendations. Contrast was made between the *a priori* identified schemes and those that the participants identified with no prompting. Contrast was also made between states, households with land assets, and ST and non-ST designations.

Based upon a review of government schemes and previous policy evaluation analysis (Breitkreuz et al., 2014; Patnaik, Nath Sahu and Ranjan Hathy, 2011), the hypothesis is that *policy scheme effectiveness will vary significantly between states and households, with households with fewer assets finding the policies less effective*. This chapter will continue with: 1) a description of the dataset and methodology employed; 2) a result section responding to the impact of schemes; 3) identification of important schemes; and 4) recommendations for the future. Discussion and conclusions are made and key messages highlighted.

9.3 Data and Methodology

The data and methodology for this chapter is similar to the process described in Chapter 6: the primary data informing this analysis is the FGDs, informed and complemented by specific questions from the DHED survey. Following an integrated approach, introductory FGDs provided information on public awareness and understanding of major issues in advance of the survey and FGDs. These preliminary discussions provided insight into the identification of the significance of federal government schemes and how to frame questions in the survey instrument and FGDs.

The eight FGDs conducted in August 2014 provide the foundation for this analysis, composed of a subsample of DHED respondents from three generations: the current or "young" generation (GEN3), the interim "parent" generation (GEN2) and the elderly "grandparent" generation (GEN1)[70]. Only

[70] See Table 6-1 for a summary of the composition and structure of the FGDs.

responses to questions that dealt with government schemes are included in this analysis. The FGDs included three questions on government policy schemes. These questions are contained in Table 9-1 below:

Table 9-1. Government policy questions for FGD participants conducted in Jeypore, Kolli Hills and Wayanad research locations in August 2014.

Q4	*How important has government assistance has been in leading to these changes?*
Q7	*Have there been particular government programmes that you have used that significantly impacted your life?*
Q8	*Is there something you think government could do - or stop doing - in terms of policies that will help in the future? Any recommendations?*

Analysis of the FGD responses was conducted using a thematic qualitative approach summarized previously in Chapter 4. In the first phase, recordings and notes from the FGDs were listened to and linked with facilitator observations from the meeting[71]. In the second phase, care was taken to ensure each response provided by participants identified their gender (male or female), generation (one, two or three), site location, land ownership and ST membership. In the third phase, responses were read again with a view for common themes, such as major events and positive or negative impressions. Fourth, these themes were considered and weighed in perspective with literature and information from the DHED survey. Fifth, these themes were finalized and identified. Three distinct themes were associated with policy and related to each specific question: importance of government assistance (none, low and high), identification and ranking of important schemes, and recommendations for future policy improvement. Finally, these results were synthesized and interpreted. A general overall ranking of scheme importance was determined for each focus group and representative quotes from each focus group and category were also identified. Representative quotes are identified and recorded for each thematic question in the results section.

DHED survey data used in this section was obtained from government scheme related questions identified in the DHED survey. These questions

include question three, *participation in MGNREG*; and Question 17 on *trajectories*, where respondents were asked if "government policy programmes (food for work, employment schemes, building of roads for infrastructure, etc.)" was a significant positive shock over the last three generations.

9.4 Results

This section provides the evidence from FGDs and DHED survey questions on the perspectives and recommendations for government policy schemes. First, the impact of government interventions on the lives of the households is established; second, the relative importance and effectiveness of schemes that households use most often is ranked; and third, recommendations for future enhancements of the existing schemes or propose new ones are provided.

9.4.1 Impact of Government Schemes

The DHED survey provides the first indication of the significance of government schemes to the lives of the people across the research sites and across generations. Government programmes were identified as the primary significant positive improvement by 1.6 per cent of GEN1 respondents, 2.6 per cent of GEN2 respondents and 12.9 per cent of GEN3 respondents (Table 9-2). There is an increasing trend to attribute government schemes as the source of wellbeing advance in the younger generations.

Table 9-2. Relative importance of government schemes as a significant event in the DHED respondent households across three generations in percentages (N=896).

Significant Event	GEN1 (N=125)	GEN2 (N=469)	GEN3 (N=302)
0. Did not experience	78.4	66.5	59.3
1. Natural Disaster	0.0	0.0	0.0
2. Livestock Inheritance	0.0	5.3	0.7
3. Land Inheritance	2.4	9.0	3.0
4. Crop Production Change	2.4	11.1	9.3
5. Health	0.0	0.0	0.0

6. Weddings	0.8	1.9	3.6
7. Government Schemes	**1.6**	**2.6**	**12.9**
8. New Business	3.2	2.8	10.3
9. Migration for Labour	11.2	0.9	1.0

FGD participants enhanced these results by indicating overwhelmingly that government schemes had been pivotal in their increase in standard of living over the last three generations - across all state, ST and land ownership classifications. Out of a total of eight FGDs, the individual responses and consensus among every group was that government has played a significant role in improving their status of wellbeing and was the major reason for their current standard of living (Table 9-3). The landless ST group in Wayanad affirmed that they are "completely dependent upon government support for their survival" (W2LLT G1 man).

Table 9-3. Summary of the perceived importance of government programmes to enhance wellbeing across all FGDs conducted in August 2014 (N=37).

High Impact (76%)	**J3LT G2 woman:** *"government has provided most of these things that have made life better for us, like the PDS, bore well, old age pension, road, electricity"*
Low Impact (19%)	**W1LNT G2 woman:** *"the government is less concerned by the agricultural industry than the IT industry. Although they are encouraging us too. In agriculture, there is no middle class. Whoever is in the middle class has now come down to being poor, as we are not getting much help from government – but they are increasing investment in other sectors"*
Zero Impact (5%)	**W2LLT G3 man:** *"there is no [agricultural] training provided by government. And regarding the new varieties, it is very hard to grow. Planting is difficult compared to old varieties and they have had no training"*

9.4.2 Identifying and Ranking Schemes

Due to the national exposure of the MGNREG scheme (Bonner et al., 2012) the DHED survey includes a question on the participation rate of respondents within the scheme. Approximately 48.1 per cent of households participated in MGNREG and the participants averaged 10.2 days of work in the last month. Nearly 80 per cent of participants in MGNREG joined in 2008 or 2009.

The second thematic grouping from the FGDs was the identification and ranking of the schemes. Participants were asked to identify government programmes that had benefited them the most and then rank the three most important government schemes impacting their lives over the last 20 years. This part of the FGDs was intentionally left very open, with guidance from the facilitator only if the discussion went off track, thereby allowing a very free conversation where only those schemes high in the minds of the respondents were put forward. Pooling the results from all eight focus groups presented the possibility of a large number of schemes to be identified from the vast number of schemes available at all levels of government to the households (Government of India, 2016d; Wayanad District, 2016; Das, 2012; Narasimhan, 2012). However only 12 individual schemes were identified across all research locations with consistent overlap. Some of the agricultural schemes were not identified by name, despite requests for elaboration from the facilitator, so they were pooled as “agricultural schemes”.

Table 9-4 below provides the identification, response rate and ranking of schemes in each research location. The most frequently recorded schemes were the Indira Awaas Yojana (IAY) housing scheme, the PDS, the Mahatma Gandhi Rural Employment Guarantee scheme (MGNREG), the Midday Meal (MDM) scheme at school for children, the Pradhan Mantri Gram Sadak Yojana (PMGSY) roads scheme, the Integrated Child Development Services (ICDS) and the Indira Gandhi National Old Age Pension Scheme (IGNOAPS). While the rank of importance of the schemes varied across the project locations, these five were the most frequently mentioned. Other schemes of importance that were mentioned by participants include the Janani Shishu Suraksha Karyakra (JSSK) scheme for mothers, public service provision in the form of health centres, electricity and borehole provision, and finally disaster insurance and agricultural schemes, particularly identified by the landed FGD participants.

Table 9-4. Ranking of three government schemes identified to be the most significant determined from the pooled FGDs conducted in the three research locations in August 2014.

Focus Group (N)	**Highest Importance (%)**	**Secondary Importance (%)**	**Tertiary Importance (%)**	**Other Responses (%)**
J1LLT (15)	IGNOAPS (27%)	PDS (20%)	MDM (13%)	MGNREG, IDCS, JSSK, SHG (40%)
J2LNT (11)	PDS (27%)	MDM (18%)	ICDS (18%)	MGNREG, IGNOAPS (37%)
J3LT (12)	PDS (42%)	MGNREG (33%)	ICDS (8%)	MDM, Disaster Insurance (16%)
KH1LLT (7)	MGNREG (50%)	IAY (25%)	PDS (13%)	Electrical Provision (13%)
KH2LT (4)	Electrical Provision (25%)	PMGSY (13%)	MGNREG (13%)	- (0%)
W1LNT (25)	IAY (40%)	MGNREG (20%)	Agriculture Schemes (20%)	Electrical Provision SHG, PDS (40%)
W2LT (17)	IAY (59%)	MGNREG (12%)	PMGSY (12%)	PDS, Electrical Provision (17%)
W3LLT (9)	PDS (44%)	MGNREG (33%)	IAY (11%)	MDM (11%)
POOLED (101)	**IAY (24%)**	**MGNREG (21%)**	**PDS (19%)**	**(36%)**

The schemes identified tend to be large national level initiatives and not state or panchayat level targeted initiatives and there was no clear difference in the schemes identified across location, landed or ST membership. This information highlighted the extreme importance of the large national level schemes of IAY, MGNREG and PDS in particular. After identifying the schemes of significance, the conversation then led to an evaluation of their personal experience with the programmes and suggestions for improvement – included in the following section.

9.4.3 Evaluation and Recommendations

The final policy theme explored in the FGDs was recommendations for improvement of existing schemes and suggestions for future schemes. This question serves two purposes: it provides a basic evaluation of the policy claims and their effectiveness, and elicits local knowledge to guide future

policy decisions. Consensus responses[72] from the individual FGDs are provided and general comparisons between the locations, landed and ST households are discussed.

Overall, the most common sentiment expressed for strategies to improve the wellbeing of households revolves around better and enhanced provision of houses and land (Table 9-5). These sentiments were expressed in all research locations regardless of land ownership or ST membership. Participants indicate that there are layers of corruption existing within the IAY waiting list system and feel greater oversight and transparency would address this problem. There is also a perception that many schemes – in particular the agricultural schemes – are reliant upon land ownership to participate. Therefore some participants felt that government should provide land thereby allowing them greater income opportunities and access to a broader array of schemes.

Table 9-5. Suggestions for improvement of government assistance determined from the pooled FGDs conducted in the three research locations in August 2014.

Focus Group (N*)	**Primary Suggestion (%)**	**Secondary Suggestion (%)**	**Tertiary Suggestion (%)**	**Other Responses (%)**
J1LLT (20)	Increasing Size of Homes (50%)	Land Provision for homes and agriculture (50%)	-	-
J2LNT (8)	Increasing Size of Homes (25%)	Build More and Better Water Wells (25%)	Cover Medical Costs for when accidents and sickness occurs (13%)	Provide Electricity services and land (38%)
J3LT (5)	Increasing Size of Homes (40%)	Land Provision for homes and agriculture (20%)	Provide modern Ag. Equip to the farmers (20%)	Build a Comm. Hall (20%)
KH1LLT (4)	Stop Bribery of Government Officials (50%)	Close the Liquor Shops (25%)	Provide more Widow Programmes (25%)	-
KH2LT (3)	Land Provision for homes and agriculture (33%)	Provide more houses under IAY or other schemes (33%)	Improve the speed and focus of Government Assistance	-

[72] "Consensus responses" are characterized as responses that are vocalized by a spokesperson in consultation with group discussion. These responses are not necessarily specific to an individual but represent the group as a whole.

			(33%)	
W1LNT (25)	Increase the Number of Farm Subsidies (43%)	Increase the availability and access to government agricultural loans (29%)	Provide Ag. Training for workers and landowners (14%)	Provide modern Ag. Equip. to the farmers (14%)
W2LT (6)	Build More and Better Water Wells (50%)	More Road Construction as some of these ST areas have no paved roads (33%)	More Job Training for vocational skills (17%)	-
W3LLT (8)	PDS Better Equipped with quality food that arrives on time (50%)	MGNREG Faster Pay (25%)	Increasing Size of Homes (13%)	Provide Free Medical Services (13%)
* **Consensus response**				

The major issues expressed were generally consistent between sites, with a few exceptions. However, Kolli Hill participants spent a significant amount of time discussing the existence of illegal alcohol shops and corruption and bribery among government officials. While much of the FGD conversation revolved around methods to address this problem, no consensus was found. Water provision was only mentioned in the Jeypore location, while quality and quantity issues with products from the PDS ration shops was only mentioned in the Wayanad research site.

Landed FGD participants emphasized greater provision of agricultural related schemes and government production subsidies. Participants also expressed concern regarding crop prices, disease control mechanisms and urban migration of youth. Rapid changes in the agricultural sector in terms of new crop varieties and new pests (and thereby control mechanisms) were highlighted. Participants in all landed and agriculturally related focus groups felt that there were limited agricultural training programmes for farmers on new crop varieties and disease control methods.

Issues specific to ST groups were not apparent when compared to non-ST groups. The only groups that were noticeably impoverished compared to their non-ST counterparts – and indeed ST counterparts in the

other locations – were in Wayanad. These participants had a much poorer physical appearance and remained very connected to the land. Interaction outside of ST society was not prevalent and even paved road systems did not reach their communities. There was an underlying belief that government "owed" them and they were waiting for more provision from government for survival (W2LLT). Examples of representative responses from each of the project location focus groups are provided in Table 9-6.

Table 9-6. Representative responses from each FGD on suggestions to improve or enhance current government schemes collected in August 2014.

Jeypore (33 total responses)	**J1LLT G1 woman:** "*we all need land and houses. Government is already giving us all the other things we need - schools, food, uniforms, textbooks, cycles"* **J2LNT G3 woman:** *"we need water for irrigation – bore wells, irrigation systems. Also drinking water sources. Every day I take half an hour to walk to get drinking water (about 1 km). There are only 3-4 tube wells and there are queues for them"* **J3LT G2 man**: *"we need more provision of machinery! Like a power tiller. A big one and not a small one. Also we want a spray machine. These are big expenses, so we cannot buy them alone. Government needs to give it to us"*
Kolli Hills (7 total responses)	**KH1LLT G2 woman:"** *"we need stricter control over the illegal unofficial liquor shops that are everywhere in the village. Even when the police come they bribe them and it continues. Government needs to do something more on this issue"* **KH2LT G2 man**: "*we have been asking for a long time for government to give assistance, but it is really groups like the MSSRF that are actually doing things. The politicians claim that an activity that groups like MSSRF do is from government – but it really has nothing to do with government. MSSRF has constructed a few buildings, if they could build some group houses, it would be beneficial!"*
Wayanad (39 total responses)	**W1LNT G2 woman**: "*we need training programmes for farmers for better practices, better agricultural loans and they should provide subsidies for seeds and fertilizers, etc."* **W2LLT G2 man:** "*government has to take care of us. Government officials must come here and check what is lacking here and then fulfill our needs. They have to come and see how they are living and their current situation – we should not have to go and ask for things"* **WLLT3 G2 man**: "*the ration shops should include more things – rice, wheat, sugar and kerosene and we should get more than we currently get. Plus oil. Currently, we are not getting it in sufficient quantity and need more for survival"*

9.5 Discussion and Conclusions

The importance of government programmes as a poverty alleviation tool across India is substantial. An abundance of government schemes – both universal and targeted – exist at the federal, state and local panchayat levels (Government of India, 2016d; Mishra, 2014; Narasimhan, 2012; Government of Kerala, 2016). Although other sources of assistance do exist – such as private enterprise (timber companies in Jeypore, tourism in Wayanad), and non-government development organizations (MSSRF, ecotourism, religious groups) – information obtained from the DHED survey and the FGDs clearly identifies these sources as less influential for wellbeing advance than the existing government support programmes[73].

Comparing and understanding the policy claims of *a priori* identified schemes with the local perceptions was relatively successful. Despite problems of implementation and vast bureaucratic procedures, the PDS and MGNREG remain the two most important schemes across all sites, having a very important role in reducing poverty and increasing household wellbeing. While the expectation is that these programmes will diminish in importance over time as households transition out of poverty, their continual existence as a safety net will remains important.

The IAY housing scheme had a significant role in all locations as well, and is expected to increase in importance as households and communities develop. The PMGSY and the BRGF were less known amongst the participants, likely as they were not designed for specific household access. But considering their higher-level focus, the fact that they were even mentioned within the FGDs indicates that they have a major impact. Indeed, the remarkable road access to even the most remote parts of these rural areas is a tribute to their success. Schemes that were not identified in advance but had a major impact on advancing household wellbeing were also mentioned. The MDM scheme in particular has influenced the quality of

[73] Efforts were made during the FGD process to limit strategic responses from participants (see Annex 2).

education in these areas by increasing school attendance and enhancing the nutrition of children.

Reflections on the efficiency of existing schemes provide lessons for both improvement and design of future schemes. Corruption was identified as a chronic issue in all locations. Nepotism is perceived to exist at all levels of the bureaucracy, but has been experienced personally by many households, who have seen friends and family members of local scheme implementation officers take full advantage of programme services. Bribery for access often occurs (KH1LT, W2LNT, J3LT). Many FGD participants concluded that continuous transparency monitoring is needed, similar to other studies that found constant monitoring of economic and social efficiency is required to help those that need it most (Véron et al., 2006).

Lack of awareness over scheme availability was not as large an issue as expected as has been mentioned in previous literature (Nayak, Saxena and Farrington, 2002). While some groups, particularly in Jeypore, were not always aware of the timing of the scheme rollout, in Kolli Hills the FGD participants seemed very aware of the available schemes.

In addition to the discussion of specific schemes, there exists underlying disagreement about universal versus targeted schemes. Some non-landed participants felt schemes should not be linked to land ownership, as many of the landless people are then immediately excluded. Other disagreed with this statement, in particular the landed focus groups, arguing that there were already too many targeted schemes for marginalized groups (such as ST/SC) and that those with land were being forgotten – even though they were struggling to ensure a living through agriculture (W1LNT). Since its formation as an independent nation in 1947 India has had many schemes, and in those earlier times the schemes tended to be more universal in nature. While there is economic and financial efficiency of targeted schemes, there is a perception among ineligible groups that the other groups are getting more benefit. For example, landed households felt that they ST and landless groups were getting large amounts of government assistance, while

agricultural households like theirs were also suffering but not availing government support.

In conclusion, government schemes in the Ghat regions of South India have been a significant driver of wellbeing development over time. While problems exist and end-users of the schemes have different impressions of the efficacy of the schemes' design and implementation, there is a general consensus that the schemes have been very beneficial and local households would like to see expansion of the existing programmes.

9.6 Key Messages

- Government schemes have played a major role in increasing the wellbeing of communities in the research locations.

- The government schemes that have had the greatest impact according to the FGDs are IAY, MGNREG and PDS.

- Improvements to various existing schemes are thought to be essential: the IAY needs to be expanded, MGNREGA needs to improve the payment time, and the PDS ration shops should have better quality food and other resources should be included. All programmes suffer from corruption and measures need to be included to prevent abuse of the system.

- Non-specific issue for government assistance: build water wells, enhance roads, cover medical costs, and provide land.

10. DISCUSSION AND CONCLUSION

10.1 Chapter Overview

This chapter summarizes the major findings of this thesis and situates them within the relevant academic, development and policy discussions on poverty alleviation in India. First, a review of the four research questions and their respective conclusion is provided: local perceptions on wellbeing are positive, no evidence of multiple equilibria traps is found, women's bargaining power has a non-linear influence on household asset accumulation and government schemes play a major role in the promotion of wellbeing. Second, five major findings from the thesis are identified and discussed with regard to their contributions to literature: 1) the methodological contribution of the MFP approach; 2) absence of empirical evidence for multiple equilibria poverty traps; 3) the influence of social position with respect to qualitative perceptions and quantitative measurements of wellbeing; 4) the non-linear impact on women's intra-household bargaining power; and 5) the positive impact of government schemes. Policy implications from these results are then considered and limitations presented. The thesis concludes by re-iterating the need for continual action to monitor and evaluate the status of these marginalized populations within India to ensure that the appropriate policy measures are implemented to reduce – and eventually eliminate – extreme poverty and hunger.

10.2 Summary of Results

The primary objective of this thesis is to enhance the understanding of poverty dynamics in three remote Blocks of India's Western and Eastern Ghat mountain ranges. The research is motivated the moral and economic imperatives to alleviate poverty and the assertion that deeper understanding of the contributing factors of poverty will assist to achieve this goal. The research is methodologically founded on a principle of integrated understanding: that the most comprehensive way to understand poverty dynamics is to integrate quantitative and qualitative techniques; in this case,

quantitative evidence from the DHED survey instrument combined with qualitative perceptions from FGDs exploring the perceptions of wellbeing change over time and influence of government schemes. Finally, the research based on a belief that this information could inform future poverty alleviation strategies for marginalized populations in the future.

Four research questions guided this thesis. The first question asked: *what are the local perceptions of wellbeing change over time?* Through in-depth qualitative FGDs it was determined that a general optimistic outlook existed across all research locations; marginalized ST and landless demographic groups overall shared this perception. The second question asked: *do unconditional multiple equilibria poverty traps exist?* We empirically tested for these traps using a novel semi-parametric MFP approach on four possible outcome variables: income, expenditure, agricultural land assets and a total household asset index. While slight differences were observed between outcome variables, the quantitative results confirmed the qualitative FGD consensus: no multiple equilibria poverty traps exist in any of the locations. The third question asked: *what is the impact of female intra-household bargaining power on asset accumulation?* The MFP approach was again used to answer this question – to our knowledge the first time this covariate has been included in empirical poverty trap analysis. We found that the level of power that female spouses had relative to their husband had a significant and non-linear impact on household asset accumulation. Specifically, asset accumulation in households where women had lower levels of power greatly benefited from slight increases in female power, but then assets decreased for a time when females had interim levels of power. While this situation did change eventually to a positive relationship again when females were highly empowered, this result challenges the standard positive and linear relationship between female spousal power and household wellbeing assumed in economic development models. Finally, we returned to the FGDs to ask: *what are the local perceptions on the impact of government policy schemes?* Despite inefficiencies and other challenges, government policy schemes were determined to have a positive and major impact on the lives of all households.

10.3 Discussion of Results

The analysis presented in this thesis has resulted in five primary conclusions. These results include: 1) the methodological advantages of the MFP estimation approach; 2) the absence of empirical evidence for multiple equilibria poverty traps; 3) the influence of social status on poverty perceptions and dynamics; 4) the non-linearity of women's intra-household bargaining power; and 5) the influence of government support schemes. This section will discuss the importance of each of these factors.

10.3.1 Methodological Estimation

A major contribution of this research is the methodological advantage of the MFP estimation approach to determine the existence of poverty traps. The majority of existing literature employs a parallel combination of non-parametric and parametric approaches to determine the existence of – and contributing factors to – multiple equilibria poverty traps (Adato, Carter and May, 2006; Lybbert et al., 2004; Quisumbing and Baulch, 2013; Naschold, 2013). To our knowledge only two studies have explored semi-parametric approaches to estimation (see Naschold (2013)) and I contribute to this emerging estimation literature using the MFP approach, which has two primary advantages over other techniques: 1) it statistically selects covariates for inclusion in the regression based upon significance; and 2) selects the functional form for the specified covariates.

First, selecting the significant covariates within a semi-parametric framework has econometric importance. It removes the inelegant necessity[74] of conducting parallel regressions that first identified multiple equilibria traps (non-parametric) and then determined the impacts of causal factors (parametric). This approach simplifies the identification of multiple equilibria traps while simultaneously determining the significance and relationship of

[74] This necessity is due to statistical estimation challenges (Carter and Barrett, 2006; Naschold, 2013).

covariates on asset accumulation. Second, the statistical selection of covariate functional form also has important econometric implications. The ability to allow the estimation approach to select the functional form adds a level of objectivity to the analysis that is not provided in the current parametric or semi-parametric approaches (Sauerbrei, Royston and Binder, 2007). While the estimation approach may not alter the positive or negative identification of a multiple equilibria poverty trap, it greatly expands the ability of researchers to identify – and provide evidence of – the contributing factors of poverty and thereby understand the possible approaches for alleviation.

10.3.2 Multiple Equilibria Poverty Traps

The contribution towards multiple equilibria poverty trap literature is another important result from this research. While nearly twenty studies exist on this particular form of poverty trap (Kraay and McKenzie, 2014), relatively few studies have been conducted in south Asia, and even less in South India. Of those studies that have been conducted in India, none have found evidence for multiple dynamic asset equilibria (Quisumbing and Baulch, 2013; McKay and Perge, 2013). My results affirm this conclusion. Some scholars suggest that this situation occurs because of the choice of outcome variables may mask the presence of poverty traps (Carter and Barrett, 2006; McKay and Perge, 2013). The results from this thesis do not support this position: I tested four different outcome variables – income, expenditure, land assets and an asset index – and none of these variables yielded evidence of multiple equilibria. Further, in-depth FGDs on perceptions of wellbeing trajectories from among the sample population showed a general optimism from most participants.

The lack of evidence for multiple equilibria poverty traps in India requires some consideration. Possible factors suggested by Quisumbing and Baulch (2013) are the relatively well functioning markets and supportive institutions of South Asia to stimulate economic growth. Another explanation is the increasing diversity of employment sources in South Indian communities. Although agriculture remains a primary employer, there are

options to migrate for labour and relatively strong banking and credit systems. A third possibility is multiple productive assets that households benefit from – including livestock and land (McKay and Perge, 2013). Contrary to the studies in sub-Saharan Africa that primarily focused a single productive asset (livestock), India is relatively asset diverse (Lybbert et al., 2004; Adato, Carter and May, 2006). The decreasing reliance upon agriculture, as indicated by smaller agricultural land holdings, contrasted with no poverty trap indicates that other sources of income for rural households may be in place. A primary example of this could be rural urban migration, which was indicated by the FGDs. Finally, the reason could be the high level of supportive institutions in India – discussed in a following section.

However, the lack of empirical or qualitative evidence for multiple equilibria poverty traps does not mean that some form of poverty trap does not exist. It is possible that the single, low-level equilibria point identified in the agricultural land and household asset outcomes may effectively mirror the conditions of multiple equilibria. However, the FGD results are relatively positive in outlook and do not support this conclusion. With the exception of Kolli Hills the outlook from participants is predominantly positive. Slow improvement and transition out of poverty is occurring. While support systems are necessary to promote the rate of exit from poverty, these perceptions and the lack of multiple equilibria is a strong signal that an upward trajectory is possible for these households.

10.3.3 Influence of Social Status: ST and Landlessness

The thesis also provides insights on the development pathways of marginalized ST and landless households. The use of integrated methods initially seems to yield contradictory results. Quantitative evidence from the MFP estimation shows a significant negative linear relationship between ST and landless households and asset accumulation, while qualitative evidence from the FGDs shows no apparent differences between the responses of landed or landless household participants and ST or non-ST participant

discussions – all groups seem relatively optimistic about their future outlook. However, despite this stated optimism by many of the ST and landless participants, the underlying level of poverty apparent among some communities – in particular the landless ST FGD in Wayanad and alcoholism suffering FGDs of Kolli Hills – means these groups require additional support to speed their wellbeing advance.

First considering STs, the statistical data and existing development literature is united on the marginalisation and low socio-economic status of these people (Nithya, 2014; Sahoo, 2011; Gang, Sen and Yun, 2008; Census of India, 2011; Karade, 2008). ST individuals are less educated, have less land and infrastructure assets, are less able to get employment and in general suffer more social discrimination that non-ST individuals (Kirubakaran, 2013; Hasseena, 2014; Kumar and Tiwari, 2016; Sahoo, 2011; Nithya, 2014; Census of India, 2011). Although STs are not empirically caught in multiple equilibria poverty traps in this thesis, ST households are significantly more likely to have lower levels of assets and do live in lower positions of wellbeing than non-ST households. However, the relatively positive perspectives among STs in the FGDs enhance the quantitative narrative. While location-specific problems, such as alcoholism in the Kolli Hills and eviction from forested areas in Wayanad, have had a significant negative impact on these communities, the generally positive outlook from ST households is in large part due to the past and current resources provided government aid programmes. Further, they are confident that these programmes will continue to assist them into the future.

Second, the insight from landless households is important to consider. In a similar pattern to the STs, landless households are much marginalized economically and socially in India (Rawal, 2008). Nearly 30 per cent of rural Indian households are landless and are more likely to exist in extreme poverty than landed households (Rawal, 2008; Government of India, 2013). Land is a valuable asset that can provide food for consumption and sale, generate employment and assist households to transition out of poverty (Allendorf, 2007; Manjunatha et al., 2013; Jackson, Pascual and Hodgkin, 2007;

Hatlebakk, 2014). However, during the FGDs the difference between the landed and landless household perspectives on wellbeing was not evident: both groups were ambiguous in their responses. I suggest this similarity is due to the importance of agricultural land as a source of employment for both landed (sale of products) and landless (labour). Further, the ambiguity of responses may suggest that some households are being severely impacted by landlessness – indeed, some FGD participants indicated that provision of land would be one of the most significant contributions government could make for them – while others, predominantly the currently landed households, are seeing the land area decrease between generations and therefore do not consider land inheritance as an important factor driving their wellbeing, as the younger generations move to the urban areas for employment. While understanding changing patterns of land holding and livelihoods sources in these areas was not a focus of this thesis, investigation into the relationships between the two could shed important light on the results obtained by this research.

10.3.4 Women's Bargaining Power

Another major finding of the research was the non-linearity of women's intra-household bargaining power. Women typically occupy lower positions of power across the various populations within India (Government of India, 2007) and there is significant effort being exerted towards women's equality[75]. While much of the bargaining power literature has confirmed a positive, linear relationship between women's empowerment and household wellbeing (Doss, 2013; Duflo, 2012; Haddad et al., 1997), our analysis indicates a non-linear relationship similar to the conclusions of Felkey (2013). This result diverges from the existing empowerment literature by using asset accumulation outcomes for wellbeing, and finds: at low levels of women's power small increases in bargaining power results in a linear and positive impact on asset accumulation; at interim levels additional power actually had a depressing

[75] Positive discrimination towards women is explicitly stated in the Indian Constitution 15 (3).

relationship with household asset levels; and at higher levels of women's power this relationship again becomes positive and asset levels increase.

It is important to emphasize what these results do – and do not – mean. Non-linearity does not imply that women's empowerment is bad: to the contrary, empowerment and gender equality are important goals and these results do not contradict this position. What these results do indicate is that there are other implications of increasing women's empowerment – in this case for asset accumulation as a measure of household wellbeing. While empowerment of women does increase a household's wellbeing at certain levels, it also indicates that there is a complex relationship between the endogenous household relationship and the social conditions in which the household is situated. The responses from the FGDs affirm this assertion. For example, an empowered woman may greatly contribute to a household's asset accumulation, but when situated in a socially conservative village that does not reward women becoming involved in "male" work, then this could decrease the opportunity for the woman and the household will suffer. It is only when she becomes powerful enough to break these social barriers that the household again begins to benefit from the increased power. This result is an indication that any gender-related policy recommendations need to be firmly based on integrated methods to elicit the most comprehensive understanding possible of the power of women in the household. Quantitative intra-household analysis needs to be balanced by comparable research into socio-cultural understanding and how wellbeing enhancement strategies impact women at different levels of power.

A final point to consider is the role of ST women within this scenario. ST women have traditionally occupied more equal positions with their husbands than women in Hindu society (Hasseena, 2014). An example of this relationship is the practice of a bride-price system within STs versus the dowry system favored by the Hindu populations (Anderson, 2007). When asked about the dowry system in the FGDs, female ST members from all research locations said that while they maintained the bride-price traditions, the expansion of non-ST settlers into traditionally ST populated areas was

resulting in the slow replacement of this practice with dowry systems. Therefore, retaining the cultural traditions of STs may have important consequences for the empowerment – and wellbeing advance – of women.

10.3.5 Role of Government Assistance

The final insight we present is the relationship between government schemes and household wellbeing. Since independence from the British Empire in 1947, India has been favorably disposed to government schemes to assist the poor. While there are many studies that either advocate (Chakraborty, 2014) or decry the limitations (Government of India, 2014b) of government schemes in India, both qualitative and quantitative results from this thesis indicate that government schemes have played a major role in increasing the wellbeing of these households. Most participants ranked government support as higher than other factors such as migration for labour or new crop varieties or even inheritance of land. The FGDs results also indicate that the government schemes with the greatest impact in these research sites are the large integrated development programmes: IAY, MGNREG and PDS. FGD responses also indicate that existing schemes could be improved: the IAY should be expanded, MGNREG should decrease the payment time for wages, and the PDS ration shops should have better quality food and include other resources.

Despite a general perception that all government programmes suffer from a level of corruption and measures to mitigate this systematic abuse should be included in future policy improvements, we can speculate that the absence of multiple equilibria poverty traps in the research sites may be a result of the vast array of government schemes that exist. While they are flawed, the effort and cost required to maintain these programmes is having a positive impact on the lives of these people.

10.4 Limitations and Future Research

A few limitations of my data and research are important to acknowledge for interpretation and to guide the advance of future research. First, there is a degree of inaccuracy inherent with recall approaches to historical data collection. Despite attempts to limit this bias, such as anchoring questions to important local or national events, we cannot expect respondents to precisely remember all the information over the last 20 years; some generalizations will undoubtedly have occurred. However, in studies where no longitudinal data exists, published literature affirms the validity of this approach (de Nicola and Gine, 2012; Mohapatra, Rozelle and Goodhue, 2007; Krishna, 2004). Further, pre-testing the survey instrument assisted in strategies to increase the accuracy of results. However, primary longitudinal datasets would remove most recall bias and strengthen the results in this thesis.

Second, there is no explicit measure for bargaining power, and as such the literature relies on imperfect proxies (Doss, 2013). Therefor our use of female decision-making authority for asset purchases is only one such proxy for women's power. Future studies and additional data could compare different measures of female spouse decision-making power, such as clearly defined proxy for female spouse decision-making power – such as female *and* male income or asset control.

Finally, there are possible influencing factors associated with my role as a white, male researcher interacting with local community members in rural, predominantly tribal areas in India. Social anthropological literature refers to this as reflexivity (Muhammad et al., 2015). While every effort was made to conduct the FGDs with an awareness of this factor following (Davies, 2008) – such as liaising with MSSRF field staff that spoke the language and with whom I had a personal relationship – there will have been a small measure of influence from my presence. Future research studies may benefit from removing the foreign researcher element to the FGDs.

These limitations, however, create a basis for considering the directions of relevant future research. Repeat surveys of the DHED households in the future would create a longitudinal dataset that could be used to test and validate the results of this thesis. If local MSSRF staff conducted these future survey iterations, concerns over reflexivity would be eliminated. Further, incorporating more questions in these future surveys to capture female and male empowerment would be a way to test and deepen the understanding of the reasons for the non-linearity in the women's empowerment covariate. In addition, I am also interested in creating a theoretical model of women's empowerment to complement and expand the understanding and results of the empirical model described in Chapter 8. Another area of future research that was not explored in either the DHED survey or the FGDs was how agricultural and environmental practices impact poverty dynamics in these households. Further exploration through FGDs and expanded questions within another round of surveying would yield very interesting results to inform this aspect of poverty dynamics.

Overall, I would be very interested in establishing a partnership with MSSRF to build upon the foundational research of this thesis to explore these future research areas, as it would build upon the contributions of this research and further promote locally informed policy scheme design and enhancement.

10.5 Policy Implications

This research is highly policy-relevant due to the prevalence of rural poverty in India – particularly within ST and landless households (Government of India, 2013). Scholars assert that different kinds of poverty require different policy responses (Azariadis and Stachurski, 2005; Barrett and Carter, 2013). According to these microeconomic growth theories, the existence of multiple equilibria poverty traps presents a case for direct "big-push" interventions to assist the poor escape the structural circumstances of their poverty. Alternatively, households occupying single, low-level equilibrium points will slowly transition out of poverty or remain in this state without long-term

government intervention – depending on the relative location to the poverty line (Azariadis and Stachurski, 2005; Ray, 1998). However, there are very few practical differences between the two situations: for those living below the poverty line slow accumulation of assets is very hard to distinguish from no expected accumulation of assets (McKay and Perge, 2013). And I argue that there are moral and economic imperatives to understand and facilitate this movement out of poverty conditions.

International development strategies are heavily influenced by poverty trap theories and literature. Many of the development strategies arising from the Millennium Declaration assumed the existence of poverty traps, and argued for large-scale development interventions (Michelson, Muñiz and DeRosa, 2013). My results do not identify multiple equilibria poverty traps. However, they do indicate s-shaped asset accumulation pathways and equilibrium points across all three samples, and specific sub-groups of the population have a negative and non-linear impact on wellbeing: specifically STs, lower education and landless households. The fact that low equilibrium points are significantly influenced by differences in immutable traits suggests that the most appropriate policy response are schemes that address the long-term sources of heterogeneity that mitigate poverty among households that are more susceptible to remain at low levels of assets (Barrett and Carter, 2013) – such as social and cultural education programmes.

The relatively positive results from this thesis confirm the perception among the local policy users that large-scale policy programmes have worked in alleviating poverty across all research sites. In the short run, households in low-level equilibrium may require government assistance to either push or speed-up the rate of change to increase the wellbeing of these households. As the Indian federal and state governments are already funding these sorts of schemes – such as the IAY, PDS, MGNREGA and PMGSY – I re-iterate the concerns raised by local FGD participants and encourage greater oversight by government officials to ensure lack of corruption and greater awareness of the local community members that use these policies.

Concomitantly, the results also suggest continued and greater targeting of sub-populations, such as STs, landless and women. Targeted schemes do exist for these groups – such as MDM, ICDS, etc. – but end-users within these sub-groups are often more vulnerable and therefore prone to not enroll (due to lack of awareness) or to be taken advantage of by corrupt individuals in positions of power. Concerted effort needs to be made to address these problems and the answers will not be short-term. The structural issues faced by ST, for example, indicate that ST support programmes and schemes need to be maintained and improved – in consultation with ST communities – for the foreseeable future.

Finally, my results suggest a more targeted approach to how government schemes provide assets or other services to women within households. The "benevolent" preferences of women cannot be exercised without power, but more insight is required to understand how women's power is related to asset accumulation. The FGDs indicate some of this is due to structural social issues, such as patriarchy, inequality, landlessness and entrenched institutional and political discrimination against STs. Most women's empowerment literature argues for providing greater asset power to women to enhance household wellbeing (Felkey, 2013). However our results indicate that direct assistance to women may only work in households where women occupy a low level of power. When a woman is more powerful, then factors – possibly social perceptions over gender roles – may actually cause the household asset wealth to decrease. Policies do exist across India to promote the status of women, such as the National Credit Fund for Women, the Conditional Maternity Benefit Plan, the Rajiv Gandhi Scheme for the Employment of Adolescent Girls, and local Self-Help Groups. By obtaining more information on the household characteristics that cause the non-linear influence of increasing women's power on household assets, schemes that target women that exist in each "Box" – particularly those in Box 2 – will be important to elevate both the status of women and the wellbeing of the household.

10.6 Conclusion

This thesis provides empirical and qualitative evidence to inform policy alleviation strategies in the remote mountainous areas of South India. At one level the results provide a positive conclusion that supports the global narrative on poverty reduction: there is no qualitative or empirical evidence of self-reinforcing mechanisms that cause multiple equilibria poverty traps. While the pathway out of poverty may still be long and difficult – and undoubtedly influenced by negative events that will slow household's wellbeing advance – persistence within households and government assistance will slowly push these households towards higher levels of wellbeing. However, these results do not negate ongoing evidence of poverty conditions within India and slow social mobility for many marginalized subpopulation out of these conditions (Census of India, 2011).

Contributions have also been made to several branches of development literature. Research on empirical asset-based, multiple equilibria poverty traps is bolstered in South India, where relatively few studies currently exist. Further, the MFP semi-parametric estimation technique provides a novel approach to identify variables that cause poverty to persist. Intra-household bargaining literature benefits from a unique empirical study that incorporates women's power within the multiple-equilibria poverty trap literature and determines non-linear relationships between asset accumulation and different levels of women's power. Finally, integrating the qualitative local perceptions on wellbeing trajectories and policy perspectives provides a deeper understanding of poverty conditions within the Jeypore, Kolli Hills and Wayanad research locations.

Recent decades have seen positive economic growth and decreasing levels of poverty and malnutrition, yet the end of poverty across South Asia still seems in the distant future for many. Positive economic growth has not come to all places and people and there are still many marginalized people in India in living poverty conditions. My hope is that the research insights

provided in this thesis will add to the evolving poverty literature and provide moral and economic motivation for the alleviation of conditions of poverty in India.

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APPENDICES

Appendix 1. DHED Survey Instrument

Household Schedule No:	

Interview Schedule for the study

Determinants of Household Economic Development (DHED)

Identification Particulars

District……..Taluk …….....
Village…….....
Panchayat……..Ward No……
Name of the Respondent…….....
Age of Respondent ……
Category (FC/OBC/OEC/SC/ST)……
Religion……..Caste……
Community name……...
House Name/No.....

Details of Visits to the Household

Name of Investigator……Signature……..
Name of Supervisor……Signature….....
Date of Interview……..
Time…….Time taken…….

SECTION A:
HOUSEHOLD CHARACTERISTICS

1. Profile of household members

No.	1	2	3	4	5	6	7	8	9
#Member ID	Name (Head of the HH first)	Generation (iiiG-3 iiG-2 iG-1)	Sex Male-1 Female-2	Age	Year of Birth	Relation with the Head (Code-1)	Marital Status (Code-2)	Educational Qualification (Code-3)	Activity Status of Members (Code-4)
M1				…..	……				
M2				…..	……				
M3				…..	……				
M4				…..	……				
M5				…..	……				
M6				…..	……				
M7				…..	……				
M8				…..	……				
M9				…..	……				
M10				…..	……				

Code-1	Code-2	Code-3	Code-4
Head of the HH-1 Father/ Mother-2 Husband/Wife-3 Unmarried children-4 Married children-5 Son in law/Daughter in law-6 Grandchild-7 Father in law/Mother in law-8 Brother/sister-9 Others (specify).....10	Unmarried-1 Married-2 Widow / Widower-3 Divorced-4 Separated-5	Illiterate-1 Literate without formal schooling-2 Primary-3 Secondary-4 Up to SSLC-5 SSLC pass-6 Pre-degree/Plus II-7 Diploma/Certificate course-8 Graduation -9 Post graduation (PG) -10 Professional course-11	Employed-1 Unemployed-2 Student-3 Doing household chores-4 Unable to work-5 Unwilling to work-6 Others 7

2. Total Family Size

Members	Male	Female	Total
Adults (Above 18 years)	…….	……..	……
Children's (Below 18 years)	……	……	……...
Total	……	……	……...

3. Activity/livelihood details of the members:

No.	**11**			**12**			**13**			**14**			**15**			**16**			**17**			**18**
Member ID (Earning member only)	Employment (Main-E Subsidiary-S) (Code -5)			Employment Type (Code-6)			Place of Work (Code-7)			Type of emolument (Code-8)			Salary/Wage (Amount)			No. ofDays worked in last seven days			No. ofDays worked Last month			Average monthly income from all sources (Amount)
	E1	S 1	S 2	E1	S 1	S2	E1	S1	S2	E1	S 1	S2	E1	S1	S2	E 1	S 1	S 2	E1	S1	S2	
M……													……	…….	…….							
M……													…….	…….	…….							
M……													…….	…….	…….							
M……													…….	…….	…….							
M……													…….	…….	…….							
M……													…….	…….	…….							
M……													…….	…….	…….							
M……													…….	…….	…….							

Code-5		**Code-6**	**Code-7**	**Code-8**
Self employed farming-1 Self employed off farm-2 Animal husbandry-3 Wage employed farming-4 Wage employed off farm-5 Casual wage employed farming-6 Casual wage employed off farm-7 Land lord (rented lands to tenants)-8	Migrate outside the community-9 Plantation/Estate labour-10 Private office jobs-11 Public office jobs-12 Employment Guarantee Schemes-13 Others……14	Salaried-1 Contract-2 Part time -3 Full time -4 Seasonal-5 Wage labour-6 Others……7	At home-1 Outside home, in Village-2 Outside Village-3 Outside District-4 Outside Kerala in India-5 Out of India-6 **Code-10** Outside Village-1 Within the District-2 Outside the District and in the state 3 Outside State in India-4 Out of India-5	Daily-1 Weekly-2 Monthly-3 Others……4 **Code -9** To find some job-1 To get salaried job-2 To join with siblings-3 To get higher wage labour-4 Loss of agriculture-5 For agriculture inputs-6 To compensate household income-7 Regain for loss of livestock-8 Compensate for the loss in business-9 Other (please specify).....10

4. Migration

Is there any family member in this household who stays outside from this household for work and contributes (monetary) for the running of household? Yes-1/No-0	
a. How many family member stay outside for work? (Nos)	
b. How many of them are male? (Nos)	
c. How many of them are female? (Nos)	
d. How long was this person away last time?	.....
e. What type of work is/was this person doing? (Code-5)	
f. How many days these person(s) engaged for work?	.....
g. Reason for migration (Code-9)	
h. Where do/did normally they migrate to? (Code-10)	
i. Has the pattern of migration changed from last 20 years? Yes-1/No-0	
j. If yes, is there any increase in income from migration from last 20 years? Yes-1/No-0	
k. What is the extent of increase of income from all the migrants of this family? (in percentage)	----------

5. Do you have MGNREGS employment?..... (Yes-1; No-0)

6. Expenditure

Sl	Particulars	Frequency*	Amount	Monthly	Yearly
1	Food				
2	Alcohol& Tobacco				
3	Health				
4	Education				
5	Clothes/equipments				
6	Travel				
7	Communication				
8	Repayments				
9	Other utilities/bills				
10	Other miscellaneous				
	Total				

**Code11* Daily =1, weekly=2, monthly=3, Two months=4, Quarterly =5, half yearly=6, Yearly=7, Others……8

7. Expenditure History (in Rs based on current year)

Sl	Particulars	Current year	Last year	5 years ago	10 years ago	20 years ago
1	Food					
2	Alcohol& Tobacco					
3	Health					
4	Education					
5	Clothes/equipment					
6	Travel					
7	Communication					
8	Repayments					
9	Other utilities/bills					
10	Other miscellaneous					

*Approximate from 5, 10 and 20 years ago

8. House type, ownership and other amenities

SL	Infrastructures	Current year	Last year	5 years ago	10 years ago	20 years ago	Facility Status (code-21)
1	House ownership (Code 12)						
2	Type of house (Code 13)						
3	Floor material (Code14)						
4	Wall Material (Code 15)						
5	Roofing material (Code16)						
6	No. of Rooms						
7	Sanitary latrines (Code17)						
8	Land holdings for agriculture (in acres)						
9	Total land holdings (in acres)						
10	Wet land holdings (in acres)						
11	Up (dry) land (in acres)						

12	Land having irrigation facility (code 18)						
13	1Drinking Water (Code 19)						
	2. Agriculture (Code 19)						
	3. Other uses (Code 19)						
14	1. Main fuel used for cooking (Code 20)						
	2. Substitute Fuel for cooking (Code 20)						

Code 12 Own-1 Rented =2 Leased=3 Govt.provided-4 Relatives-5 Others-6 **Code 13** Pucca-1 semi pucca-2 Kucha-3 serviceable Kucha-4 Unserviceable Kucha-5	**Code 14** Earth/mud-1 Cement-2 Tiles -3 Others-4 **Code 15** Earth/mud-1 Bamboo/Iron sheets-2 Cement/bricks-3 Timber (wood)-4 Stone-5 Others-6	**Code 16** Thatch grass/palm leaves-1 Iron/tin sheet/asbestos-2 Tiles-3 Concrete-4 Others -5 **Code 17** No latrines-1 Serviceable latrines 2 With roof , wall, door-3 Pucca latrines with water supply -4	**Code 18** No land-1 Wet land-2 Dry land-3 **Code 19** House/Piped connection-1 Own well-2 Public well/Tap-3 Stream/Canal/river-4 Rain water harvesting-5 Others-6	**Code 20** Wood-1 Kerosene-2 Gas-3 Electricty-4 Others-5	**Code-21** Improved-1 Old and Same-2 Miserable-3 NA-4

9. Animal Husbandry (numbers)

SL	Animal Husbandry	No's	How Procured Code -22	Current year	Last year	5 years ago	10 years ago	20 years ago
1	**Live stock**							
	Cow							
	ox							
	buffalo							
	goat							
	pig							
	Others……..							
2	**Poultry**							
	Chicken							
	Duck							

	Other birds…….							

Code-22
Self -1
Loan/Hire -2
Provided by friends/relatives-3
By govt. Prog-4
Grants/subsidies-5
By NGO/other instititions-6
Other……..7 (specify)

10. Household Access to services (Yes-1, No-0)

Name of Service	How Procured (code-22)	If -grant amount	Ownership Individual-1 Shared-2	Current year	Last year	5 years ago	10 years ago	20 years ago
Proper Sanitation								
Water								
Electricity								
Fuel								
Bank ……								
Loan ……								
Other ……..								

11. Where do you buy food stuff from? (Rank 3 main)

Ration shop	Local market	Local vendor	Margin free market	Maveli/Supply co/Consumer fed/Triveni, etc.	Common Market

12. Access to Public utility services

Services	Distance (Km)	Availability Current year	Last year	5 years ago	10 years ago	20 years ago
Fuel stations (for domestic use)						

Pucca road						
Bus stop						
Market						
PDS-Ration Shops						
PHC / Hospital						
Schools						
Colleges						
Bank/financial institutions						
Post Office						
Village/Panchayat Office						
Library/ reading room						
Police Station						
Electricity office						
Ambulance facilities						

13. Household assets and other equipment (nos)

Name of asset	Total owned Current year	Total owned Last year	Total owned 5 years ago	Total owned 10 years ago	Total owned 20 years ago	Year Procured	How Procured Code-22
Domestic appliances							
Cooker/stove							
Gas							
Refrigerator							
Radio							
Tape recorder							
Television							
DVD player							
Fixed phone							
Mobile phone							
Computer							
Mixer grinder							
Sofa set							

Sewing machine							
Furniture							
Mosquito nets/protection							
Water pump							
Cable /dish TV							
Water tank							
others							
Transport							
Bullock cart							
Bullock car/truck							
Bicycle							
Motorcycle							
Auto-rickshaw							
Car/jeep							
Others……							
Agricultural equipment							
Hoes							
Spades/shovel							
Ploughs							
Sprayer pump							
Irrigation pump							
Others……							
Code-22 Self -1 Loan/Hire -2 Provided by friends/relatives-3 By govt. Prog-4 Grants/subsidies-5 By NGO/other instititions-6 Other……..7 (specify)							

***Hint to enumerators**: fill in 1st and 6th column first as a check on recall responses.*

14. Common Amenities of this village (yes-1; no-0)

Assets	Distance (Km)	Current Year	Last year	5 years ago	10 years ago	20 years ago
Health centre/Hospitals	…….					
Public library/reading room	…….					

Community/Town hall	…….					
Common market	…….					
Ration Shop	…….					
Emergency ambulance facility	…….					
Rescue/fire station	…….					
Open ground	…….					
Career Guidance centre	…….					
Government School	…….					
Government College	…….					
Anganwady/primary school	…….					
TV/ Radio hall	…….					
Recreation Club	…….					
Others……	…….					

SECTION B: INTERGENERATIONAL QUESTIONS

IDENTIFY THREE GENERATIONS IN A HOUSHOLD. "GRANDPARENT" (GENERATION I), "PARENT" (GENERATION 2) AND "CURRENT" (GENERATION 3). GET INFORMATION ON EACH GENERATION FROM A REPRESENTAETIVE FROM THESE GENERATIONS DIRECTLY OR IF NOT POSSIBLE FROM THE CURRENT HOUSHOLD HEAD.
The official household head may be one grandparent for the entire household. I need to identify the 3 generations and identify the heads within each generation (e.g., current head, his parent and his grandparent). I have to allow for the fact that some heads within a household (e.g., grandparent) may be dead or away. In that case I get information about them from the next generation
Framing Question: "During the decade when you were 30-40 years of old"…
(Note: if the respondent (e.g., current head) is younger than 30 then ask the question as "During the time last 5 years of your life")

15. Time period controls

	Generation iiiG-3, iiG-2, iG-1	born=1	migrate=2
1. Were you born in this village or did you migrate here? (Tick)	……		
2. What was the calendar year you were born	……...	……	
3.What was the calendar year your spouse was born	……	……	
4. What was the calendar year during which you were age 35 (if age less than 35 put current year as answer)	……	……	

16. Activity and literacy History

Gender	Activity Employed-1 Unemployed-2 Others -3			Literacy Illiterate-1 Literate without formal Schooling-2 Literate with formal Schooling-3		
	iiiG	iiG	iG	iiiG	iiG	iG
Male						
Female						

17. Income History (Amount)

Income (Member ID)	Generation iiiG-3, iiG-2, iG-1	Current Year	Last year	5 years ago	10 years ago	20 years ago
M…….						
M…….						
M…….						
M…….						
M…….						
M…….						
M…….						
M…….						
Total Income						

18. Inter-generational Housing Profiles

Generation	Land in Acres	per acre value landholdings*	Area of House	House Type (Code 13)	Sanitary (Code 17)	Water Source (Code 19)
iii G		……	…….			
ii G		……	…….			
i G		……	…….			
*Value at current rate						

19. Standard of living

Generation	Standard of living
iii G	
ii G	

i G	
Code -23 Low-1, Medium-low-2, Medium-3, Medium-high-4, High-5	

20. Economic trajectory shifts: opportunities and challenges

Five major events that ***positively*** and ***negatively*** affected your economic well being by presenting and/or taking away opportunities for progress. Please ensure the most significant events are recorded first.

Code-24	*Positive*			*Negative*		
	iiiG	iiG	iG	iiiG	iiG	iG
1 (most important)						
2						
3						
4						
5						
Code-24 Natural disaster-1 Livestock sale or ownership change including shared ownership arrangements, inheritance-2 Land sale or ownership change including shared ownership arrangements, inheritance-3 Crop change in production-4 Health-5 Dowry or wedding expenses or receipts-6 Government policy programmes (food for work, employment schemes, building of roads infrastructure etc)-7 Started new business or economic activity-8 Household sent out migrants-9						

SECTION C:QUESTIONS FOR SPOUSE OF THE CURRENT HEAD OF HH

21. Spouse of Current Head Of HH (wife-1/husband-2)……	
1. Year of Marriage…….	
2 . Was it your decision to marry or was it decided by elders of your hh? (you-1/elders-2)	
3. Children ……..	
3a. Male …….. ….	3b. Female…….
4. Do you earn any share of household income (Yes-1/No-2)……..	

4a. If yes, what share of household income do you earn (as a percentage of total household income) ?……..
4b. Has there been a major change in your contribution? (positive-1/ negative-2/no change-4) ……..   If positive, from which year…….
5. Do you have a savings or checking account in your name? (yes=1; no=0)…….

22. Since your marriage have there been any changes in laws (in the region or country) that affects your power and control inside the household, and thereby your household wellbeing ?

Legal Changes	Response (yes-1; no-0)	Specify (if applicable)
1. Not aware of any such laws		
2. General laws about marriage and divorce		
3. Welfare, subsidy and aid programmes that are conditional on marriage status		
4. Laws governing divorce and marital property (e.g., land, assets etc) division		
5. Laws regarding marital violence		
6. Other (please specify)		
7. How many years ago did the law change? ……..		

23. Do you own any assets in your own name? If the assets listed below were to be sold, who would be the decision-maker?

Assets	Response (yes-1; no-0)	Specify (if applicable)	Decision-maker if asset is sold (**Code 25**)
1. House and land in which the household lives			
2. Livestock, Agricultural equipment			

3. Consumer durables that are expensive like cars			
4. Smaller vehicles like bikes			
5. Jewelry, large appliances like washing machine and refrigerator and furniture			
6. Savings and financial assets			
7. Businesses			
8. Other (specify)			
9. Have you inherited any assets?(if yes specify in column 3)			
10. What is the value of assets in your name?……..			
Code 25 1= I make the decision 2= My spouse makes the decision 3=I make the decision together and I am the primary decision-maker 4=I make the decision together and my husband is the primary decision-maker 5=I make the decision together and both share authority equally 6=Others …….			

24. For purchasing decisions regarding expensive appliances, who would be the primary decision maker? …….
(e.g., TV, VCR, Refrigerator, Modern cooking stove etc)(Insert from
Code 25 above)

Domestic appliances	Primary Decision Maker (Code-25)
1. Cooker/stove	
2. Gas	
3. Refrigerator	
4. Radio	
5. Tape recorder	
6. Television	
7. DVD player	
8. Fixed phone	
9.Mobile phone	
10. Computer	

11. Mixer grinder	
12. Sofa set	
13. Sewing machine	
14. Furniture	
15. Mosquito nets/protection	
16. Water pump	
17. Cable /dish TV	
18. Water tank	
19. Other……	

25. Who makes decisions on different family matters in your household?

Family Matter	**Primary Decision Maker** (Code-25)
1. Visiting your parents	
2. Getting self-employed	
3. Borrowing money	
4. Buying new appliances	
5. Buying new Land/Property/Assets	
6. Children level of education	
7. Children nutritional status	
8. Having another child	
9. Migrating to other regions	
10. House maintenance	
11. Switching employments	

Code 25
1= I make the decision
2= My spouse makes the decision
3=I make the decision together and I am the primary decision-maker
4=I make the decision together and my husband is the primary decision-maker
5=I make the decision together and both share authority equally
6=Others …….

25.Does your husband help in child-care?

Activity	Level of Help
1. Putting children to bed	
2. Playing with children	
3. Helping in studies	
4.Taking children to hospital	
Code 26 1= Often 2= Occasionally 3= Never 4= Don't know 5= No answer	

27. Are you a member of community seed bank? Yes/No

28. Do you do seed exchange through this bank? Yes/No

29. Have you received any bank loans through SHGs? Yes/No

30. If you are self-employed has it been under the assistance of SHGs? Yes/No

31. Are you head of Panchayat Samiti in your village? Yes/No

32. Did you vote in the last Parliamentary election? Yes/No

33. Did you vote in the last municipal election? Yes/No

34. What is your opinion of status of women in your village?.....

35. Has the status of women in your village changed over the time?

	Response (yes-1; no-0)	If Change, please specify (1= positive/ 2=negative)
1 5 years ago		
2 10 years ago		

3 20 years ago		

Remarks

……
……
……
……
……
……
……
……

Notes:
*1.*The primary respondent should be the current Head of the household and aged 30 years or older.
2.If the head of the household is not present, the information should be collected
from the immediate responsible person of this age level.
3.Head of Household: An individual in one family setting who provides actual support and maintenance to one or more individuals who are related to him or her
4. (iiiG- Current generation; iiG- Parent; iG- Grand Parent)
5. Section B: GENERATIONAL head of HH: Current, Parent, Grand Parent.
6. Section C: SPOUSE of the GENERATIONAL head of HH (relating to Section B).
7. Recall responses need to be recorded with caution. Frame the question as “what was your [insert question] 5, 10 and 20 years ago?”

Appendix 2. Focus Group Discussion Forms

A2.1 Consent Form

Focus Group Discussion Consent Form

Title of Research Project: Occupation and Asset Poverty Traps in India: Determining the Distributional Impact of Policies (Alleviating Poverty and Malnutrition in Agro-Biodiversity Hotspots)

Investigators:
V.A. Nambi, Principal Investigator APM project, MS Swaminathan Research Foundation, Chennai, Tel: +91 (44) 22541229, +91 (44) 22541698
Sandeep Mohapatra University of Alberta (phone: +1-780-492-0823)
John K Pattison University of Alberta (phone: +1-780-878-5086)
Brent Swallow, University of Alberta (phone: +1-780-492-6656)
Jeremy Haggar, University of Greenwich (phone: +44 (0)1634 883209
Consent:

Please answer the following questions by circling yes or no.

Do you understand that you have been asked to be in a research study?			YES	NO
Do you consent to being audio-taped?		YES	NO	
Have you read and received a copy of the attached Information Sheet?		YES	NO	
Do you understand the benefits and risks involved in taking part in this study?		YES	NO	
Have you had an opportunity to ask questions and discuss this study?		YES	NO	
Do you understand that you can quit taking part in this study at any time?		YES	NO	
Has confidentiality been explained to you?	YES	NO		
Do you agree to keep what is said in the focus group confidential?		YES	NO	
Do you understand who will be able to see or hear what you said?		YES	NO	
Do you know what the information you say will be used for?		YES	NO	
Do you give us permission to use your data for the purposes specified?		YES	NO	

This study was explained to me by: _____

I agree to take part in this study:

_____ _____ _____

Signature or thumbprint of participant Date Witness

_____

Printed Name

I am confident that the participant who has signed this form understands what is involved in participating in this study and voluntarily agrees to participate.

_____

Signature of Investigator

A2.2 Information Sheet

Occupation and Asset Poverty Traps in India: Determining the Distributional Impact of Policies

Information Letter for Focus Group Participants

Purpose of the Study:
The goal of this research component is to search for the existence and determinants of poverty traps in rural India, and understand how government policies and services can help households escape these traps and achieve economic development in rural India. I are holding meetings like this in the places where I work together in Tamil Nadu, Kerala and Odisha.

Who is doing this Study:
A team of researchers from the University of Alberta in Canada, the M.S. Swaminathan Research Foundation (MSSRF) and the University of Greenwich (UK) are conducting this study. Dr. Sandeep Mohapatra, John Pattison and Dr. Brent Swallow are the project leads. In this area, the MSSRF team includes: Chaudhury Shripati Mishra, Rajakishor Mahana, and Seema Tigga.

Methods:
The information for this study will be collected through focus groups. The focus groups will take approximately 1 hour to complete. Each focus group interview will be audio recorded and typed out to ensure the accuracy of the data and assist with data analysis. Translators and note takers will help us to communicate between English and your local language.

Consent:
Participation in this research study is entirely voluntary. You are free to leave the focus group at any time. You may also choose not to answer particular questions within the focus group interviews. No one will be able to connect your data with any identifying information. Because of the way that I are recording the group proceedings, I won't be able to remove your contribution at any later time.

Confidentiality:
The data will be kept in a locked filing cabinet/password protected digital file for five years following the completion of the study, after which time the data will be destroyed. I will not share the original interviews with anyone other than the researchers.

Members of the research team will comply with the University of Alberta Standards for the Protection of Human Research. They will sign a confidentiality agreement to ensure confidentiality.

Benefits of participating in this study:

While participating in this study may not benefit you directly, the information I gather will help us to better understand how Indians are using available programmes to meet their needs. This knowledge may help other people access programmes and may be used to create suggestions to improve Indian policies as well as policies in other countries.

Risks of participating in this study:
A risk of participating in this study is that you may feel upset about the information that you have shared. If this occurs, the focus group facilitator will talk with you after the focus group. The focus group facilitator can also provide information about services that you can go to for help.

There is also a risk that another focus group participant might share what you have said in the focus group with someone outside of the group. Before and after each focus group, all participants will be reminded that information shared in the group is confidential and shouldn't be shared outside of the focus group.

Reimbursement of expenses:
To acknowledge your time, I will provide a meal for you and transportation to and from your home.

Ethics Approval:
The plan for this study has been reviewed for its adherence to ethical guidelines and approved by a Research Ethics Board at the University of Alberta. For questions regarding participant rights and ethical conduct of research, please contact the Research Ethics Office, University of Alberta at 1-780-492-0459 or the Director of the MS Swaminathan Foundation, Dr. Ajay Parida at Tel: +91 (44) 22541229, +91 (44) 22541698.

Contact Information:
If you have any questions or concerns, please contact V.A. Nambi at Tel: +91 (44) 22541229 or Dr. Brent Swallow (phone: +1-780-492-6656), or John Pattison (phone: +1-780- 878- 5086) at the University of Alberta, or Dr. Sandeep Mohapatra at the University of Alberta (phone: +1-780-492-0823), or Jeremy Haggar at the University of Greenwich (Tel: +44 (0)1634 883209).

A2.3 Interview Guide

Focus Group Interview Guide

For HH Heads, Parents and Spouse
GROUP 1 = Landed Non-Tribal (OBC – other backward caste; not untouchables)
GROUP 2 = Landless Tribal (ST – Scheduled Tribe)
GROUP 3 = Landed Tribal (ST – Scheduled Tribe)

The purpose of this gathering is to help me understand find out how the general wellbeing of your family has improved, remained the same or decreased over the last 20 years.

Questions Regarding Poverty Traps and Generations

1. Do you think your general wellbeing has increased or decreased over the last 20 years?

2. What are the major changes in wellbeing that you have observed between the generations in the hh during the lifetime of the older generations present? (Note this question is looking at changes between the generations over time - assuming at least 2 gens are present).

3. Have there been significant events that have affected you negatively or positively during this time? For example: new laws, prices changes, drought, floods

4. How important has government assistance has been in leading to these changes?

5. Have any of you been lifted out of (escaped?) poverty, only to fall back in again for some reason? What was that reason?

6. Have there been particular government programmes that you have used that significantly impacted your life?

7. What programmes were available in YOUR generation (GEN2) that are not available now? What programmes that currently exist do you wish you had access to then?

8. Is there something you think government could do - or stop doing - in terms of policies that will help in the future? Any recommendations?

9. For the women – do you think there have been significant changes in the status of women? Positive or negative? What are they?

Appendix 3. Overview of Five National Anti-Poverty Schemes

India has a large number of national government policies and associate schemes (or programmes) to assist the poor (Government of India, 2016d). Based upon social, environmental and agricultural impact and in consultation with MSSRF project staff, five major national government schemes will be described here that are considered to have a significant impact on marginalized groups in the remote regions of Odisha, Kolli Hills and Wayanad. These specifically identified schemes will be considered in the policy perspectives analysis in Chapter 8 and are summarized below.

Public Distribution System (PDS)

The premier national social policy scheme in India is the PDS. With historical foundation in the rationing system of the British Empire, public distribution of food-grains was formalized in 1951 when the nation decided to institute planned national economic development that incorporated justice (Food and Agricultural Organization, 1994). It was institutionalized in 1958 and the "Ration Shops" now included other commodities such as kerosene, sugar and cooking coal. By 1965 the PDS was managed by the state owned Food Corporation of India and had shifted from a food rationing system to a food safety system with the objectives of:

i) Providing foodgrains and other essential items to vulnerable sections of the society at reasonable (subsidised) prices;

ii) having a moderating influence on the open market prices of cereals, the distribution of which constitutes a fairly big share of the total marketable surplus; and

iii) attempting socialisation in the matter of distribution of essential commodities.

In 1992 the PDS was revamped to increase the number of shops in rural areas and address the issue of increasing prices. And in 1997 it was revised again with the formation of a *targeted* PDS system that had a pro-poor focus - no longer universally accessible to all members of the population. Access to food from ration shops now requires Below Poverty Line (BPL) cards accessible to individuals based upon socio-economic information obtained in the latest Indian census. According to Breitkreuz et al. (2014) the PDS is viewed as an essential but highly criticized government programme due to the gross inefficiencies within the system.

Backward Regions of India Fund (BRGF)

The second scheme of import in two of the three project locations is the national Backward Regions Grant Fund (BRGF) that the Districts of Wayanad and Koraput have been classified. This Fund was established in 2007 as a new form of the similar Rashtriya Sama Vikas Yojana (RSVY). The BRGF identifies and provides financial support to 250 Districts in 27 states across India for four objectives (Government of India, 2009):

1) *Bridge gaps in local infrastructure that are not being achieved with current financial inflows*
2) *Strengthen Panchayat and Municipality level governance*
3) *Provide professional support to local planning bodies*
4) *Improve the performance and delivery of critical functions at the local government level.*

The expected outcomes of this scheme are to contribute towards poverty alleviation, promote accountable and responsible Panchayats and Municipalities, and mitigate regional imbalances (Government of India, 2009). Direct benefit to the poor will be increased funding to amenities, anganwadis and health centres that cater to poorer communities. Special attention is to be directed towards funding

programmes that directly benefit ST/SC communities and towards that end each region must have separate sub-plan to show the specific allocation to these populations (Government of India, 2014a).

Mahatma Ghandi National Rural Employment Guarantee Act (MGNREGA)

The third major national scheme that is expected to have had significant impact on poverty levels in the project sites is the 2006[76] National Rural Employment Guarantee Act (MGNREGA). NREG is a national employment guarantee scheme that provides the opportunity for up to 100 days of employment per year per household across rural India. Typical activities available for compensation are watershed development, road construction and clearing of land for agricultural use. Although nationally directed, it is implemented by the individual states, and if the state government is unable to provide the applicant with work within 15 days there is eligibility for unemployment allowance (Breitkreuz et al., 2014). While the objective is supplemental employment and income, the NREG also has an objective to facilitate the empowerment of women by strengthening civic participation, promoting financial inclusion and independence and improving the rural landscape (Breitkreuz et al., 2014; Mann and Pande, 2012).

The NREG is operationalized through the use of household work cards provided by the Gram Panchayat. A card entitles 100 days of work for a household of up to three adults. These cards must include the name, age, sex and photographs of the participants to stop misuse and corruption. Renewal is required every 5 years. An important component is the guaranteed daily wage rate which is a self-targeting measure providing an incentive for the poorest members of the community to participate. In 2012 the official wage rate for NREGA across the states ranged from 122 rupees per day to 191 rupees per day (Government of India, 2005) with no wage distinction

[76] Although legislated in 2005 the programme was not launched until 2006.

made between women and men. In practice this situation has not been occurred. Wage rates vary from the official and differences are observed between genders – men are often paid more than women (Breitkreuz et al., 2014).

Pradhan Mantri Gram Sadak Yojana (PMGSY)

The Pradhan Mantri Gram Sadak Yojana (PMGSY) - commonly referred to as the "All India Roads Scheme" - was introduced in 2000 under the jurisdiction of the Ministry of Rural Development (Mahajan, Sahai and Pasrija, 2007). Facing a poor road network and transportation links for many of the poor regions of the country, the objective was to provide an excellent network of all weather roads between villages across the country. The construction of roads was completed swiftly and with modern technology, but often workers with the NREGA programme completed the foundational work on rural roads, thereby providing another benefit of work for unemployed members of the population. Original milestones were to have roads established between villages over 1000 people by 2003 and villages over 500 people by 2007 (Government of India, 2016c). While the physical success of many schemes is difficult to observe, the benefit from the PMGSY is very evident when driving to the project locations. Despite many of the communities being very rural and remote, there is an excellent network of paved roads that are passable in even heavy rains (Mahajan, Sahai and Pasrija, 2007).

The Indira Awaas Yojana (IAY)

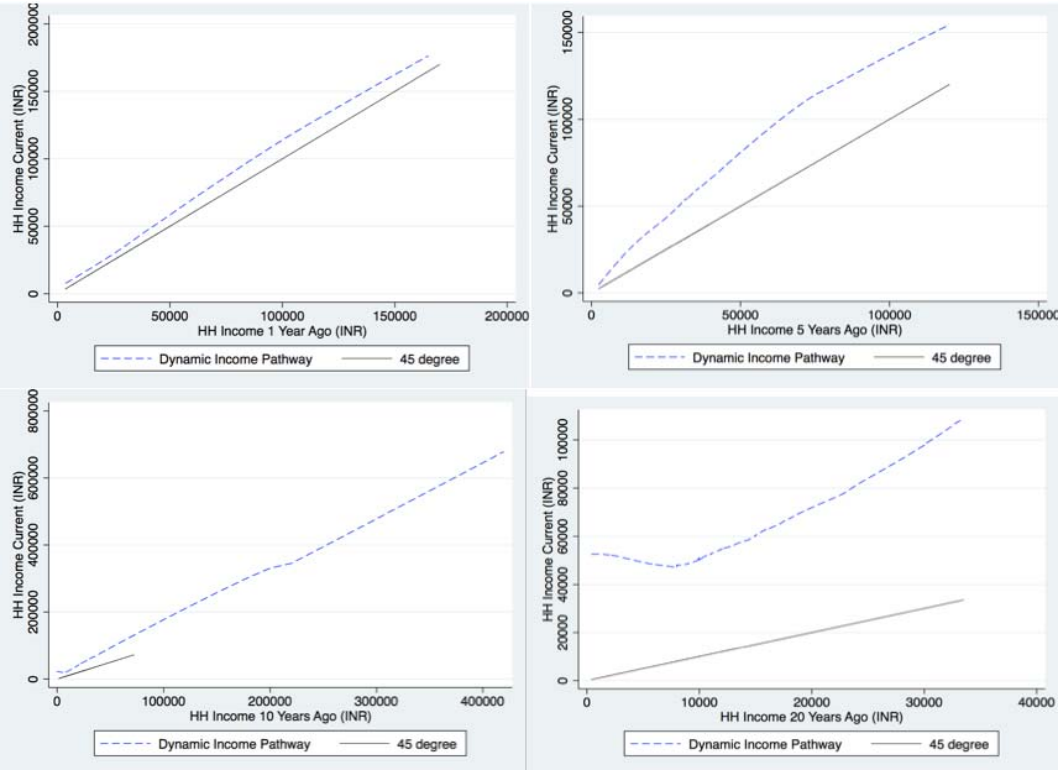
The final national level policy explored is the Indira Awaas Yojana (IAY) – or the "housing scheme". The IAY was started in 1985 as part of the Rural Landless Employment Guarantee Programme and has been operating as an independent scheme since 1996. Established to address rural homelessness across India, the scheme provides funds and building materials to ST/SC and BPL households. The finances can be used to construct or upgrade current houses (Government of India, 2016b). The main objective of the scheme is to

allow the rural poor to build a home without savings or entering into debt. Financial assistance is determined based upon location and upgrading versus constructing and is shared between central and state governments at a 3:1 ratio (Mahajan, Sahai and Pasrija, 2007).

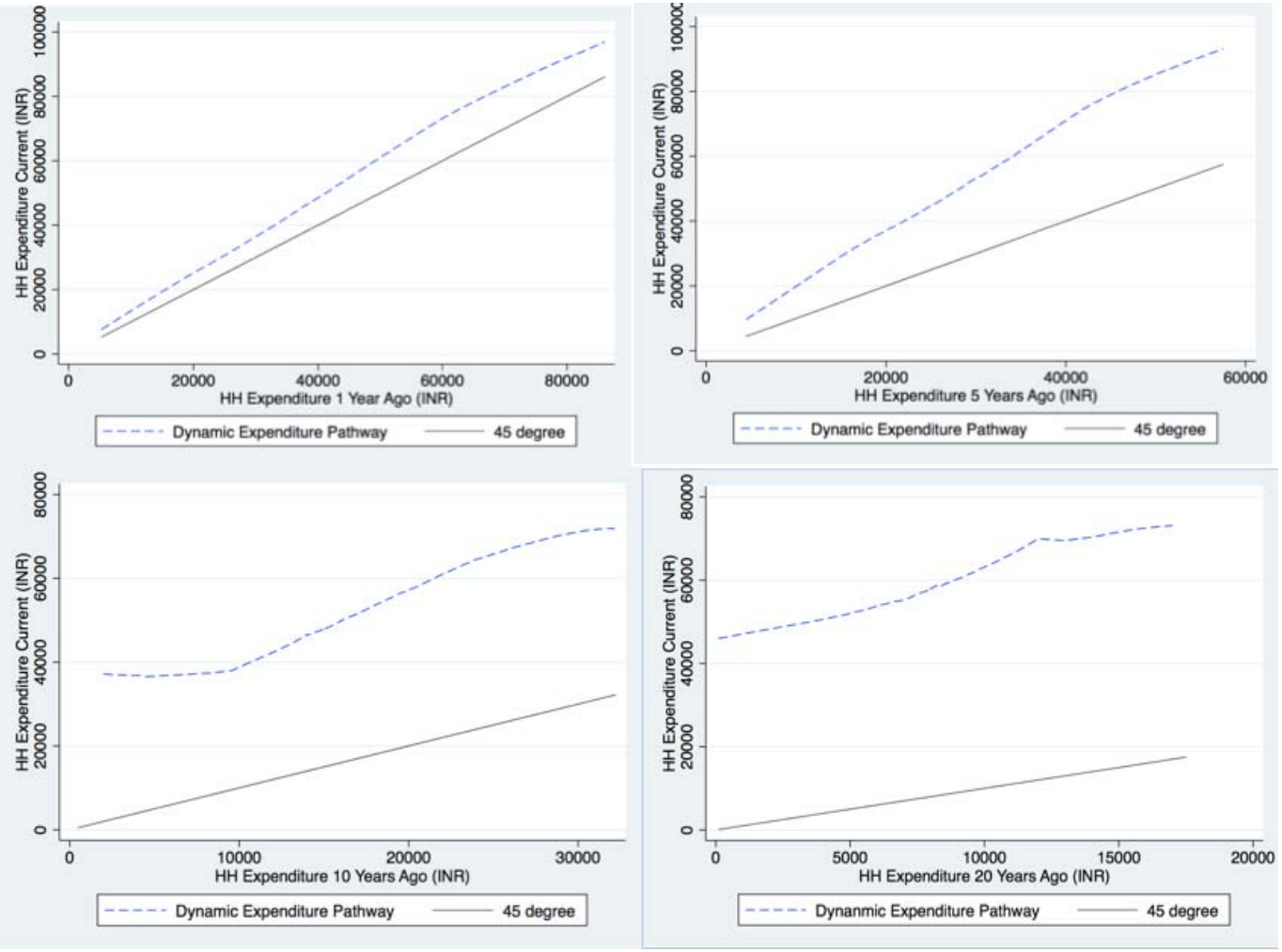
Appendix 4. Methodological Comparison: LOWESS Smoothing

The graphs within this section are the non-parametric outcome variable results (income, expenditure, agricultural land and total household asset index) calculated with the standard LOWESS approach. These results are very similar to that calculated with the MFP approach used in Chapter 7.

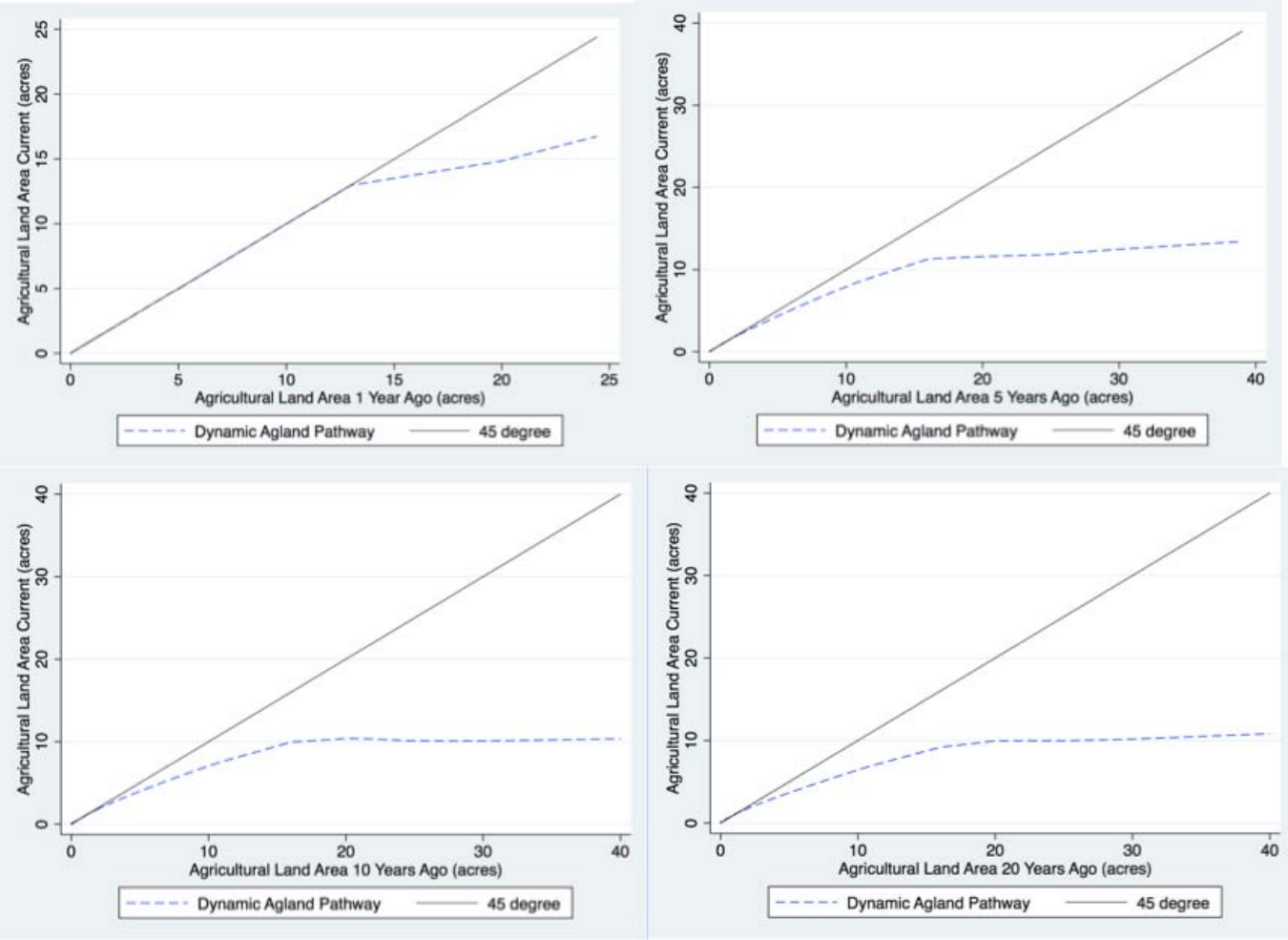
A4.1 Income



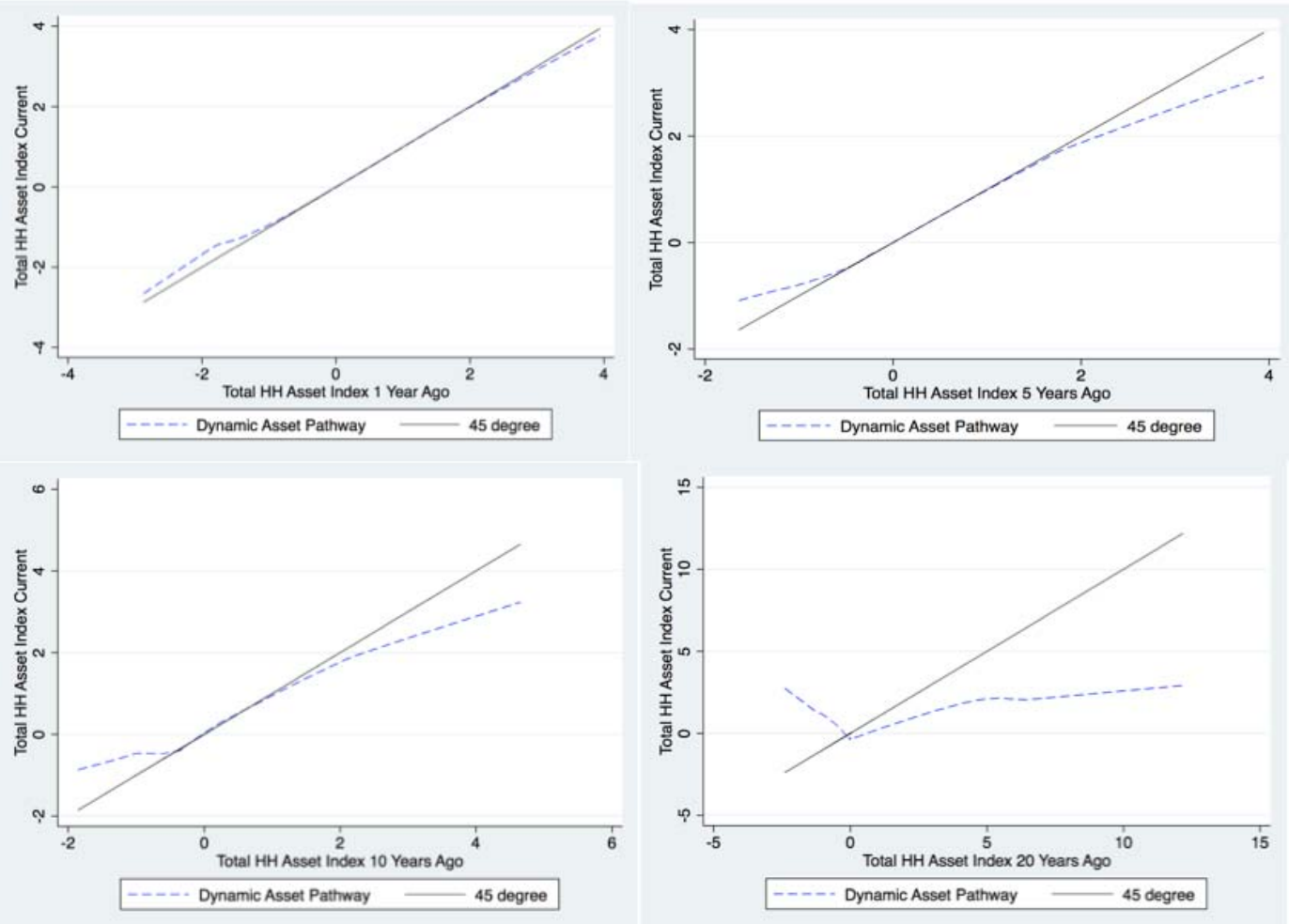
A4.2 Expenditure



A4.3 Agricultural Land Asset

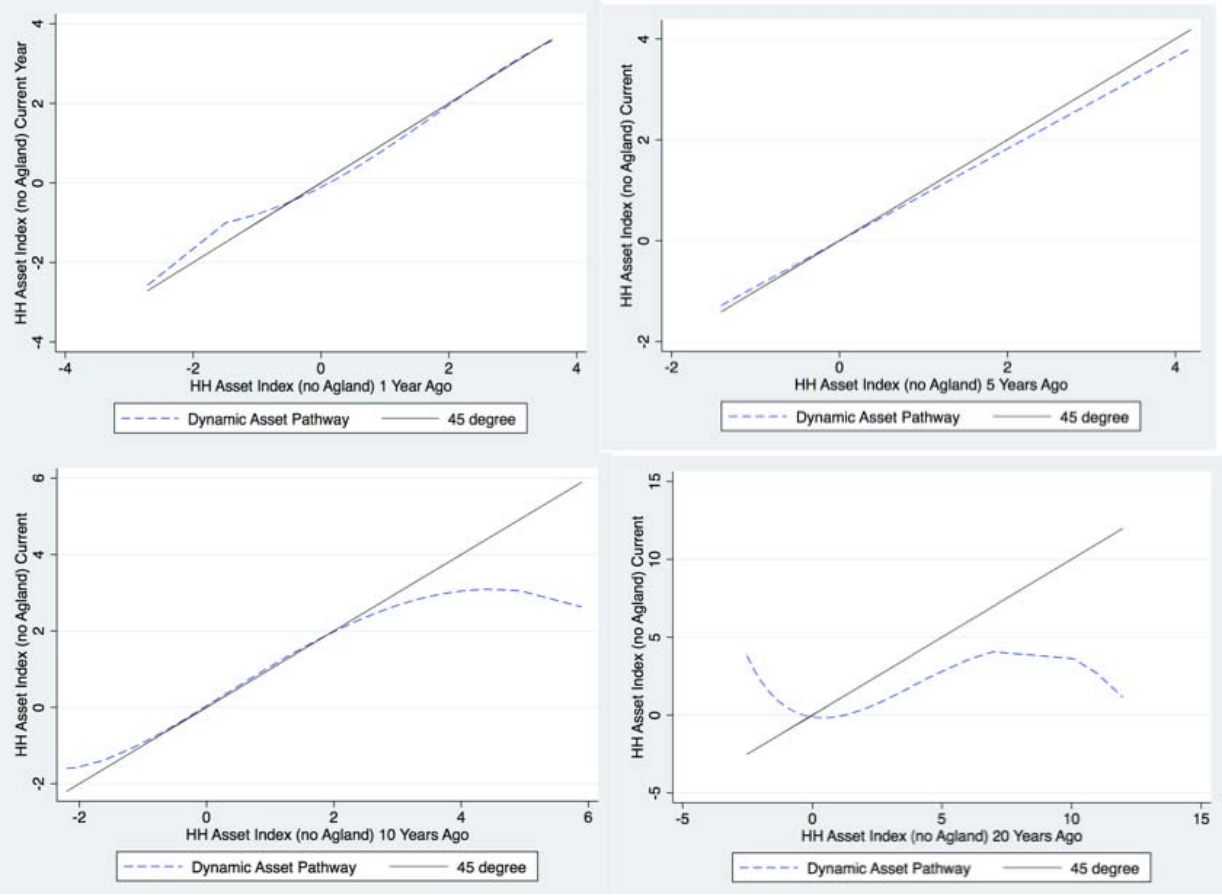


A4.4 Total Household Asset Index



Appendix 5. Total Asset Index Analysis with Agricultural Land Removed

The graphs below represent an MFP estimation of the total household asset index without agricultural land in the PFA index construction. The purpose of this comparison is to determine how much influence agricultural land has on the results. As can be seen, the results remain quite similar, thereby affirming the decision to keep agricultural land in the PFA index in Chapter 7.

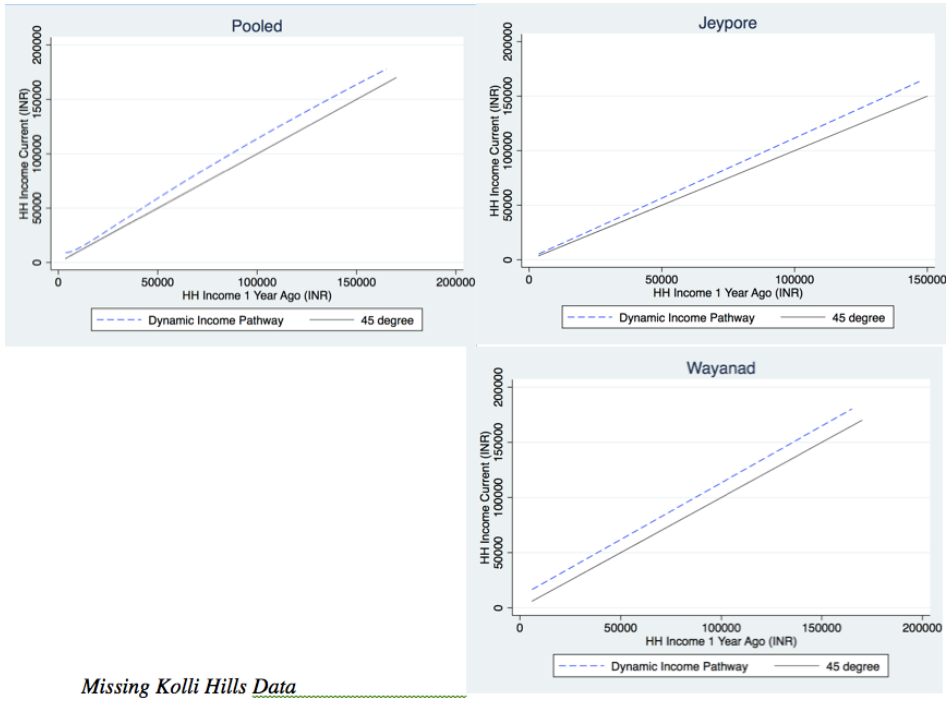


Appendix 6. Research Site Comparison of Outcome Variables

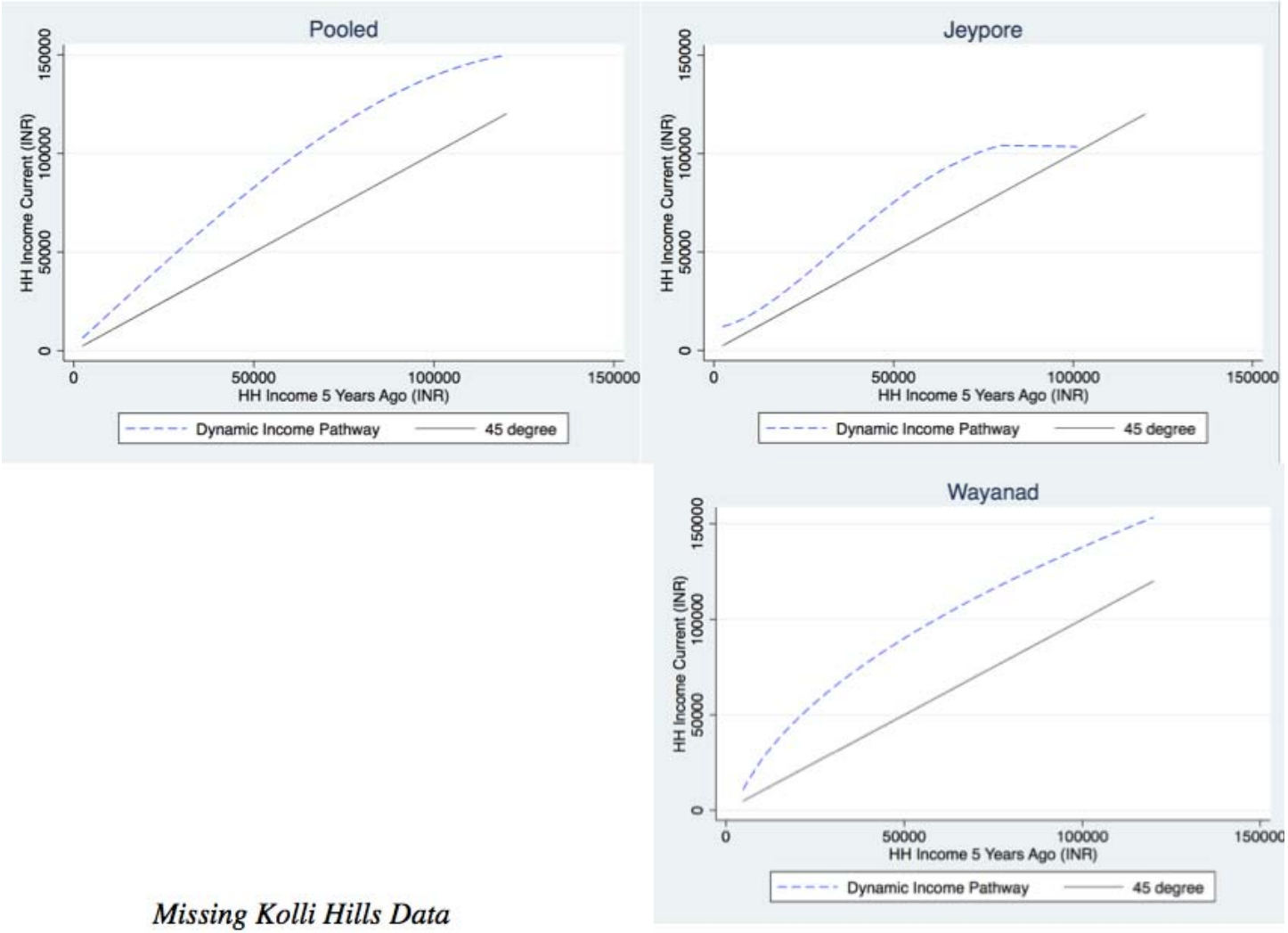
Throughout the thesis distinction was made between the individual research locations. However, the analysis presented in Chapters 7 and 8 was conducted on pooled data from the three sites (though Chapter 8 did include location covariates). The graphical representations below show the semi-parametric MFP results for the total household asset index comparison. There is a common result across research sites, providing a level of affirmation for the decision to pool the data in the body of the thesis.

A6.1 Income

a. 1 Year Ago

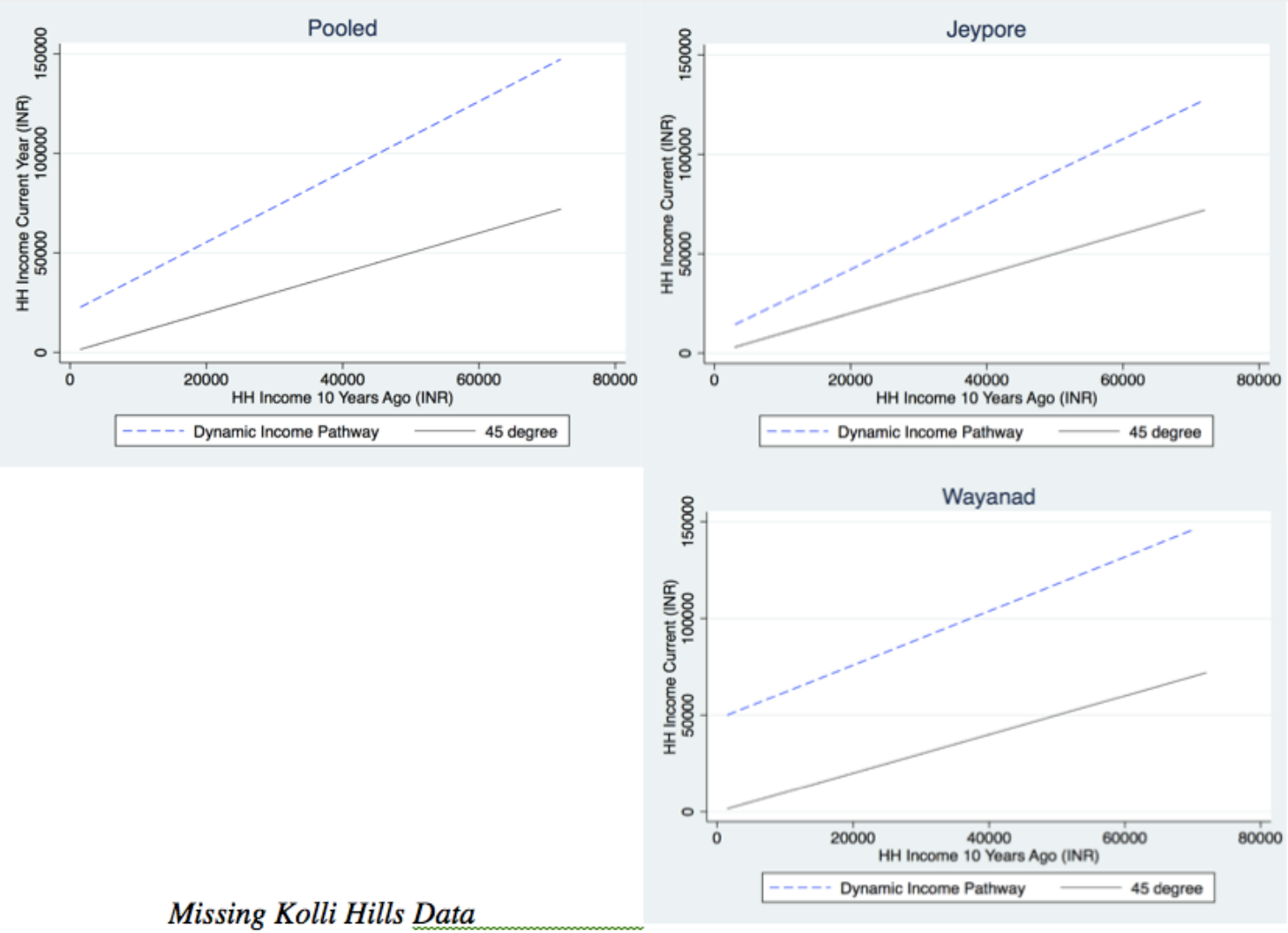


b. 5 Years Ago



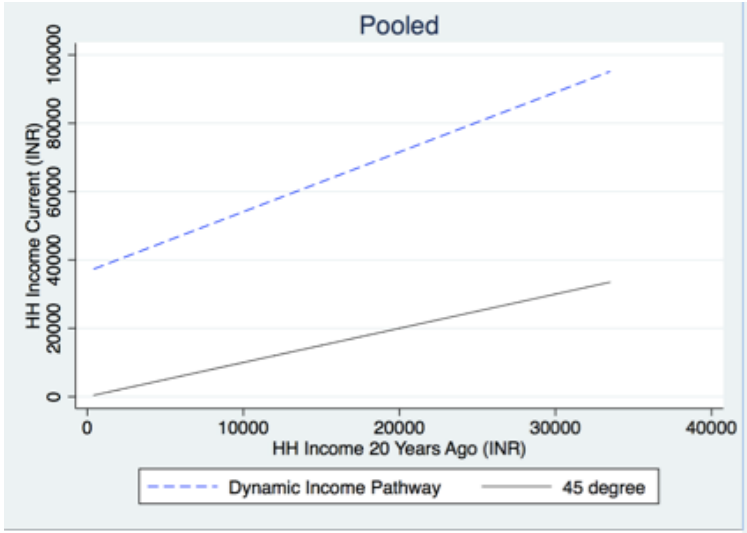
Missing Kolli Hills Data

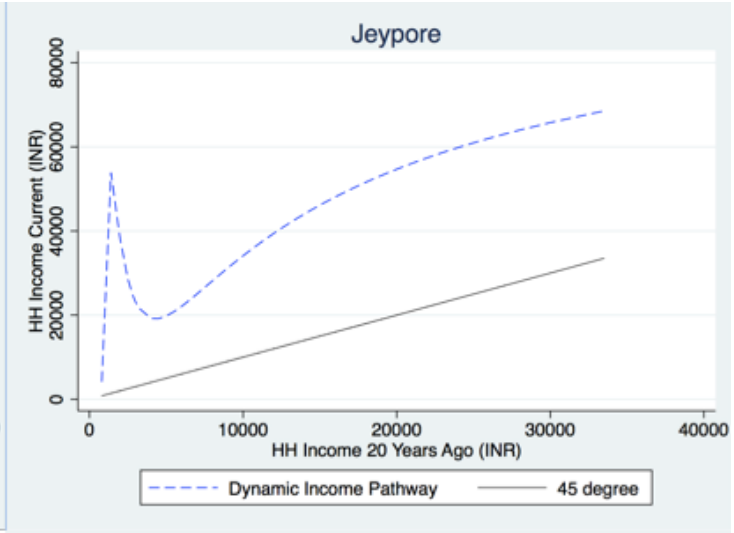
c. 10 Years Ago

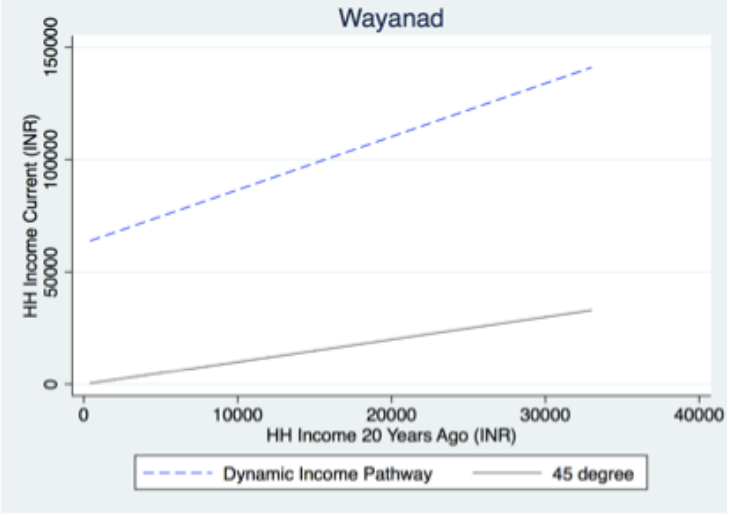


Missing Kolli Hills Data

d. 20 Years Ago



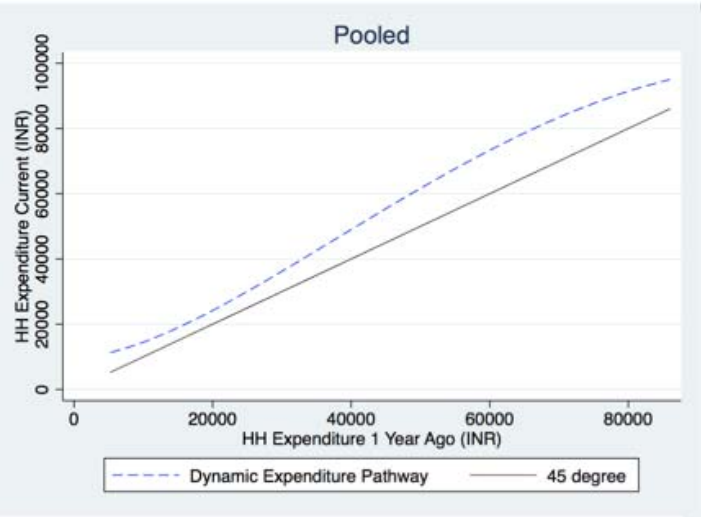


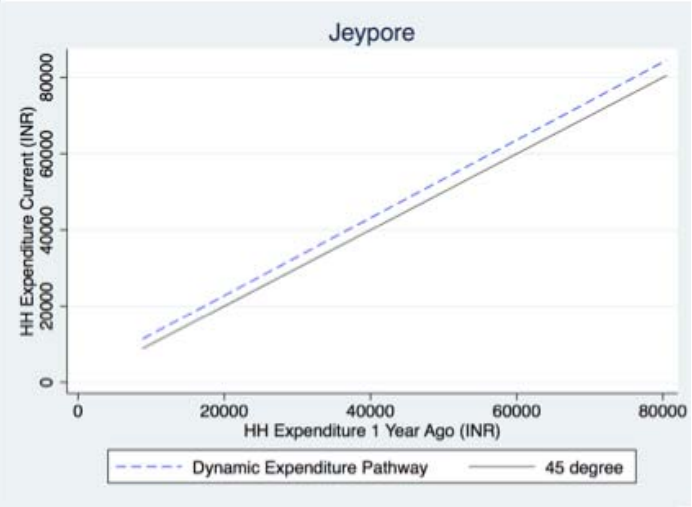


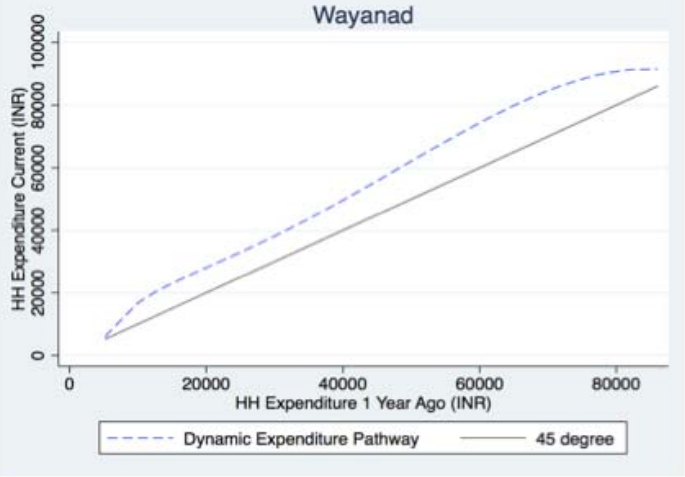
Missing Kolli Hills Data

A6.2 Expenditure

a. 1 Year Ago

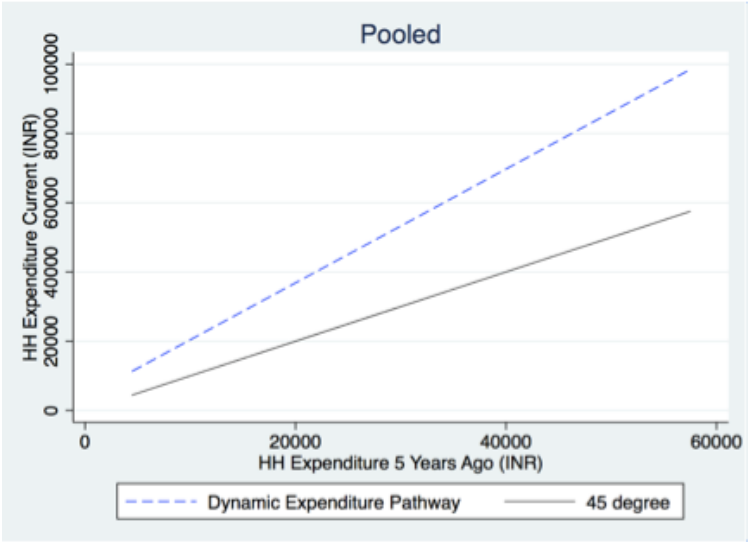


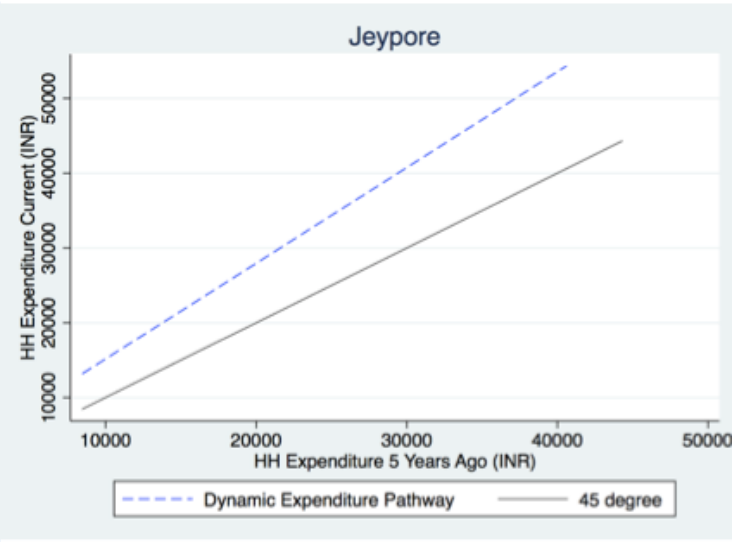


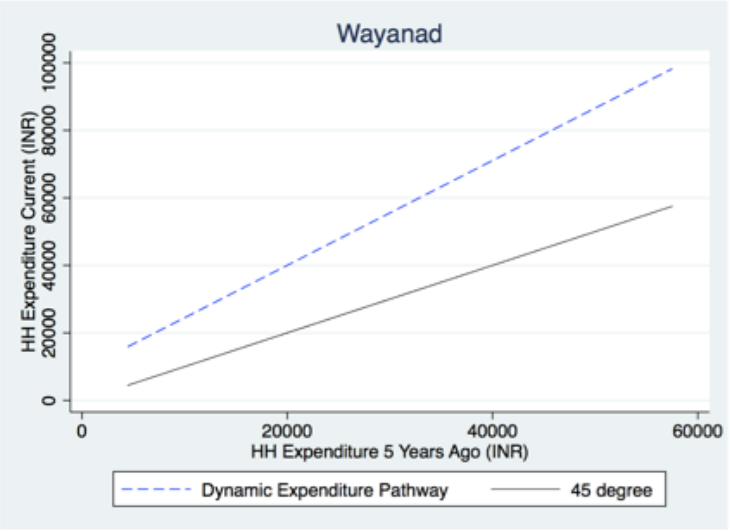


Missing Kolli Hills Data

b. 5 Years Ago







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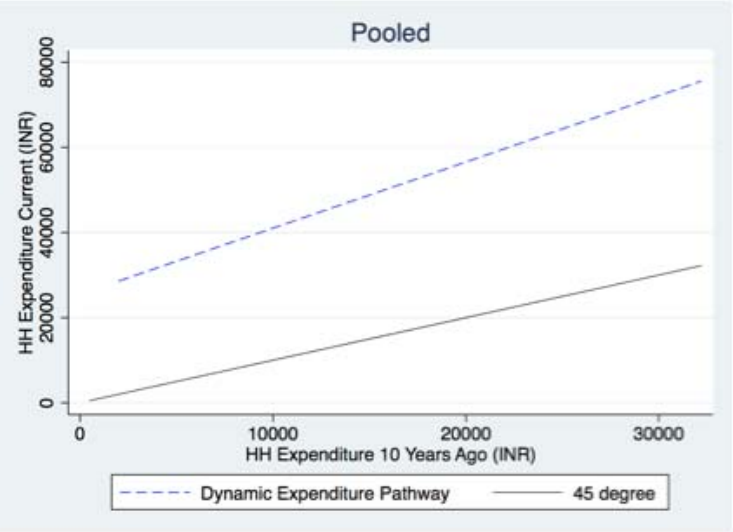
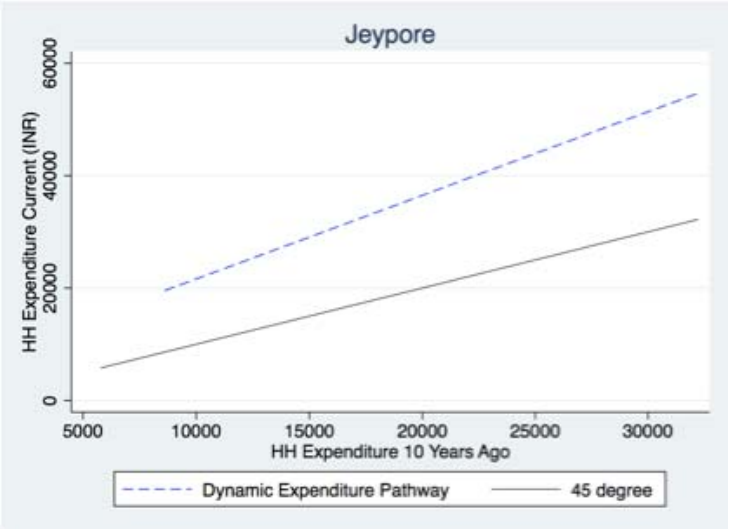
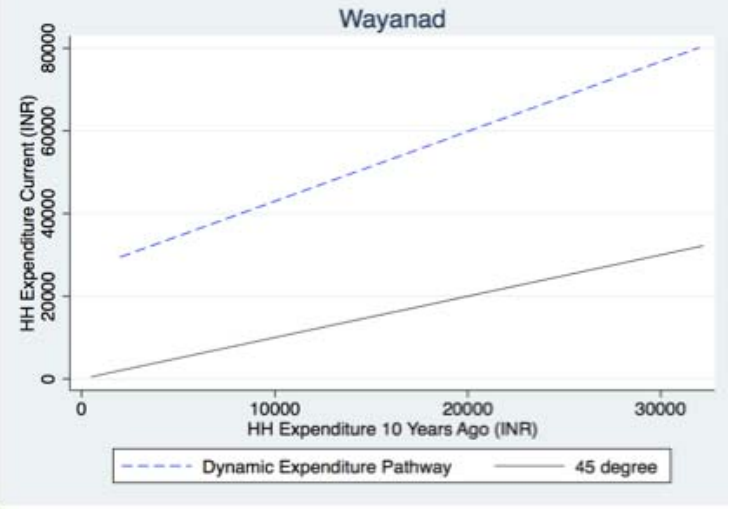
c. 10 Years Ago

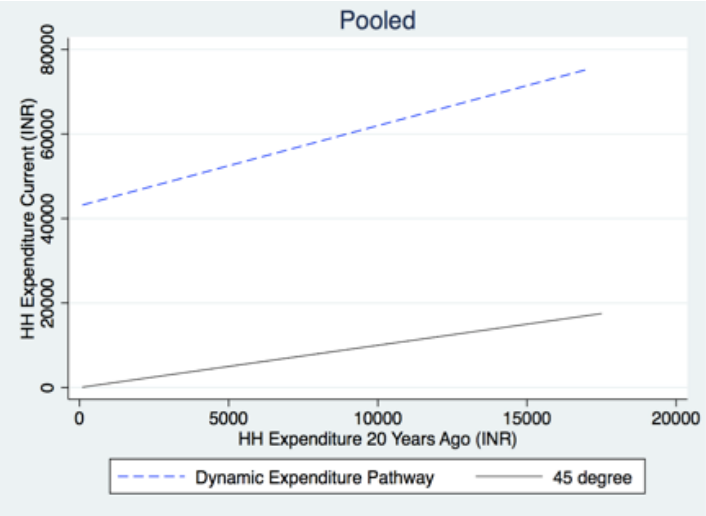




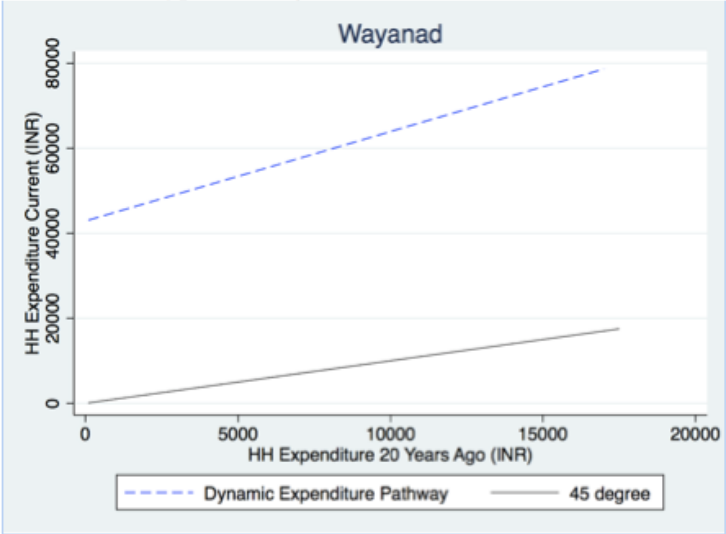


Missing Kolli Hills Data

d. 20 Years Ago



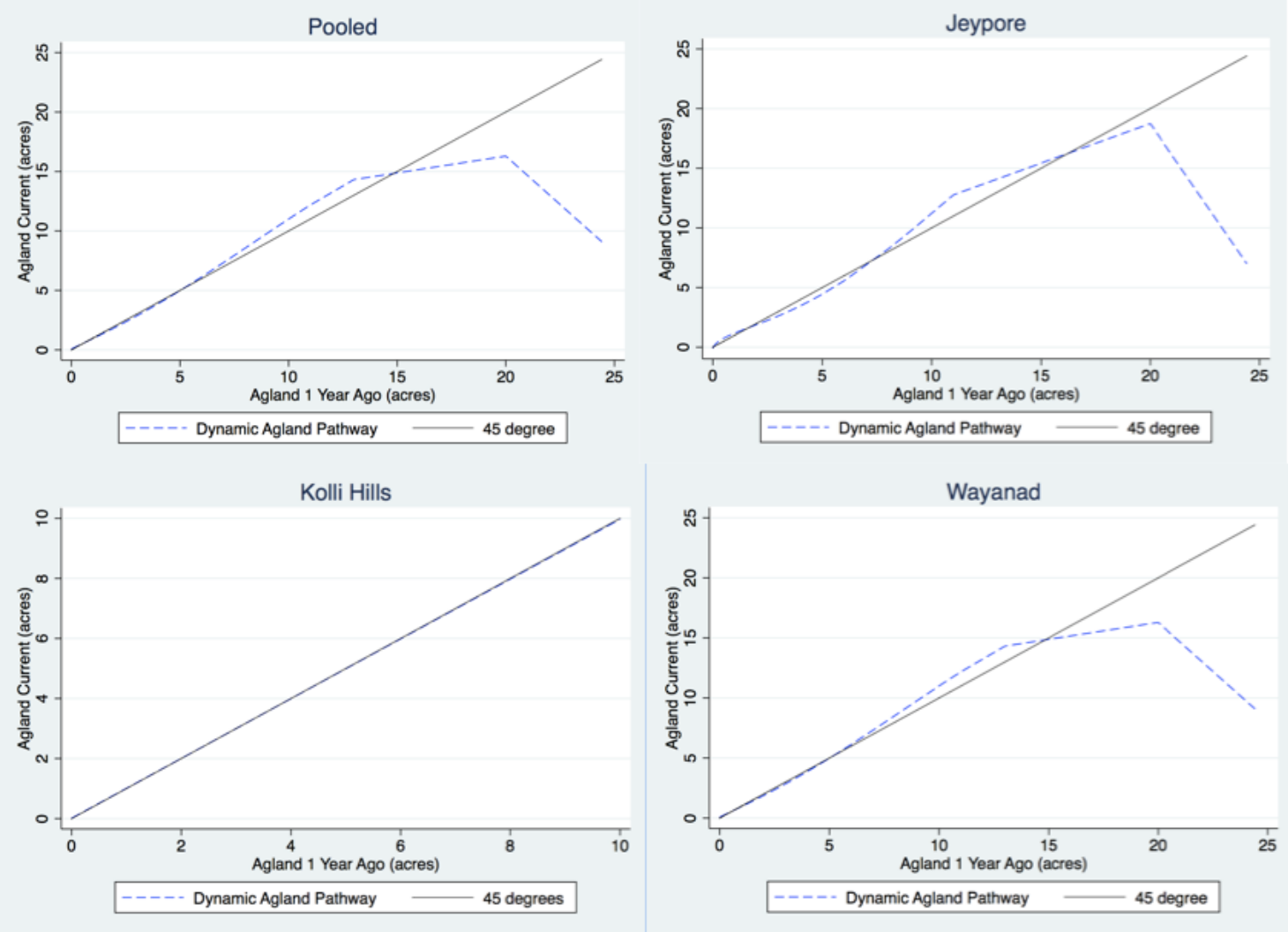
Jeypore too few observations



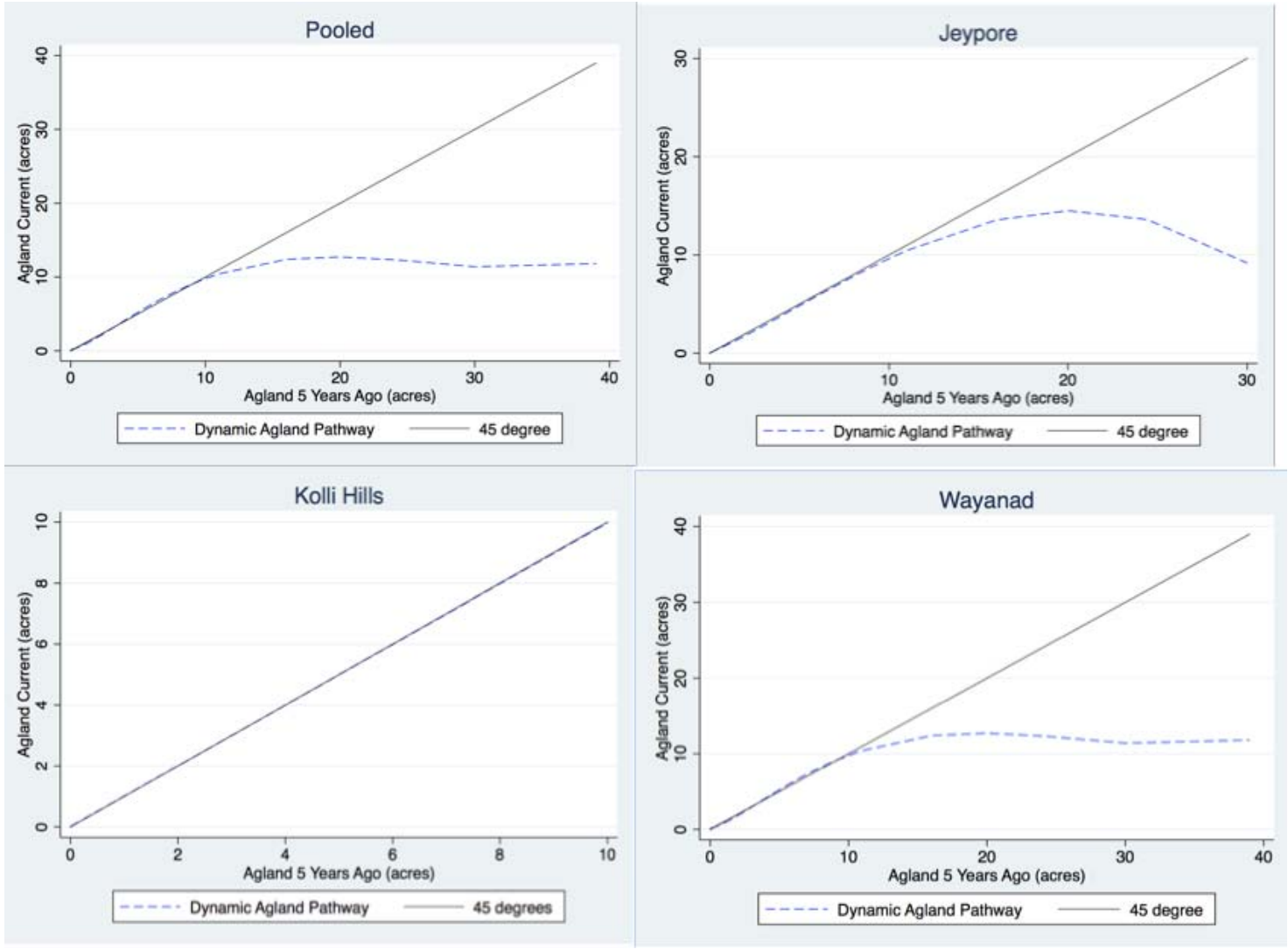
Missing Kolli Hills Data

A6.3 Agricultural Land Assets

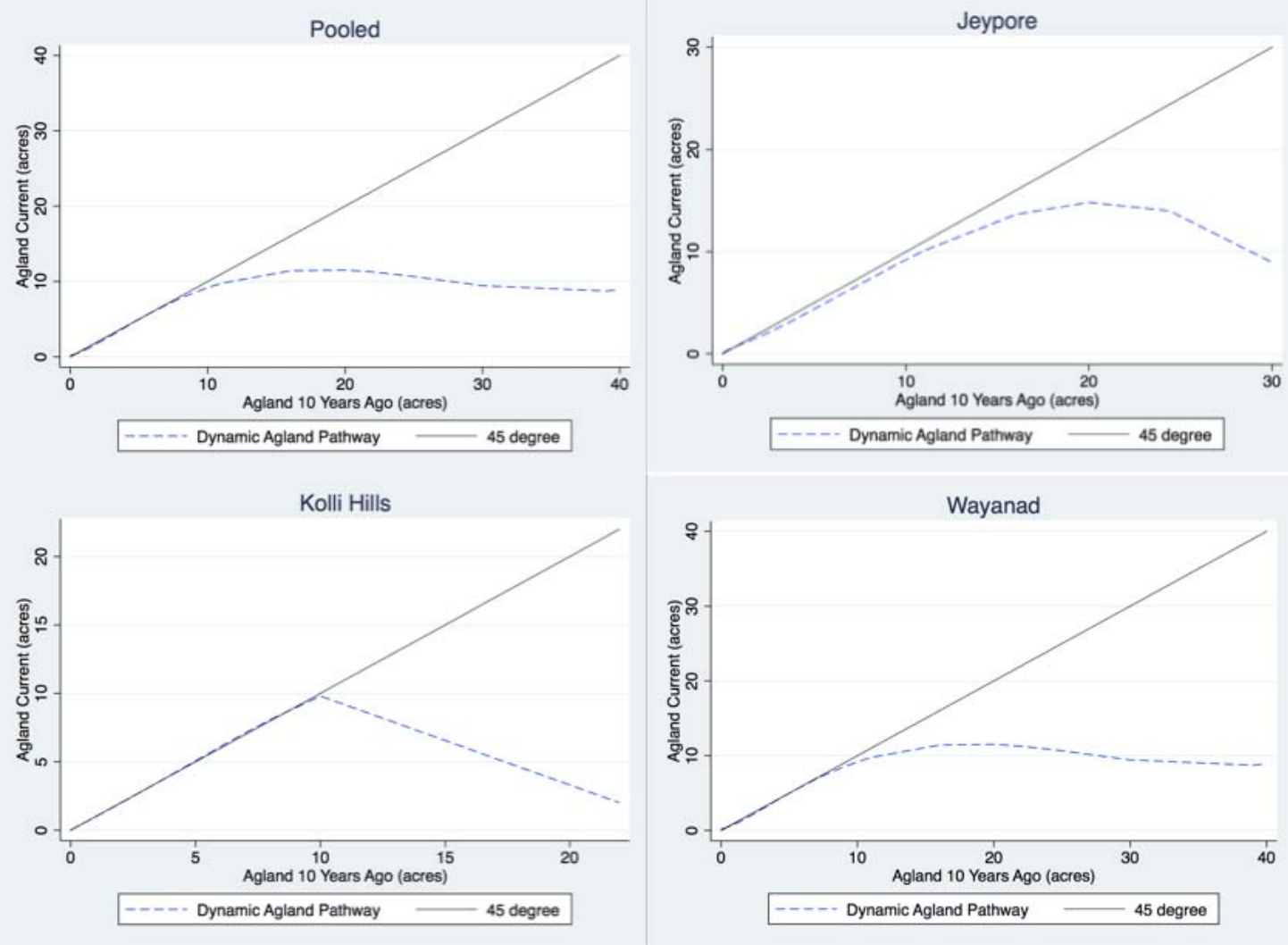
a. 1 Year Ago



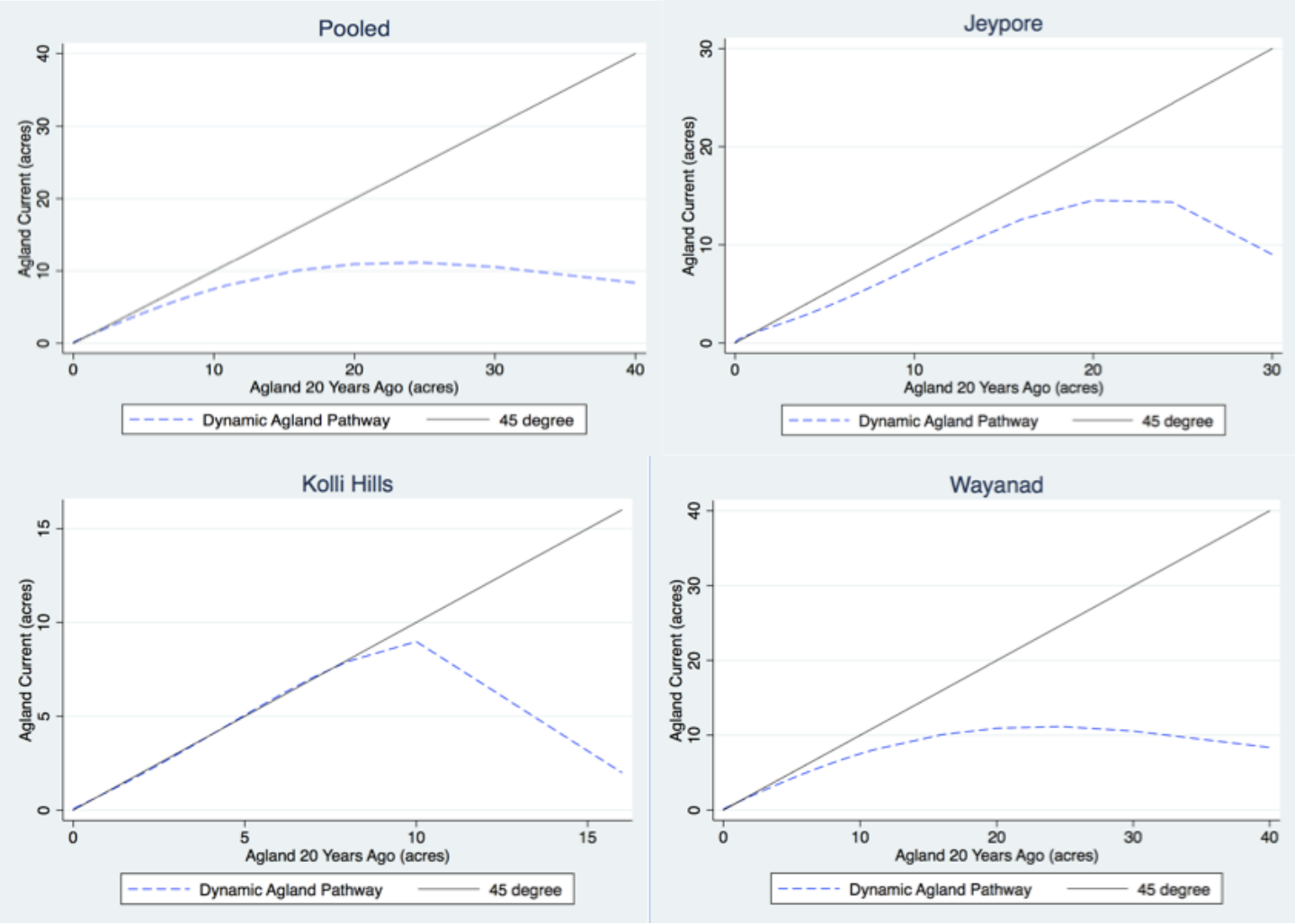
b. 5 Years Ago


Pooled
Agland Current (acres)
0
10
20
30
40
Agland 5 Years Ago (acres)
Dynamic Agland Pathway
45 degree
Jeypore
Agland Current (acres)
0
10
20
30
Agland 5 Years Ago (acres)
Dynamic Agland Pathway
45 degree
Kolli Hills
Agland Current (acres)
0
2
4
6
8
10
Agland 5 Years Ago (acres)
Dynamic Agland Pathway
45 degrees
Wayanad
Agland Current (acres)
0
10
20
30
40
Agland 5 Years Ago (acres)
Dynamic Agland Pathway
45 degree

c. 10 Years Ago

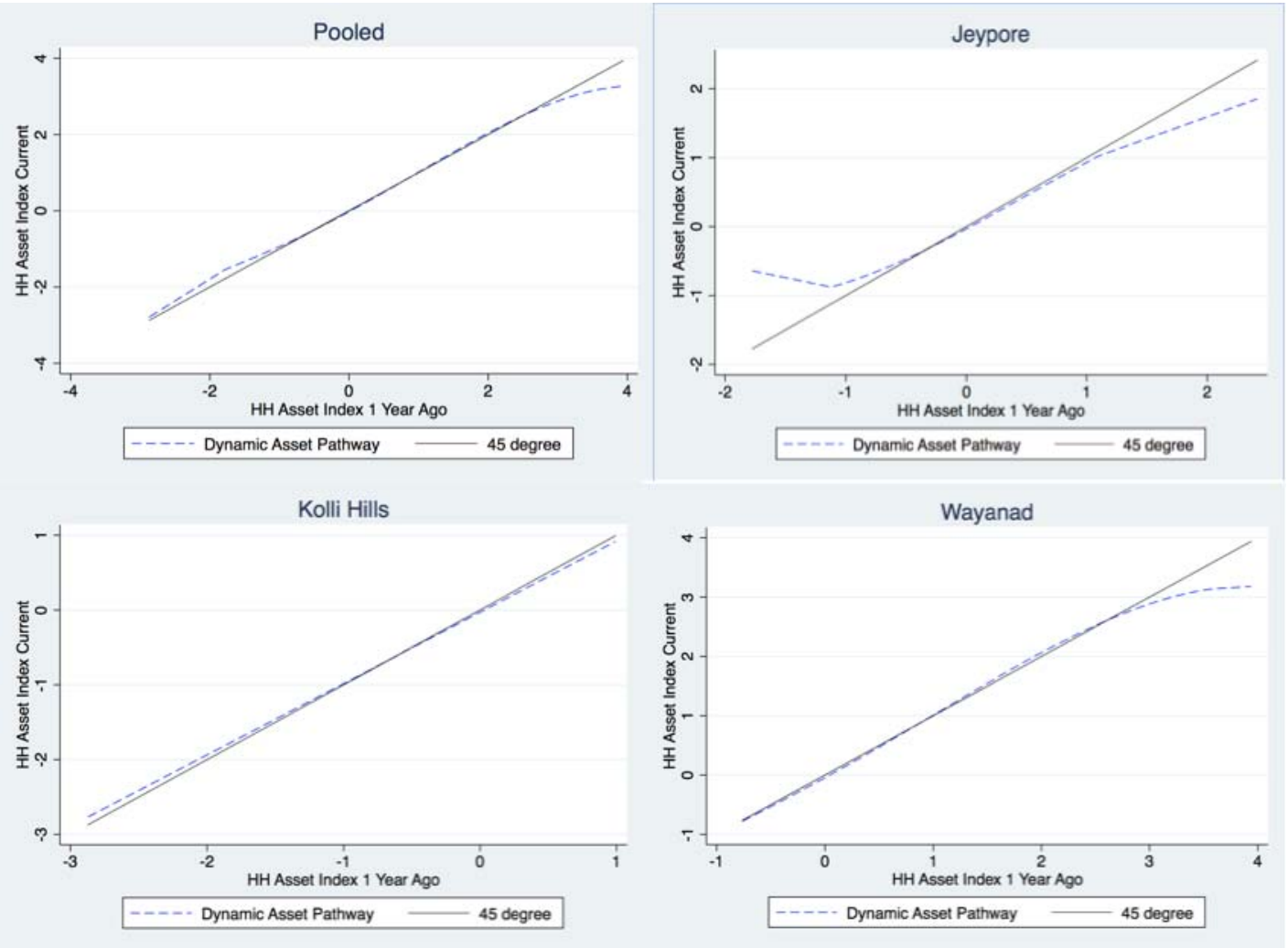


d. 20 Years Ago

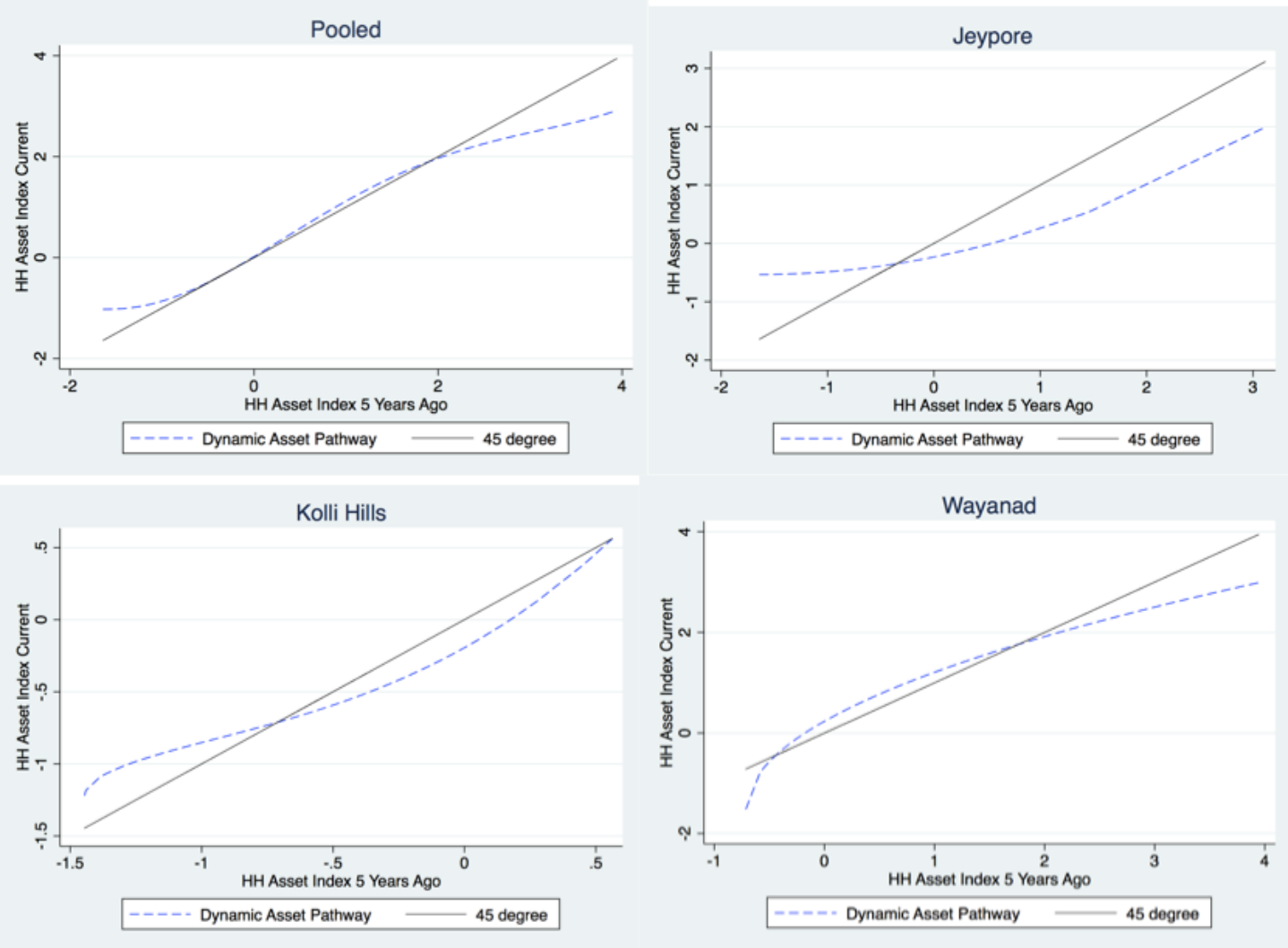


A6.4 Total Household Asset Index

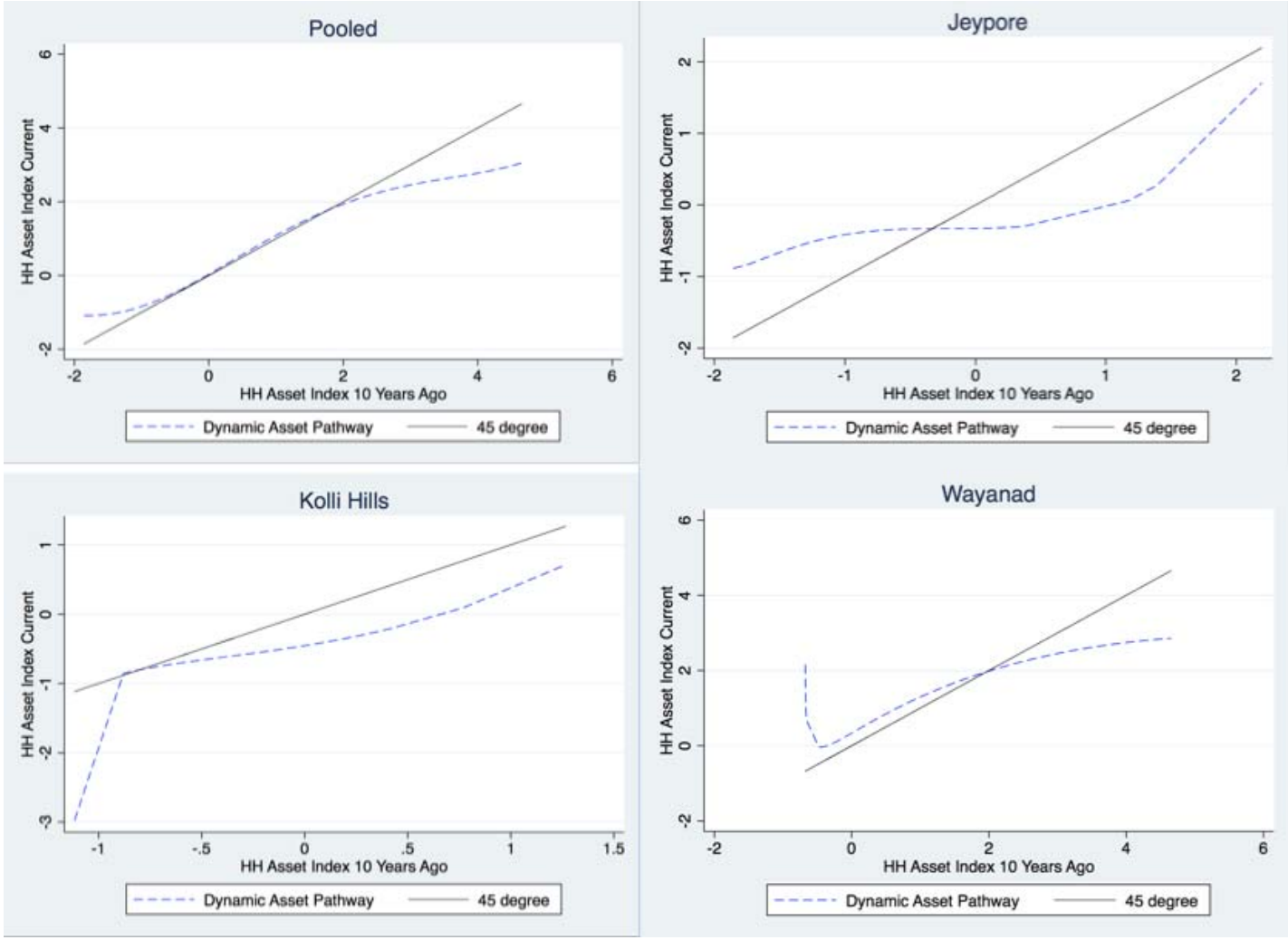
a. 1 Year Ago



b. 5 Years Ago


Pooled
HH Asset Index Current
HH Asset Index 5 Years Ago
Dynamic Asset Pathway
45 degree
Jeypore
HH Asset Index Current
HH Asset Index 5 Years Ago
Dynamic Asset Pathway
45 degree
Kolli Hills
HH Asset Index Current
HH Asset Index 5 Years Ago
Dynamic Asset Pathway
45 degree
Wayanad
HH Asset Index Current
HH Asset Index 5 Years Ago
Dynamic Asset Pathway
45 degree

c. 10 Years Ago



d. 20 Years Ago