

THE ECONOMICS OF SOCIAL SUBORDINATION
Gender Relations and Market Failure
in the Highlands of Papua New Guinea

Duncan Overfield
2

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Abstract

This thesis is concerned with the causes and consequences of the market failure that is generated by the social subordination of women in the Highlands of Papua New Guinea (PNG). It is argued that the development impasse in PNG, noted by a number of observers, has its principle antecedents in the extreme economic and social discrimination facing women.

Gender based discrimination occurs within the context of dualistic modes of social relations of production: (1) the pre-incorporation social order, which was patriarchal; (2) capitalist market exchange relations which followed the widespread introduction of cash cropping. These two modes combine to alter the price signals determined by the world market, and domestic pricing policy, at an intrahousehold level. That is individual incentives are not determined by world markets but by household power structures, in particular the pervasive nature of patriarchy; this provides the basis for gendered market failure in the Highlands of PNG.

Market failure in the Highlands takes the form of the underallocation of labour and land to coffee production. This is a direct result of the poor labour returns that women receive; they receive around one-third of those of men. Women's returns are so low that their labour returns are higher in food production and they act as rational economic beings and apply more of their labour to this endeavour. Whilst behaving in a rational manner to the incentives they face, this must necessarily reduce household income levels because labour returns from food production are much lower than those associated with coffee cultivation. Patriarchy creates an uneven pattern of intrahousehold distribution of coffee income, which generates perverse (non-efficient) individual incentives which lead to market failure. Additionally, the intrahousehold distribution of tasks is so uneven that many households face a 'female' labour constraint, particularly

during the peak coffee harvesting period (flush). This reduces the ability of the household to respond to changing incentives, such as increased coffee prices. Poor economic incentives for women and socially determined labour constraints combine to create a vicious gendered circle of underdevelopment in the Highlands of Papua New Guinea.

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List of Tables	vi
List of Figures	viii
Glossary of Terms and Abbreviations	ix
Acknowledgements	xi

Part I

Chapter 1	Introduction	2
	1.1 Principle Concerns	2
	1.2 A Brief History of Peasant Analysis	3
	1.3 Approach	6
	1.4 Main Hypothesis	7
Chapter 2	Papua New Guinea, the Highlands and Coffee	9
	2.1 Introduction	9
	2.2 Papua New Guinea	9
	2.3 The Highlands	11
	2.4 The Importance of Coffee in the Highlands	16
	2.5 Men, Women and Coffee	18
	2.6 Conclusion	21
Chapter 3	The Study Area	23
	3.1 Introduction	23
	3.2 Eastern Highlands Province	23
	3.3 Benabena District	26
	3.4 The Study Villages	26
	3.5 Conclusion	28
Chapter 4	Methodological Considerations	29
	4.1 Introduction	29
	4.2 Household Definition	29
	4.2.1 General Considerations	29
	4.2.2 Study Definition	30
	4.3 Data Collection Methods: General Points	32
	4.4 Methodology	34
	4.4.1 Sampling Approach	34
	4.4.2 Monitoring Procedures	39
	4.4.3 Qualitative Data Collection and Field Observations	43
	4.4.4 A Qualitative Assessment	45
	4.5 Conclusion	47

Part II

Chapter 5	Global Incorporation and Rural Economic Differentiation	50
	5.1 Introduction	50
	5.2 The Creation of the Household	51
	5.3 The State, Indigenous Capital and Economic Differentiation	53
	5.4 Rural Economic Differentiation in the Highlands	56
	5.5 Incorporation, Resistance and Attitudes to Cash Cropping	62
	5.6 Levels of Market Integration	66
	5.7 Global Incorporation, Land Tenure and Reciprocity	69
	5.8 Conclusion	76
Chapter 6	The Determinants of Household Resource Allocation: Mobilisation, Conflict and Market Forces	78
	6.1 Introduction	78
	6.2 Neoclassical Theory and the Efficient Peasant	78
	6.3 Household Objectives of Resource Use	83
	6.4 Household Resource Use	86
	6.5 Determinants of Resource Use I: Household Structure	94
	6.6 Determinants of Resource Use II: Ideology and Labour Mobilisation	99
	6.7 Determinants of Resource Use III: Market Rationality and Economic Theory	105
	6.8 Food, Conflict and Intrahousehold Resistance	113
	6.9 Conclusion	117
Chapter 7	Household Decision Making and the Distribution of Benefits in the Coffee Economy	120
	7.1 Introduction	120
	7.2 Measuring and Defining Dependency	120
	7.3 The Scale of Household Production	123
	7.4 The PNG Coffee Industry: Structure and Competitiveness	124
	7.5 Inside the Black Box: Deconstructing Coffee Production and Marketing Decisions	128
	7.5.1 The Context of Intrahousehold Multiple Objectives	128
	7.5.2 Decision Making Power	130
	7.5.3 Security and Uncertainty	131
	7.5.4 Household Marketing Decisions	132
	7.5.5 Variable Cash Inputs, Technology and Risk	135

	7.5.6 Further Reactions to Changing Prices	136
7.6	Strategic Alliances, Determinants of Household Success and the Distribution of Economic Benefits	142
	7.6.1 Introduction	142
	7.6.2 Determinants of 'Success'	142
	7.6.2.1 Yields	142
	7.6.2.2 Production	144
	7.6.2.3 Incomes	146
	7.6.2.4 Household Success	148
	7.6.3 Strategic Alliances and the Distribution of Policy Benefits	149
	7.6.3.1 General Points	149
	7.6.3.2 Pricing Policy	150
	7.6.3.3 Research Policy	152
	7.6.3.4 Extension Policy	153
	7.6.3.5 Distribution of Policy Benefits	154
	7.7 Conclusion	154
Chapter 8	Intrahousehold Welfare and Economic 'Transformation'	157
	8.1 Introduction	157
	8.2 Economic 'Transformation' and Household Income Sources	157
	8.3 Intrahousehold Income Acquisition	162
	8.4 Determinants of Household Success and Economic Activity Mix	167
	8.5 Welfare Impact I: Food Security and Nutrition	174
	8.6 Welfare Impact II: Intrahousehold Variations in Economic Returns	179
	8.7 Claims on Incomes, Expenditure and Intrahousehold Transfers	181
	8.8 Welfare Impact IV: Labour Allocation and Welfare	189
	8.9 Economic Sustainability and the Household Trade-Off Between Investment and Consumption	190
	8.10 Conclusion	192
<u>Part III</u>		
Chapter 9	Historical Influences, Competing Paradigms and the Development Impasse	196
	9.1 Introduction	196
	9.2 Historical Influences	197
	9.2.1 Women and the Pre-Existing Social Order	197
	9.2.2 The Impact of Colonialism and Capitalism	199
	9.2.3 History and Women's Access to Productive Resources	202

9.3	The Dominant Paradigm: Does it Measure Up?	203
9.3.1	The General Picture of Neoclassical Economics	203
9.3.2	A.V. Chayanov and the Theory of Drudgery Aversion	205
9.3.3	The Contribution of 'New' Home Economics	207
9.3.4	The Next Theoretical Advance	208
9.3.5	New Neoclassical Conceptions of Economic Behaviour	211
9.3.6	Of What Value is Mainstream Economics?	214
9.4	Competing Paradigm I: Marxism and Competing Modes of Social Relations	215
9.5	Competing Paradigm II: Feminist Economics	219
9.5.1	Feminist and Neoclassical Economics: Ethical Considerations and Model Choice	219
9.5.2	Feminist Models of the Agricultural Household	223
9.5.3	Feminist Economics and Papua New Guinea	225
9.6	The Model of Household Resource Allocation and Welfare	226
9.6.1	The Framework	226
9.6.2	Duality and Household Influences	226
9.6.3	Competing Objectives within the Household	227
9.6.4	Allocational Mechanisms and Resource Use	228
9.7	Further Notes on the Success of Coffee	232
9.8	Conclusion	233
Chapter 10	Conclusion and Policy Implications	236
10.1	Introduction	236
10.2	Policy Considerations	237
10.2.1	Land Reform and Women's Access	237
10.2.2	Food Crop Research	238
10.2.3	Extension and Marketing Projects	239
10.3	Other Policy Concerns	242
10.3.1	Coffee Extension	242
10.3.2	Population Growth and Land Productivity	243
10.4	Conclusion: the Cost of Doing Nothing 270	243
	Bibliography	245
	Appendix 1 Agricultural Systems Information	261

Appendix 2	Baseline Questionnaires and Garden Survey Forms	265
Appendix 3	Monitoring Forms	280
Appendix 4	Labour Constraints During Coffee Harvesting Period (Flush)	291
Appendix 5	Household Incomes Sources and Gender Shares	293
Appendix 6	Labour Scaling - Subjective Weights	297
Appendix 7	Expenditure Levels and Gender Patterns	299

List of Tables

	<u>Title</u>	<u>Page No</u>
2.1	Coffee Labour Inputs by Gender	20
3.1	Village Altitudes and Access	28
4.1	Indication of Ideal Sampling by Altitude Zone	36
4.2	Average Annual Error Rates - 1992	45
4.3	Average Annual Error Rates - 1993	47
5.1	Household Land Holdings	57
5.2	Household Cash Incomes	59
5.3	Attitudes to Cash Cropping	63
5.4	Proportions of Food Output Retained	67
5.5	Total Household Incomes and Subsistence Proportions	68
6.1	Household Coffee Returns to Labour	81
6.2	Objectives of Resource Use (Highest Ranking)	84
6.3	Objectives of Resource Use by Generation	84
6.4	Objectives of Resource Use (all responses)	85
6.5	Labour Allocation - 1992/3	87
6.6	Land Allocation - 1992	88
6.7	Labour Allocation per Worker Unit - Food	89
6.8	Labour Allocation per Worker Unit - Coffee	90
6.9	Labour Allocation per Worker Unit - Household	91
6.10	Household Labour Constraints	92
6.11	Cultivated Areas and Household Size - Regression Analysis	95
6.12	Labour Input per Worker and Dependency Ratio	97
6.13	Food Planting and Selling Decisions	114
6.14	Food Marketing - Surplus or Intentional	115

	<u>Title</u>	<u>Page No</u>
7.1	Coffee as a Proportion of Externally Derived Income	122
7.2	Coffee Production Levels	123
7.3	Marketing Patterns and Coffee Prices	132
7.4	Marketing Rationale - Form and Point of Sale	134
7.5	Household Coffee Incomes and Yields	137
7.6	Cherry and Parchment Prices	139
7.7	Yield Regression Equations	143
7.8	Production Regression Equations	145
7.9	Income Change Regressions	147
8.1	Total Cash and Coffee Incomes	158
8.2	Food Marketing Incomes	159
8.3	Coffee and Food Incomes as Percentage of Total Cash Incomes, Wage and Business Income	160
8.4	Proportions of Household Incomes Directly Obtained by Women	162
8.5	Proportion of Gender Incomes Accounted for by Coffee and Food	163
8.6	Proportions of Incomes Directly Obtained by Women	167
8.7	Household Incomes per Capita and per Worker Unit	168
8.8	Coffee/Food Income Ratios and Return Ratios	171
8.9	Coffee/Food Return Ratios by Gender	172
8.10	Market Access and Ratios of Coffee to Food Incomes	173
8.11	Labour Returns in Food Production	180
8.12	Labour Returns in Coffee Production	180
8.13	Proportions of Incomes Acquired by Women	181
8.14	Proportions of Direct Expenditures by Women	184
8.15	Principle Uses of Food Income	185

8.16	Principle Uses of Coffee Income	185
8.17	Intrahousehold Income Transfers	189

List of Figures

	<u>Title</u>	<u>Page No</u>
2.1	Map of Papua New Guinea	11
3.1	Study Area and Villages	27
6.1	Economic, Technical and Allocative Efficiency	79
6.3	Gender Based Inefficiency in Coffee Production	82
7.1	Total and Smallholder Coffee Production 1955-1994	124

Glossary of Terms and Abbreviations

AREP	Agricultural Research and Extension Project. Project financed by the Asian Development Bank to increase institutional capacity in the provision of research and extension services. It provided in the region of \$6mn per annum for coffee research and extension.
AVG	Average
Bride Price	The modern, monetised version of bride wealth
Bride Wealth	Payment from husband's to wife's family on marriage, as an expression of the value of the women's reproductive value - but not monetised, traditionally in the form of pigs and kina shells etc.
Big-man	Clan chief/village elder (not hereditary). 'Election' is based on merit as to what he can do for the interest of the clan. Holder of considerable influence and power over the group.
Bisnis Ethos	Promotion of the business (capitalist) money making philosophy.
CIB	Papua New Guinea Coffee Industry Board.
CIC	Papua New Guinea Coffee Industry Corporation.
Compensation	Payment (monetary or other) for death, injury or other event generally from one clan to another. Often used as a means of avoiding inter-tribal warfare.

COV	Coefficient of Variation
EHP	Eastern Highlands Province.
Flush	Peak coffee harvesting period which generally occurs between May and August in the study area.
GDP	Gross Domestic Product.
Market Failure	The inability of the market to allocate resources in an efficient manner.
Menarche	A Women's first period (menstruation)
PNG	Papua New Guinea.
SD	Standard Deviation
Wantok	Literally means one who speaks the same language (local language or <i>tok ples</i>) but means more in terms of group loyalty. Under this system principal loyalties are to your clan group and this superceeds any other including that to any electorate or employer.

Note

The household numbers refered to throughout the text relate to the following villages:

1-3; Safanaga

4-6; Kenimaro

7-9; Upegu

10-12; Matausa

13-15; Foi

16-18; Kafonaga

See chapter 3 for more details on each village.

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Part I

Introduction and Methodological Considerations

Chapter 1

Introduction

1.1 Principal Concerns

This thesis is concerned with the causes and consequences of the market failure that are generated by the social subordination of women in the Highlands of Papua New Guinea (PNG). The inability of the market to allocate resources in an efficient manner has its antecedents in the structure of Highlands society, in particular, the all pervasive nature of patriarchy. Markets, and governments, can only set the general level of prices (incentives and signals) in the economy; individual labour returns are determined by the power structure of the household. In this patriarchal society male heads of household control both productive resources and the cash flows that they generate; at an intra-household level this creates differential work burdens and individual incentives. This would then suggest that each individual within a household faces different constraints and incentives; these may well not equate to 'efficiency' prices - providing the basis for the occurrence of market failure, or the inability of the market to allocate household resources in an efficient, welfare maximising, manner.

Market failure has an economic cost to the Highlands of PNG. Since resources are not allocated to the areas of the rural economy which would yield optimum welfare levels, rural households are necessarily worse off and development levels are therefore reduced. Many observers have referred to a state of 'arrested' transition or 'terminal' development in the Highlands explaining this

phenomenon by reference to land tenure patterns and other social constraints upon individual success. The findings of this thesis will shed new light on these observations by focusing on intra-household gender relations.

A study of this nature requires data collection and modelling at the intra-household level. This is a break from the traditional economic modelling approach to peasant behaviour; the next section will outline this tradition before highlighting its major theoretical shortcomings. These deficiencies will be addressed in the 'economic' modelling of social subordination in this thesis.

1.2 A Brief History of Peasant Analysis

The analytical approach to assessing peasant¹ economic behaviour began with the writings of Chayanov in Russia in the 1920s. Although not translated until the 1960s these created considerable interest and have been applied to a few developing countries (see Hunt, 1979 for example). Chayanov's model is based on the concept of drudgery aversion or the disutility associated with work and how this is influenced by both family size and structure. It provides a number of testable propositions for which some support has already been found in PNG. The data collected for this thesis provide an excellent opportunity to test some of Chayanov's propositions.

Chayanov's model rests heavily on a number of assumptions, such as the absence of a labour market which, while relevant to peasant producers in early post revolution Russia, is not to many developing countries in the 1990s. Drawing heavily on the work of Chayanov and that of Becker (1965) on time allocation in the household, 'new' home economics presents households as having a utility function which represents preference

ordering between a range of final characteristics of home produced goods and services. The household is a production unit which converts purchased goods and services, as well as domestic resources, into a set of final use values yielding utility in consumption. Several household models have been developed on these axioms (Barnum and Squire, 1979; Low, 1986; see also Singh, Squire and Strauss, 1986a, 1986b). All attempt to explain decision making in terms of a singular household objective; the goal of utility maximisation, using relative market prices, of inputs and outputs, for the valuation of home production and participation in the labour market. They have considerable value for exploring the impact of many different changes to the exogenous variables confronting the household. However, the value of bringing all household decisions to a singular consideration, given the often observed multiple objectives of peasant producers, would appear to be limited in the PNG context (Carrad, 1982; Overfield 1993a) and elsewhere.

Another major problem with this approach is the level of aggregation at household level. New home economics uses a single household utility function which is not the sum of the individual functions of household members. A strong assertion invoked is that individuals are assumed to subordinate individual inclinations to the pursuit of common household goals; pure altruism is the main behavioural trait. It amounts to assuming that a benevolent dictator (the male household head?) sets goals in the interest of the family as a unit (Ellis, 1988: 175). Not surprisingly this tenet has come up against a large amount of criticism, for example by Folbre (1986). It takes absolutely no account of the very different power levels individuals have within the household; this being particularly critical when it comes to looking at the economic consequences of gender relations.

Most observed facets of gender economic relations can be explained by the social subordination of women. However, market and non-market determinants of the division of labour and resources first must be distinguished. Non-market interactions (such as social rigidity) may be identified as constraints on the flexible use of variable resources within the household: rigidities in time allocation and unequal command over resources can result in households being inflexible to changes in the external environment including market forces. This has already been found to have an economic effect on the well-being of the household in PNG (Overfield, 1993a: 15-6, 32) quite apart from the problems (and issues) associated with the inferior social status of women. This presents a large avenue of investigation for this thesis.

New behavioural theories have begun to emerge concerning a systematic critique of neoclassical economics. Though directed primarily at macro economics some of the behavioural traits presented as the alternate hypotheses could usefully be applied to peasant households. For example; Lane (1993) argues that work and production are a source of satisfaction in themselves through fostering personal development, deepening skills, humanising and structuring lives. Coming from the perspective of social anthropology, Hawkes argues, based on her studies of the Hazda people in Tanzania, rewards to hunters, who routinely share out their catch without a reciprocal share out, receive their rewards in a different 'currency'. They may gain kudos within the tribe which may then be 'traded' for other kinds of benefits later; more affairs, win more wives and have more children - a genetic rather than economic pay-off (Economist, 1993: 91-3). These different formulations of human economic behaviour can usefully be applied to peasant producers and provide a myriad of ideas to test; particularly where 'big men' are primarily concerned with gaining power and

influence which will mainly have long-term pay-offs.

Peasant producers in the Highlands are in a state of flux concerning their level of integration with the global economic system, with coffee acting as the main agent of incorporation. People are therefore involved in many decisions concerning the balance between peasant and capitalist modes of production; analysis therefore needs to be set within the context of the appropriate political economy writings (for example Scott, 1976).

1.3 Approach

The previous section has shown this study to be located within a number of intellectual traditions. The methodology has been designed to allow examination of possible relationships between household size and structure, food production, coffee production, and other sources of cash income; it was constructed to allow detailed examination of intra-household factors in relation to differences between individuals work burdens, economic incentives and the behavioural responses these could be expected to generate.

The main body of evidence comes from a two-year monitoring study conducted in 1992-3 in the Benabena District of Eastern Highlands Province (EHP) financed by the PNG Coffee Industry Corporation (CIC) for whom the author was then working. This study collected quantitative data on coffee production, food production, other sources of cash income, household expenditure, and labour inputs. Qualitative data were also collected at several points during the two year period to try and ascertain why certain types of economic activity were being entered into and other areas neglected or discontinued.

1.4 Main Hypothesis

The primary concern of this thesis is an exploration of the economics of social subordination with particular reference to the Highlands of PNG; it is the relationship between gender relations and market failure that will be under investigation. Whilst there is widespread evidence of gender discrimination demonstrated by the limited access of women to the economic benefits of commodity production and their longer working hours, it is unclear how these two factors impact upon the overall economic welfare of the household, or on the level of market failure created. It is likely that they both have a negative impact.

It will be argued that the restricted access of women to the economic returns from coffee production creates a perverse incentive for them to grow more food to sell, despite the fact that this produces a much lower return to labour and therefore reduces overall household income levels. Market failure is generated because incentives are altered by the system of patriarchy, where male heads of household control virtually all the coffee income, which in turn creates very poor relative returns for women. Women acting as rational economic beings, substitute activities which produce a higher return for them (and which they will have control of the profits), in this case food crops, which reduces overall household incomes and hence general welfare. Furthermore intrahousehold distribution of tasks were displayed to be so uneven in some households that an effective labour constraint could be observed thereby reducing the extent to which households could respond to changes of exogenous parameters, such as coffee prices.

This thesis will show that considerable levels of market failure are generated by the continuance of a system of patriarchy which reduces the level of economic welfare in

society generally. Further it will show that women have been bypassed by many of the 'benefits' that have accompanied the introduction of cash cropping, while at the same time borne much of the additional labour burdens. This unequal intrahousehold distribution of tasks reduces household welfare by reducing its ability to respond to economic opportunities. The thesis will be concerned with modelling the economic consequences of the social subordination of women and developing its policy implications.

1.5 Structure of the Thesis

The thesis is split into three main parts. This first part will act as an introduction and assess all aspects relating to methodological considerations. Part II will cover the main body of research results setting them within the context of the international development literature relating to global incorporation, economics and gender relations. Part III will conclude the thesis by focusing on the theoretical implications of the results presented in part II.

Notes

1. Defined as individuals and households who are wholly or partially absent from market relations and who are primarily concerned with the maintenance of the household rather than seeking profits.
2. Improving equality of opportunity and levels of living.

Chapter 2

Papua New Guinea, the Highlands and Coffee

2.1 Introduction

The purpose of this chapter is to set the general context of the study by providing background information on PNG, the Highlands, and its principle agent of incorporation into the global economic system; coffee. The chapter will provide a brief description of the structure of the economy along with recent general historical influences for PNG before moving onto a more detailed analysis of the Highlands region where the study is based. Particular attention will be paid to the impact of coffee as an agent of global incorporation and its influence upon gender relations within Highlands society.

2.2 Papua New Guinea

Papua New Guinea (see figure 2.1 for map) is a South Pacific nation with a population approaching 4 million (in 1993) on a land area of 462,000 sq. km. Arable land is plentiful and it is endowed with plentiful, but shrinking, forests and rich mineral deposits. Agriculture is the main economic activity and source of income for more than 80 per cent of the population. Coffee, cocoa, copra and oil palm account for 90 per cent of agricultural exports with limited amounts of tea and rubber making up the residual (Bank of Papua New Guinea, 1993: S33). Manufacturing has experienced very little growth and makes up around 9 per cent of GDP. The mining sector (mainly copper and gold, but also oil) provides two-thirds of the country's export earnings and around 15 per cent of GDP (Bank of PNG, 1993).

Approximately 15 per cent of population are employed for wages, with one-third of these found in the public sector. Around 90 per cent of rural households are involved in some form of commercial activity (mainly cash cropping) with the rest in wholly unmeasured subsistence activity¹. Per capita incomes vary from 3-4 times the national average (of \$1098 gross domestic product (GDP) per capita in 1992 (Pacific Economic Bulletin, 1993)) in Central Province/National Capital District to less than half in the provinces of Gulf, West Sepik and Southern Highlands (World Bank, 1988: 7).

The area that now constitutes Papua New Guinea was formerly British and German colonies. In 1828 the Dutch took possession of the western half of New Guinea (now Indonesian Irian Jaya); between 1885 and 1914 the rest of New Guinea was divided up. Germany took possession of the mainland north coast area and the Bismark archipelago (currently island provinces of East and West New Britain and New Ireland), with Britain taking the south-east part of mainland New Guinea. In 1906 mainland British New Guinea and the Trobriand Islands became Australian Papua and German New Guinea and following World War I became the Australian Mandated Territory of New Guinea (also gaining North Solomons Province). In 1975 PNG, an amalgam of bits and pieces joined together by colonial powers, gained its independence.

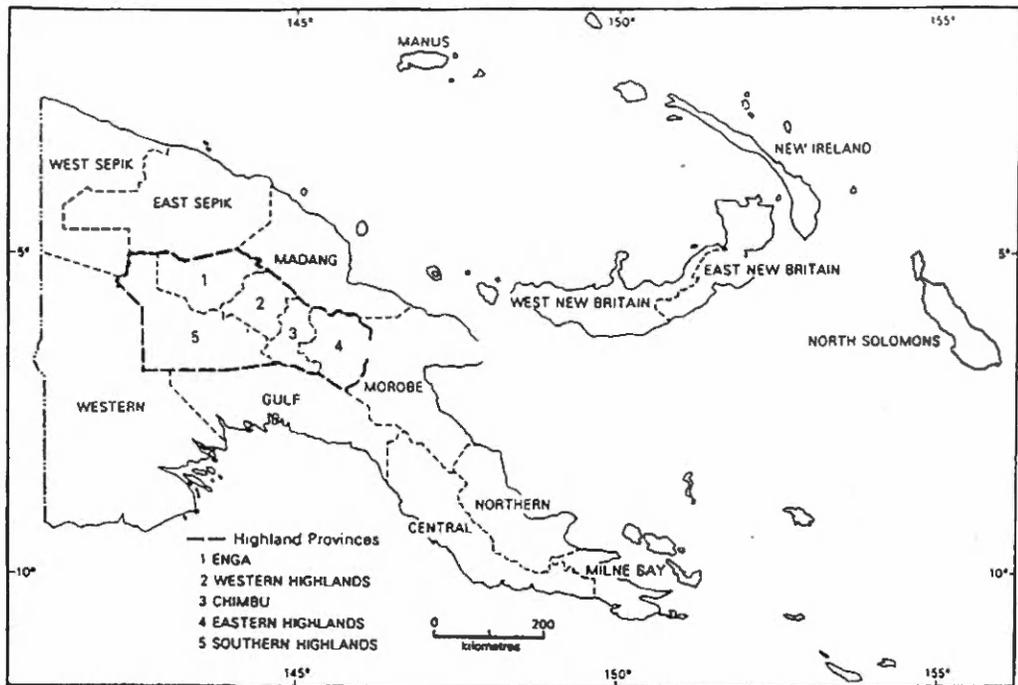


Figure 2.1 Map of Papua New Guinea, taken from Grossman (1984)

2.3 The Highlands

The history of the people in the PNG Highlands goes back at least 40,000 years; there is considerable evidence of large horticultural societies dating from this time but direct links with the global economy have existed for less than 50 years. The relative state of isolation existed until the 1930s when Australian gold prospectors entered the area. The horticultural society they stumbled upon (the area was thought to be uninhabited) is believed to be the result of the introduction of the sweet potato from the Philippines in the seventeenth century (approximately 100 years after the Spanish carried it from South America in the sixteenth century): it reached the Highlands through existing tenuous trading links with the coast (tribal border to border links). The social order 'discovered' in the 1930s was the result of the introduction of a high yielding crop into a traditional system based heavily upon social exchange (Allen and Crittenden, 1987: 147-8).

Between the seventeenth and twentieth centuries social order was based on the competitive exchange of pigs, for things like bride price (wealth) and compensation. Social ceremonies involved individuals and groups in the exchange of pigs and other valuables gained through trade (Allen and Crittenden, 1987: 149). Strathern (1969) identified two forms of exchange: firstly, massive periodic prestations combining the efforts of thousands of individuals; secondly, long chains of exchange relations in which live pigs, meat and shells passed along chains up to 150 kms long.

There was a marked tendency for these ceremonial exchanges to become inflationary. This trend was the result of the competition between ambitious men who could gain power by manipulating wealth in large public prestations (Strathern, 1982). All members of a social group were put under pressure to participate in these events; those who would not, or could not, were derided (Modjeska, 1982). The power of these 'big men' rested on their ability to marshall the efforts of the reluctant (Strathern, 1971).

Modjeska (1982) argues that big men exploited the introduction of the sweet potato to further dominate the social system. This not only took the form of dominance over women, but as agriculture intensified and the system of exchange developed, there was a tendency for male society to become more stratified. Early visitors to the Highlands were struck by the degree of stratification in the 1930s: 'big men' had more pigs, shells, and wives than ordinary men, while poor men were often unmarried and worked for big men in return for food, shelter and security (Strathern, 1966). Waddell (1972: 216) suggests how this evolved among the Raiapum Enga:

"wealth is found primarily in agricultural production, and power is largely achieved through the manipulation of the flow of this wealth between individuals and groups. Hence 'big-men' achieve and strengthen their position through careful agricultural planning, in which culturally determined limitations on both the availability of, and access to, open fields lead to major inequalities in levels of production of the staple food within the local group. These in turn, result in interhousehold variation in the number of pigs supported, and therefore in the opportunities of adult males for marriage."

Before World War II the Australian administration's prime objective was to establish government stations and to send out patrols to make contact with, and pacify, the Highlanders who appeared to be in a constant state of warfare and hostility. Some Highlanders were killed during early skirmishes but the pacification process did not have the dramatic effect on the Highlands population that has been experienced by other colonised peoples (Grossman, 1984: 22). Missionaries representing a wide spectrum of the Christian church arrived to convert and 'civilise' in the 1950s. Economic and social change accelerated after World War II: administrative control was re-established and even the most remote areas had been pacified by the mid to late 1950s.

Cash began to appear in ceremonial exchanges in the 1950s as villagers began to receive payment for produce and labour; they could also purchase much desired imported goods (tools, cloth, matches and salt) at European owned trade stores in the towns and mission outposts. Taxes were also imposed in the 1950s which had to be paid in cash spurring the involvement of villagers in commodity production and wage labour. At this time both secular and mission schools opened and Highlands children received their first formal schooling (Grossman, 1984: 23).

Export crops were first raised in the Highlands by European settlers in the 1950s on leased land that had been sold to the Australian administration. Village export cash cropping (mainly coffee) became significant in the late 1950s when agricultural extension officers made intensive efforts to increase coffee plantings with a high degree of success. Planners believed that any negative impact of increased commodity production would be minimal because of surplus land and labour in most Highlands areas; this was often described as a state of 'subsistence affluence'. Frisk (1971: 368) defined this state as:

" a condition in which population pressure on land resources is relatively light, productivity per unit of applied labour (as distinct from available labour) is very high, and most subsistence agriculturalists are able to produce as much as they can consume, with satisfaction of their main requirements, and to sustain an adequate level of living by their traditional standards, at the cost of as little as fifteen or twenty hours per week. "

Village coffee production was positively encouraged until 1962 when Australia ratified the International Coffee Agreement (ICA); it was promoted once again when export quotas were removed in 1973. However coffee production increased steadily on villagers' own initiative during this period, becoming their major source of cash income; the sale of food crops also started at the newly established markets in towns and rural areas. Extension officers also promoted cattle and pig projects in the 1960s to diversify the rural economy. There was an increase in the use of wage labour through the Highlands Labour Scheme². Significant expansion has also occurred in other areas of commercial endeavour since the 1960s - particularly public motor vehicles (PMV), coffee purchasing and trade stores (Grossman, 1984: 26).

A relatively extensive feeder road network has been a

contributing factor for stimulating economic growth. The main Highlands Highway has reduced transport costs considerably: previously everything had to be flown or walked in and out. Initial sections of the highway were constructed in the 1950s but was not open to freight traffic until 1966 (Young, 1973; 1977). Following its opening to freight traffic it was improved and expanded into the western and southern highland areas. The colonial administration required villagers to construct numerous unpaved roads connecting with the Highlands Highway; many chose to build their own feeder roads for better access to coffee buyers and the outside world; feeder roads are most extensive close to the Highway and major urban centres.

With the reduction of tribal warfare, the erosion of traditional sex taboos, and the introduction of modern medical facilities, population growth has increased substantially (Grossman, 1984: 27). According to the 1990 census population growth is now at a national average of 2.3 per cent per annum, with considerable variations across the Highlands. Rural densities have been found to be as high as 300 per sq. hectare (Howlett et al, 1976: 28) and in traditionally crowded areas commodity production has exacerbated land shortages³. Howlett (1980: 116) argues that the potential for landlessness, or inadequate access to meet subsistence needs, exists in such areas and may contribute to the development of a rural proletariat. Despite this potential by early 1994 there had been no reports of development of a proletarian class in the Highlands. Other studies have concluded that coffee production does not have a negative impact on food production: Bourke (1988), for example, shows that variations in subsistence food supply are not related to increased coffee production.

The relatively recent imposition of a western economic, social and cultural system onto a traditional tribal society has created immense pressures for change. The extent of change has been the subject of attention by a number of researchers, with them often referring to a 'persistence of the peasantry'. One of the key economic pressures for change in the Highlands was the introduction of coffee to which the next section will turn. The extent of this 'persistence' will also be a major theme of chapter 5.

2.4 The Importance of Coffee in the Highlands

The PNG coffee industry is dominated by small peasant producers located in the Highlands who account for over 70 per cent of national production (Smith and Kuimbakul, 1993: 10). Coffee forms a major component of the cropping and livelihood strategies pursued by these growers; in most Highlands districts it is grown by over 95 per cent of households (National Statistical Office, 1992) and is the main source of cash income for the majority of households (Overfield, 1991: 11; 1993a: 11). Subsistence food production is integrated with coffee cultivation and there is an increasing incidence of intercropping in the Highlands (Ghodake et al, 1993: 15-20).

According to figures produced by the PNG Coffee Industry Corporation coffee accounts for 34 per cent⁴ of all smallholder household incomes (Overfield, 1993a: 11). This figure understates the importance of coffee as an income source to village communities: many other sources of income, such as the selling of food crops and animals, often occurs within communities and not externally (i.e. not 'exported' from the community), are dependent on coffee revenue to provide effective demand within the village. Without the externally derived income from coffee there is not sufficient effective demand within

the rural economy to purchase much of its agricultural output. Coffee is virtually the only external source of income for rural dwellers in the Highlands (see chapter 7 for more details and further consideration of this point).

Household food requirements are mainly met from subsistence production with the sweet potato being the main staple crop grown. Considerable amounts of food are also marketed for cash. Coffee however remains, by far, the most important source of income. Peasant producers combine food (mainly subsistence production) and coffee production to produce enough to eat, generate cash income and to reduce their exposure to production and market risk. This strategy allows them to have access to cash income without the full economic exposure to the volatility of international commodity markets. They have relative autonomy from market relations and can be regarded as peasantry in transition. Observers have referred to the current smallholder mode of production as one of "subsistence malaise" (Grossman, 1984), "arrested transition" (Collett, 1992), or even a stage of "terminal development" (Howlett, 1973). All terms attest to the notion that producers are 'stuck' between a pure peasant mode of production and capitalism because of various economic, social and cultural constraints.

Coffee has acted as the primary economic agent of incorporation into the global system for rural dwellers in the Highlands. Important changes in household livelihood strategies have been identified by observers following its introduction. Brookfield (1973) found that cash cropping had altered the location of food gardens to the peripheral areas and away from the central areas where coffee was now planted. Bourke (1983) observed that there was neglect of food garden maintenance resulting from increased concentration on cash cropping. He also

observed that there was a growing dependence on the use of imported food as rural people became more involved in small-scale commercial activity. Short-term migration for wage labour also became more important, and commonplace, for men.

While Brookfield (1973: 130) argued that change was only a "partial acceptance of modern innovation into a continuing system whose essential variables have not been transformed", Preston (1990) argues that household livelihood strategies have been transformed, as the proportionate importance of womens work in the food gardens has increased considerably, and male involvement in both cash crops and off-village labour becoming fundamental components. This study of evolving livelihood strategies in one area of Central Province observed similar changes to those of Bourke and Brookfield, finding increased emphasis on cash-related activities and migration for wage labour. Preston found that women had taken a greater burden of the total work as commercial trade increased; women were now responsible for all garden work and local marketing while men were spending only a little more time on fishing and canoe maintenance.

The introduction of coffee has transformed the livelihood strategies of peasant producers. It is apparent that the Highlands economy has a high degree of dependency on coffee and that it has altered social relations of production; how this has in turn altered relations between women and men (and its economic consequences) is a major concern of this thesis to which the next section turns briefly.

2.5 Men, Women and Coffee

Determinants of household coffee incomes or other measures of 'success' have been the subject of various

studies; gender was found to be significant in two of them (Johnson, 1988; Overfield, 1993a). A major survey in 1973 indicated a low level of female coffee garden ownership in the major Highlands coffee growing areas; less than 3 per cent of total gardens in Western Highlands and Simbu Provinces and only 4 per cent in Eastern Highlands Province (Wilson and Evans, 1975: 12). The survey also showed that the average area owned by female growers were between 14 and 53 per cent smaller than those of male coffee growers. These results are not surprising given that Highlands customary land tenure is predominantly patrilineal; women's access to land is accomplished through activating use rights to her husband's land. Thus most coffee is seen as planted by, and belonging to men (Hide, in press: 29): women are considered to hold only secondary use rights (Strathern, 1969, 1982; Sexton, 1986; Nihill, 1991). Their labour contributions in coffee production give women limited access to the income provided by those coffee trees (Hide, in press: 29).

Another aspect of ownership concerns decision making. A survey in 1991, by the CIB, revealed of those male household heads questioned; 98 per cent identified themselves as making all the major decisions relating to coffee production; only 14 per cent said their wives were involved to any extent in this decision making process (Overfield, 1991: 13). However no corresponding questions were addressed to women within these households concerning who they (women) believed had direct control. Other more subtle forms of control, which could probably be only picked up by direct observation, were not investigated at the time.

Table 2.1 provides a summary of labour inputs to coffee, disaggregated by gender, produced by a number of studies. These should be interpreted with caution as they relate

to different cultivated areas and points in time. They do however show conclusively show that women are heavily involved in coffee production and it is not purely a male preserve; according to these studies women provide between a third and greater than half of all the labour inputs associated with coffee production.

Table 2.1 Coffee Labour Inputs by Gender

Location	Year	Labour Input (Hrs/Week)	
		Men	Women
Modopa, Enga (1)	1966	1.6	0.8
Koge, Simbu (2)	1972/3	2.1	2.3
Kapanara, EHP (3)	1977	5.2	6.7
Kyamunga, EHP (4)	1977	7.2	5.7
Benabena, EHP (5)	1992/3	4.9	6.5

Sources: ¹ Wadell, 1972: 101, ² Hide, 1981: 260, ³ Grossman, 1984: 270-5, ⁴ Sexton 1986: 49, ⁵ this study - per worker unit, not total
Please note that these figures are not directly comparable.

Women have been shown to have considerable impact upon several output variables relating to coffee: Overfield and Irog (1992: 8-9, 45-6) established a positive statistical association between the availability of female labour and the areas of both coffee and food planted; there was no corresponding impact, positive or negative, for male labour. Johnson (1988) found the two strongest explanations of 'success' in coffee growing were: (1) the number of wives in the household; (2) and of greater importance, the number of non-wife females within the household.

The evidence from previous studies appears to imply that women are heavily involved in coffee production and contribute significantly to any household success in its cultivation. However their low levels of ownership and lower social status within the household combine to reduce their access to the income that is generated by it. Obtaining an understanding of the social processes that create this situation and the economic consequences that arise both in coffee and other elements of the rural economy are central to this thesis.

2.6 Conclusion

The purpose of this chapter was to set the general context of this study by providing background information on PNG, the Highlands, and coffee. It has tried to introduce the notion of introduced economic activities, in particular coffee, transforming social relations of production which may then generate economic consequences of their own or, more probably, through collusion with the pre-existing social order. These themes are important elements of this thesis and will be developed in considerable detail in chapters 5 to 9. The rest of part I will be concerned with a description of the study area and the methodological issues involved in a study of this nature which needs to be conducted at intra-household level.

Notes

1. The 1990 census estimated that less than 10 per cent of rural households were purely subsistence producers. Other studies have suggested higher figures though these were often based on data collected sometime ago. It appears, certainly in the Highlands, that very few households are not involved in some form of commercial activity even if this is only the selling of food surpluses at local markets.
2. This involved two-year contracts on coastal

plantations which provided little useful agricultural knowledge to workers but some Highlanders obtained other useful skills and became more familiar with the outside world and its commercial system. It ran between 1949 and 1974.

3. However the national average is 8/sq.km. with a value of 27/sq.km. in Eastern Highlands Province.

4. Based only on 18 households (over a 12-month period) and the proportion ranged between 2 and 76 per cent.

Chapter 3

The Study Area

3.1 Introduction

This chapter will provide a brief description of the study area and the prevailing agricultural systems.

3.2 Eastern Highlands Province

Agriculture is conducted over an altitudinal range of 300 to 2400 m with most people living and farming over the narrower range of 1500-2000 m (Bourke et al, 1994a: 1). Annual rainfall varies considerably from 1800 to 2500 mm, with a range of no dry months to five dry months per year. In the northern valleys between Kainantu and Goroka, where the study area is located, rainfall is in the region of 1900-2200mm with a dry season of around four-and-a-half months. Bourke et al identified 23 agricultural systems (see appendix 1) occupying 51 per cent of the land area (currently in use or in fallow; the other 49 per cent is not used for agriculture). In the main northern valleys the main landforms are hills and mountains with floodplains and dissected fans. Relief is usually moderate; intensity of land use and population density (50-75 persons/km²) are both medium. There is a large range in both intensity of land use and population density, with large areas of little used grasslands found on poorer land. These valleys account for 34 per cent of the province's total population (81,000); access to services is generally good and income levels from coffee and fresh food are relatively high (Bourke et al, 1994a: 2-3). The main fallow vegetation is short grasslands with some cane grass.

Bourke et al (1994a: 7) identified ten distinctive features of agriculture in Eastern Highlands Province:

- (1) The concentration of agriculture in a relatively narrow altitudinal band (1500-2000 m);
- (2) The almost universal dependence on sweet potato as the staple food crop;
- (3) Contrasts in rainfall, fallow vegetation, landform type, intensity of land use and population density between the northern, middle and southern regions;
- (4) The range in intensity of land use from very low to high. Land use is particularly intensive in the Asaro and Kompri Valleys;
- (5) Contrasts between the levels of cash cropping, access to cash and consumption of imported food between the northern, middle and southern regions;
- (6) The use of long, drained beds for planting sweet potato and other crops in the northern valleys;
- (7) The widespread rotation of sweet potato with peanuts and other crops in the northern valleys;
- (8) Differentiation of food gardens into sweet potato and mixed vegetable gardens in the northern valleys;
- (9) The use of planted casuarina trees to maintain soil fertility and soil retention fences in the northwestern part.
- (10) The large pig numbers maintained and the contrast in pig management with locations in the western part of the highlands.

The main northern valleys, in which the Benabena District is located, are the most accessible area of Eastern Highlands Province (EHP); cash incomes are relatively high and access to the provincial capital is generally good. Coffee remains the most important source of cash income for rural households but with fresh food becoming an increasingly important secondary source. As elsewhere in PNG salaries are paid to public servants and private sector employees (on alternate Fridays) create two 14-day

overlapping business cycles which is reinforced as rural dwellers time their visits to town to coincide with pay-days.

The most important staple crop is the sweet potato which is planted in small mounds about 30 cm high, on long drained beds orientated up the slope (Bourke et al, 1994b: 19). Other staples present include banana, taro, cassava, yam, corn and peanuts. Within food gardens peanuts, yam and winged bean are each grown in separate plots from sweet potato; corn, common bean and vegetables such as Chinese cabbage, are interplanted. Sweet potato is grown in rotation with peanuts, winged bean and yam (Bourke et al, 1994b: 19). The most common fallow vegetation type is short grass which is typically four to five years old; fallow vegetation is cut, dried and burnt (op cit: 19).

The area has a marked wet and dry season, with the wet lasting from December until approximately mid-May. The main coffee harvesting period (flush) begins towards the end of the wet season in April/May and lasts for approximately four months. During this period labour inputs in coffee production, in the form of picking, processing, and marketing, are at their most intense. It is during this time that household labour bottlenecks are most apparent as unequal intrahousehold distribution of tasks create binding female labour constraints (see appendix 4 and section 6.4).

Coffee production, subsistence cropping, and food marketing are the principle economic activities of the rural population in this province. Coffee cultivation provides the most important source of income for most households, with food marketing the next most significant. Men tend to control coffee incomes with women, generally, having responsibility for food crop

production and controlling the income from any sales in this economic area; women also derive small amounts of income from petty trading. Other economic activities, such as small business or wage employment tend to be male preserves but are confined to a relatively small number of households.

3.3 Benabena District

The Benabena Census District lies to the East of the provincial capital, Goroka, and spread around the main Highlands Highway (sealed) and the old highway (highly degraded). Some villages are located either on or close to the main Highway within 5 to 10 minutes drive to Goroka and in some cases closer to the nearest coffee factory (point of sale); others, mainly in the most northerly parts of the district are over 6 hours walk to the nearest road, and another 2.5 hours by road to Goroka. Settlements (hamlets) are close to cultivated areas. Generally the higher a village the poorer its road access; it could be reasonably expected that this would be closely correlated with degree of integration into the cash economy. The dominant farming system in this district identified by Bourke et al (1994b) is detailed in appendix 1.

3.4 The Study Villages

The selected villages¹ range between 1380 and 2030 metres above sea level (masl) with a wide variety in access (see figure 3.1) to Goroka. Upegu, the most accessible, is on the main sealed highway (with year round access) and is just over 10 minutes drive, with plentiful public transport (PMVs - public motor vehicles, mainly minibuses or trucks) from Goroka. Kafonaga (nearly 2 hours drive - dry season) and Matausa (1.25 hours - dry season) are the least accessible with road access, by motor vehicle,

often impossible during the wet season and only limited public transport. The other three villages fall within these extremes; Foi (40 minutes drive, of which 30 is on the main highway), Safanaga and Kenimaro are both around 30 minutes drive, mainly on the old highway, access is often limited, but not usually impossible, during the wet season (see figure 3.1 and table 3.1).

The wet season, between December and May, can have a major impact on roads, washing away and degrading their surfaces, generating landslides which either block or take the road with them; high river flows also wash out road bridges. This can have a considerable impact on the activities in which households become involved. The impact of the wet season is greater on those villagers who have poorer access to start with which tend to be those at the higher altitudes.

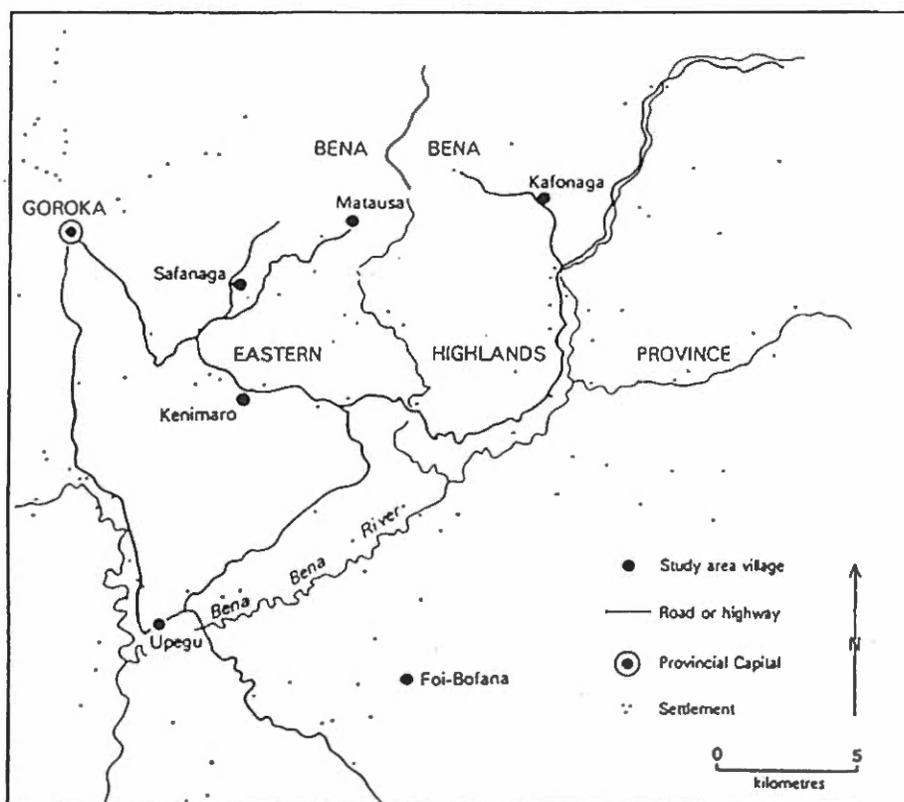


Figure 3.1 The Study Area and Villages

Table 3.1 Village Altitudes and Access

Village	Altitude	Time to Goroka	Access Index
Safanaga	1700 masl	30 mins	3.5
Kenimaro	1500 masl	25 mins	3.5
Upegu	1380 masl	15 mins	5
Matausa	2030 masl	75 mins	2.5
Foi	1550 masl	40 mins	4
Kafonaga	1760 masl	105 mins	1.5

(1) This is subjective index of access (of between 1 and 5) of the villages to the provincial capital, Goroka, based on an average between the wet and dry seasons. A score of 5 indicates trouble free, all-year-round access; the lower the score, the more difficult the access.

3.5 Conclusion

This chapter has described the general agricultural systems of EHP and the study area in the Benabena valley; more detail on the systems are available in appendix 1 and in Bourke et al (1994b). Chapter 4 will complete part I of the thesis by considering the issues involved in data collection in studies of this nature and will describe and analyse the methodology employed by this study.

Notes

1. The term village here is more administrative (i.e. this is what they are called locally and by government administrators) than functional. Hamlet would be a more accurate geographical description of these Highland settlements.

Chapter 4Methodological Considerations4.1 Introduction

This final chapter of part I will introduce the methodological considerations for this study. These relate to general points on appropriate household definition and the reliability of data collection in societies with few written records. They also concern the appropriate levels of aggregation for collecting economic information on the household. The chapter will also provide a detailed description of the methodology employed by the study; the final section will assess its efficacy.

4.2 Household Definition4.2.1 General Considerations

The household tends to be standard data collection and investigative unit in studies of rural households in developing countries. However the definition is far from straightforward despite the general assumption of their existence in household economics¹. It could be asserted that the household in many developing countries, particularly in a western nuclear sense, does not exist. This concerns the more fluid, and extended, nature of households in many subsistence based economies where more than one production mode is present, and members move in and out of the formal economy. It is also important to capture culturally specific processes which alter household definition such as the 'informal' adoption of children which is commonplace in many areas of PNG.

Concerns over the validity of the household as a data collection unit, and its exact definition, has general implications for the methodology of studies in developing countries, and for this study. It has to be shown that the method applied to collect data is appropriate to current and evolving household structures in this area of PNG; it also has to be shown that the methodology is appropriate in terms of data reliability and that sufficient qualitative data is available to interpret quantitative results.

4.2.2 Study Definition

For the purpose of this study a household has been defined as all those family members, or other individuals, who were dependent on the production of the food and coffee gardens, and other income generating activities of a single male household head who resides permanently in the village. This deliberate discrimination is necessary, and appropriate, for two reasons: firstly, the society in this region is organised along patrilineal lines; secondly, the majority of coffee activity is conducted by males, and coffee trees are generally seen as belonging to and being owned by males.

There are however still some problems associated with this approach to household definition. The organisation of household living arrangements and production units varies considerably within the Highlands; many are also influenced by Western values. Polygyny, which was very widespread, is being replaced by monogyny and nuclear family residence. For the purpose of data collection and analysis, it is useful to make a distinction between "households" and "women's cooking hearths" (Crittenden, 1982: 386). A household therefore is usually a male-headed unit whereas a women's cooking hearth centres around a married women and consists of those who depend on her for food. Where monogynous marriages are the norm,

a household usually contains one cooking hearth. However, where polygynous marriage is the norm, a household will often contain more than one cooking hearth. Data collected for this study therefore is heavily influenced by the sex which is principally responsible for a particular element of the village economy. Pig and coffee ownership and ceremonial exchanges are controlled by men, particularly heads of households, whereas women are regarded as being responsible for sweet potato production; women and men must therefore be approached for the elements of the economy for which they are responsible and hold the appropriate information.

The use of the term 'family household' poses problems of definition. Firstly it is not uncommon for men to have more than one wife, adoption of children is a common practice, boys and unmarried men often live in a separate dwelling (no common dwelling place), as would separate wives along with separate cooking hearths (Collett, 1989: 6-7). Also, there is no simple formula when, or even if, gardens are handed down from father (or mother in case of the early death of the father) to children which suggests that it is appropriate for including married children within the definition. If married children, especially sons, were excluded then in those cases where the father had transferred his gardens, those gardens would be excluded from any measurement. Further problems arise due to the often informal nature of such transfers where both a father and his married son(s) claim the same coffee.

The definition of the household in this thesis should be regarded as a Highlands economic 'unit' and not as a family household. It is essential that the economic unit of analysis be correctly identified. As the thesis is concerned with economic issues surrounding male ownership and female subordination, the household will encompass all the individuals involved in the economic activities

associated, directly or indirectly, with the land² owned by the male household head.

Defining household units in this way effectively allows full investigation of the gender relations pertaining to agriculture and the village economy in general. By defining an appropriate economic unit it will be possible to draw out the important relationships in the village economy. An example of this would be the gender split of coffee income in the household; a narrow definition would miss those incomes received by married children, which would probably be male, and thereby understate the level of gender inequality. This example illustrates that in a study such as this concerned with both intrahousehold patterns and processes, it is not just household definition (to capture the entire economic product) that is of concern; it is also the exact method of observation that is essential so that individual inputs and rewards can be identified.

4.3 Data Collection Methods: General Points

For this study a small sample, with detailed household monitoring, was chosen over a large scale survey due to the problems which would have arisen concerning the quality of collected data. Large surveys in an environment with few written records and supporting data systems, as is the case in PNG, are troublesome. They rely totally on a respondent's recall which will have varying degrees of accuracy dependent upon individuals' memories, the nature of activity and the number of economic actors involved.

The economic activities of rural households involve considerable amounts of information; this can only be retained for a short period of time with any degree of accuracy. Information asked for in large surveys is

typically of how much (income earned, area planted etc.) in the last twelve months variety and this could require remembering thousands of transactions. Where written records (or other supporting data) are absent this is expecting completely unrealistic levels of memory retention: any data collected on this basis is bound to be suspect. Only data covering short period of times can have a reasonable degree of accuracy; given the large volume of information this would surely relate to days, rather than weeks or months, particularly during the main coffee harvesting period (flush).

Adding to concerns over memory retention are the intrahousehold factors. Not only are the data relating to household activities a product of a number of events but also involve a number of economic actors. Typically surveys are aimed at the male head of household, and at best only addressed to one or two household members. However all the household members are contributors and beneficiaries and therefore each hold considerable amounts of information: requesting information from only one or two members of the cast is therefore clearly flawed.

It can be argued that the combination of these two factors precludes the use of large surveys to investigate the complicated array of economic activities into which peasant producers enter in PNG. Major disparities have been found between the results of various large-scale surveys and intensive village level studies in India (Bardham, 1989); similar disparities could be expected in PNG.

Moving to a data collection system based heavily on detailed household monitoring means having to use a fairly small sample group (assuming limited resources) reducing the probability of producing statistically

significant results. It is clear that data collected in large surveys in such an environment is likely to be flawed for non-statistical reasons providing unreliable results. Data quality needs to be a principle consideration in study design; if this in turn means that the significance that can be obtained from inferential statistics is reduced then alternative means of verifying behavioural traits should be sought. This means combining qualitative with quantitative analysis and using statistical techniques which are not too sensitive to small sample sizes. The principle aim has to be to collect reliable data and then conduct an appropriate and meaningful analysis. It would appear that this can be best achieved in the Highlands of PNG by using detailed household monitoring of a relatively small sample group using a combination of quantitative and qualitative techniques.

4.4 Methodology

4.4.1 Sampling Approach

The sampling method used in this study has been developed from earlier work conducted in the same area of PNG by the Australian Centre for International Agricultural Research (ACIAR) (see Collett, 1989, 1990). This study is much indebted to this earlier work³ that developed the initial sampling and monitoring techniques. This section is concerned with the description and analysis of the selection of household heads from which households were then defined.

The sample was selected in two stages: firstly, villages were stratified by altitude enabling village selection to take place; secondly, household heads were then selected at random from these villages. The result was a sample of small semi-subsistence growers clustered on a village basis.

In the initial work⁴ conducted by Collett (1989, 1990) four altitude zones were chosen on a basis of plant pathology advice⁵ from the PNG Coffee Research Institute. These zones were: (1) less than 1450 metres above sea level (masl), (2) 1450-1600 masl, (3) 1600-1750 masl, and (4) greater than 1750 masl. Although originally selected on a basis of differential coffee rust infection rates these zones reflect the degree of access of the villages located in them. Villages located in zones 1 and 2 are far more likely to be close to the main Highlands Highway than those located in zones 3 and 4 as this road runs through the low and more accessible areas⁶

Stratification on this basis ensured a spread between villages of higher population densities on the broad valley floors with level land and good market access, and villages at high altitudes with poor or no access by road, lower population densities and steep terrain. Given that this thesis is concerned with investigating the impact of economic integration on gender relations which could be expected to relate to market access, stratifying on this basis is highly appropriate. The focus of this thesis is the causes and consequences of transformation of intra-household gender relations: no sampling frame exists which adequately addresses this issue. Using the variable of access (via altitude as a proxy) allows stratification in terms of possible global integration.

Collett (1989) marked his zones on the most accurate and detailed map available. The EHP map produced for the Provincial Data System (PDS, 1982) provided this; the villages located on the PDS map formed the basis for villages on the Principle Roll of Electors for the 1987 National Parliament Elections. The PDS map of the Benabena Census Division is the same scale as the Goroka 1:100,000 map sheet. A transparent copy of the village locations on the PDS map were overlaid on the

topographical map sheet and marked with the altitude zones. Every village located on the PDS map was given an altitude zone.

The 1987 electoral roll lists electors for 70 villages in the Benabena CD, of which only 65 are amongst the 76 located on the PDS map. These 65 were then listed under their zones and the total number of electors in each zone calculated giving a zone population (of electors) for the sample. Table 4.1 below gives the total population and number of villages required for proportionate sampling of each altitude zone.

Table 4.1 Indication of Ideal Sampling by Altitude Zone

Altitude Zone	Total Electors	Ideal Number of Sample Villages
< 1450 masl	870	1
1450 - 1600 masl	3463	4
1600 - 1750 masl	894	1
> 1750 masl	1571	2

Source: Collett (1989: 5)

This sampling pattern was followed with the exception of the 1450-1600 masl zone where the sample was reduced from four to two making a total sample of 6 villages. This did result in unequal probabilities of selection of electors between zones; data can be weighted to correct for this although this has not been conducted for this study which uses only a small sample.

The six villages were randomly selected (with probability proportionate to size) using random numbers. Then three

electors per village were randomly selected (this study used the same villages as the earlier work but reselected the electors (one per household); none turned out to be the same as the previous study). Eighteen households were selected for monitoring over the two year period using the two-stage sampling technique developed by Collett (1989).

Selecting three electors on a two-stage statistical sample per village is a greater effort in the first instance compared to simple random sampling. However the logistics of doing field work in the PNG Highlands, and the resources available to this study precluded the use of simple random sampling. Only a small number of villages could be selected as only one vehicle, and six members of staff were available; to visit more to conduct interviews and measure food and coffee gardens was an impossibility. This method allowed both the initial survey work to be conducted, provided a degree of representativeness of this Highlands area with regard to access and related variables, and utilised the only sampling frame⁷ that had sufficient reliability.

The second stage of the sample selection is clustered on a village basis. Though this has obvious logistic advantages, it also has drawbacks. Often there is a tendency for households (or units) in the same cluster to be relatively similar to each other, as opposed to other units in different clusters. Poate and Daplyn (1993) argue that this makes cluster sampling less efficient (representative) than random sampling due to three factors: (1) units in the same cluster will have a similar cultural background and share the same language; (2) will share the similar ecology and climate; (3) influence each others practices by interaction and imitation (p.67).

It is possible to measure the extent of this effect with the intra-cluster correlation coefficient which measures the extent to which elements in the same cluster are more (or less) highly correlated with elements in different clusters. However where the cluster size is very small, as in this study, its associated bias is likely to be small. For example Poate and Daplyn (1993: 67) infer that cluster sizes of five or less are unlikely to introduce significant bias. Further when it is considered that the study was conducted within a relatively small area there is little variation in the three factors outlined in the previous paragraph above, it is unlikely to be a major source of bias. The major concern of this thesis is the causes and consequences of the market failure that is generated by the social subordination of women; the data that are associated with this question are unlikely to vary significantly between villages. There is likely to be variation by strata (level of market integration) of which the results will be slightly biased (as previously discussed) away from the most accessible and integrated area which will be considered in the appropriate sections.

Following village and respondent selection a period of ten days was spent in the field locating the respondents, obtaining baseline data on the households, and measuring food and coffee gardens. Data was collected via an interview with the household head (see appendix 2): information was collected on the demographic structure of the household, details of work and income earning activities, wealth and ownership of capital, and the level of contact with extension services. All the food and coffee gardens (see also appendix 2) identified by the household head as belonging to him were then measured using the tape and compass method: approximately 21 per cent had to be remeasured due to unacceptable error levels (where border misclosure was greater than 5 per

cent of the total border length). Approaching only the male head of household reduced the amount of time spent initially in the field thereby helping to control costs. This may be regarded as a source of bias which could have been removed by interviewing all adult household members but given resource levels and the on-going nature of this study this was regarded as appropriate in this case.

It is impossible to assess how representative this sample is of the Highlands, or even the Benabena District, as virtually no population statistics are available on items like land holdings, access and distance to urban centres, and extent of integration into the cash economy⁸. Any sampling technique is therefore always going to be second best; this study had available to it a fairly reliable sample frame and a proxy variable for market access (altitude). There was slight bias against selection of households in one of the more accessible zones which could be adjusted for. It has produced both quantitative and qualitative data which should lend themselves to a variety of analytical procedures. Of course quantitative analysis is quite sensitive to small sample sizes. Whilst it does not preclude its use, caution is needed; particular attention should be given to the impact of any outliers and their qualitative assessment. There will have to be a balance between qualitative and quantitative analysis determined by which is the most appropriate for the particular relationship(s) under examination.

4.4.2 Monitoring Procedures

The two-year monitoring programme relied on village based recorders to collect information through a combination of direct observation and interviews of household members. The recorders collected information on food production and sales, coffee sales, household expenditure, other sources of cash income, and labour input activities (to food, coffee and household activities). Information on

the first four areas was collected primarily through bi-daily interviews (but also through direct observation): labour input data was collected mainly through direct observation (and interviews where appropriate) on randomly selected days throughout the two year period (a total of 50 observation points). All the relevant monitoring forms are contained in appendix 3.

During the initial phase of fieldwork in late 1991 the 12 village recorders (two per village) were recruited to conduct the on-going monitoring work which was the central element of this study. They were recruited on the basis of interviews to select the most able from those available i.e. those who had at least grade 6 education and expected to be in the village for the next two years. It would have been ideal to recruit an equal number of men and women but only one woman put herself forward for consideration (and was recruited). This may have been a possible source of bias but through careful follow-ups and supervision it is hoped that this was minimised.

The recorders were brought into the Coffee Industry Corporation's Goroka HQ for two days training. They were given detailed instruction on how to collect the detailed monitoring information and complete the appropriate forms (all these are contained in appendix 2). Monitoring was based on the standard PNG two-week work and pay period and recorders were then sent away with enough forms for this first fortnight period. Despite the training there were considerable problems with the first set of returns where information has been incorrectly recorded or neglected completely which invalidated them. However these problems were sorted out at this time and the following set appeared to be reliable and continued to be so for the next two years. Recorders travelled to Goroka each fortnight with the completed forms, which were checked in detail before they were paid; any problems

arising were dealt with immediately.

This study collected a wide variety of monitoring information which had different levels of reliability. Information reliability is determined by a number of factors: firstly is the honesty and ability of the recorders; secondly, the willingness and honesty of the household members to provide the required information; thirdly, the collective nature (number of actors and transactions) of the information. How each of these relates to this study will be dealt with in turn.

First, the heavy reliance on village based recorders was practical in order to collect the width and depth of monitoring information that was required. Besides the checking of the fortnightly returns (given the baseline data - demographics and areas planted etc) an integral part of the study was the tri-annual survey which checked that recorders had been approaching the appropriate household members and collecting the correct information via direct interview with household members (see appendix 3). These suggested a general level of recorder reliability; other announced random visits were made which also suggested general reliability⁰. During the course of the study the honesty and ability of the recorders did not appear to be a major problem; however, one was dismissed early on in the study for falsification. Although it is impossible to be absolutely certain, the checking and recruitment procedures employed did appear to ensure a fair degree of reliability and honesty.

Secondly, the willingness and honesty of household members is a little more difficult to ascertain. Their willingness was tackled by appealing to their altruism (the information collected will help all small farmers) and by providing small incentives (such as small presents

and gifts on completion of the first and second years) and by dealing with any complaints that they may have had concerning the intrusion of the study immediately; they were free to complain to the author or other CIC staff when we were either in the village or to visit the office, as some did. It would appear that being accessible to the household members was essential to the long-term success of the study and no households withdrew during the two years. Easy and open dialogue had a large part to play along with the fact that the day to day information was being collected by people from their own clan; it would appear that such intrusion from outsiders would be tolerated over such an extended period. Ensuring that household members were giving honest information was harder than keeping them in the study. All that could really be done was to check data coming in against household parameters such as structure and size of the household, the size of overall plantings, and against other objective data such as coffee prices¹⁰ and food prices¹¹ and the passage of the wet and dry seasons. Where data was suspect an investigation was usually made through the reporters and then followed up by a site visit to interview the relevant household member(s).

Thirdly, the collective nature of the data is concerned with whether the relevant household members have the ability, and relevant economic knowledge, to inform the recorders. This is related to the number and nature of economic transactions and the number of actors involved; as both these increase the reliability of the information decreases. This can be illustrated by taking the two extremes. Coffee sales are usually performed by one or two male members of the household (at relatively infrequent intervals), a clear market transaction is involved which could often be directly observed by the village based recorder. At the other end of the spectrum would be subsistence food production, harvesting is often

undertaken by a number of individuals, often informally whilst passing, there is no market transaction to quantify the amount¹² and it was impossible for recorders to observe the often multiple daily harvestings by a number of individuals. Other data probably fall within these two extremes: each area will be assessed for its reliability in the relevant sections and checked against other studies and 'known' parameters.

Information that is directly observed is likely to be more reliable than recall but can of course only cover a limited number of relevant events. For instance, in this study labour input data were collected primarily through direct observation on randomly selected days. Interviews also had to be conducted to obtain the information on labour inputs on those household members who could not be directly observed due to such things as the geographical spread of gardens and large numbers of workers (particularly during the coffee flush period). Practicalities therefore made it necessary to use recall¹³ data as well as direct observation in spite of the preferability of the latter.

The system used for collecting the monitoring data was far from perfect but is believed to have been the most appropriate to collect the information required. By putting in place a range of checking mechanisms, as an integral part of the study, it was hoped to minimise any data shortcomings. It should also be remembered that the monitoring data will be analysed in conjunction with the qualitative data collected and the field observations made during the two year period.

4.4.3 Qualitative Data Collection and Field Observations

In addition to the baseline information and monitoring data, qualitative data was collected in the second year of the study concerning why individuals were entering

into certain economic activities and discarding other areas of endeavour. This fieldwork was conducted by the author, with assistance from other CIC staff, via a series of interviews, using open ended questions which allowed probing and some discussion. These interviews were conducted with all the adult members of each household and some of the older teenagers to provide a series of cross checks (see appendix 3). In a study of this nature, where intrahousehold factors (particularly gender) are a central part of the investigation, this information must be regarded as essential. It provides the important whys for the observed hows. In addition it also provides information of value in itself which will be central in teasing out some of the important factors in the formation of household livelihood strategies and the various conflicts that are involved. It is important to note that all the interviews were conducted in private, the results were treated as confidential, and all the respondents were made fully aware of this at the time.

A number of field observation visits were made during the two-year period. Made on different days and at different times, in and out of the main coffee harvesting period: the main purpose was to provide validation for the general observed patterns of economic inputs and outputs (as well as checking on recorders). An example of this would be subsistence food production; it was clear after observing for a few hours in various different gardens that many people were involved in 'informal' harvesting and that the data collected by the recorders would have to be regarded as qualitative only. But on the other hand coffee sales, particularly within the village were found to be easy to observe (the location is known and limited) and record. These observations allowed an assessment of how the monitoring data should be viewed as well as providing further qualitative insights¹⁴.

4.4.4 A Quantitative Assessment

The general points made earlier in this chapter concerning data reliability can be quantified with respect to this study. At the end of the first and second years of the study a survey was carried out on all respondents¹⁵ asking about production and income earning during the last twelve months (see appendix 4). The data collected from this survey was then compared against the monitoring data for the same period. Given the careful monitoring techniques employed by the study it can be asserted that the monitoring data represents the more accurate figure. Table 4.2 summarises the data for 1992.

Table 4.2 Average Annual Error Rates¹

	Average Income	Average Total Error	95 % Confidence Interval
Coffee	368	-192	-89:-293
Food	203	-125	-27:-176

¹ Between recall and monitoring data for coffee and food sales income for 1992. All figures relate to PNG Kina. Household heads only. Calling these differences errors may be a little misleading, a discrepancy that needs explaining may be more appropriate.

This table certainly suggests that respondents are making serious underestimations of both coffee and food sales income when asked to recall information from the last twelve months. Average total errors are very high in relation to average incomes confirming that recall is not reliable for collecting data of this nature. The extremely wide confidence intervals on the errors suggest that the level of underestimation cannot be reliably estimated. These figures should make it clear why this type of investigation has to be pursued through detailed

monitoring and not large-scale one-off surveys.

Food sales income was underestimated considerably more than coffee sales income. The recall information for 1992 was collected from male heads of households only, so this cannot be surprising, and relates closely to arguments made earlier in this chapter about intra-household considerations in data collection. Women conduct virtually all the food marketing within the household making it very difficult for men to estimate what this figure may be¹⁶: detailed monitoring of all household members avoids this pitfall.

Recall errors appear to be related to intra-household factors because of the variation between coffee and food. Relating these errors to household variables has produced some useful results. Errors were found to be related to the general level of sales (both coffee and food) and to both household size and number of workers within it (Overfield, 1993a: 25, 28). Neither of these can be of any surprise as both the level of economic activity and the number of actors involved increases it becomes harder for the household head to keep tabs on individual transactions, and to collate and retain this information for later recall.

The figures for 1993, presented in table 4.3, seem to confirm these arguments with respect to intra-household considerations. It can be seen that women are far better at estimating food sales income than men, and vice versa for coffee, which relates quite clearly to which activity they are most involved in and have control over. The results from 1993 also confirm that recall information, where long time lags are involved, cannot be relied upon. It tends to produce large underestimations of household economic activity and no model can be estimated to predict the size of these. It also confirms that intra-

household considerations are crucial when designing any data collection system.

Table 4.3 Average Annual Error Rates - 1993

	Average Income	Male		Female	
		Average Error	95%CI	Average Error	95%CI
Coffee	544	-286	-134:-438	-352	-181:-523
Food	218	-155	-68:-242	-70	-25:-115

4.5 Conclusion

This chapter has covered all the relevant issues on data collection for this study and provided a detailed description and analysis of the methodology employed. In particular it has shown that detailed monitoring is the only appropriate method to employ when investigating the intrahousehold processes influencing household allocational mechanisms. There are clear gendered areas of responsibility in the household economy and this chapter has shown that this study utilised a methodology which captured these facets and therefore provided reliable data.

This chapter concludes the first part of the thesis. Part II is concerned with the actual results of the study and how they relate to the relevant areas of literature. It will commence with a consideration of the impact of global incorporation on levels of rural economic differentiation in the Highlands of PNG.

Notes

1. Although not an explicit assumption in most household models little, if any, discussion takes place concerning cultural setting and therefore appropriate household definition. Never it is really considered that such a 'unit' may not exist.
2. Ownership and control of land is central to Highlands society and economy, see Waddell (1972: 216) for example.
3. Which focused on developing appropriate survey and data collection methods for export tree crops in PNG.
4. Focusing on coffee alone and specifically on developing techniques to collect data on sales and income.
5. Based on coffee rust infection rates.
6. Goroka, the provincial capital, at 1580 masl is one of the high points of the Highway in this area.
7. Collett (1989: 58-63) goes into some detail on the various sample frames available in this area of EHP and makes a comparative analysis of their appropriateness and reliability.
8. Census data is not available in this level of detail and has often been found to be incorrect.
9. There were of course some minor problems highlighted by these checks
10. Which are permanently monitored by CIC.
11. Monitored by the Fresh Produce Development Corporation (part of a New Zealand food marketing aid project).
12. Measurement of subsistence food production is made difficult by the fact that unit discretion often comes down to big or small piles. If these are then sold an inverse unit/price ratio has often been observed - "a big pile has a big price" and vice versa.
13. But this is taken from bi-daily interviews and is not of the same nature (i.e. very unreliable) as that criticised earlier in this chapter.
14. Such as observing who is involved in gambling and beer drinking.
15. At the end of the first year (1992) this was addressed to male head of households only. On study completion (end of 1993) wives were included along with male household heads.
16. Particularly where there is more than one wife and/or a large number of older daughters.

Part II

Global Incorporation, Economics, and Gender Relations

Chapter 5Global Incorporation and Rural Economic Differentiation5.1 Introduction

This chapter is concerned with the impact of global incorporation on rural economic differentiation in the PNG Highlands. Incorporation was initiated during the colonial period with levels of monetisation increasing progressively and then accelerating with the introduction of coffee in the 1950s. This altered the nature of village level subsistence systems which had previously being based on mutual assistance and reciprocity. The introduction of a market economy brought with it increased emphasis on individualism and monetisation of once reciprocal arrangements. Even the notion of the household could be seen as a manifestation of this (see section 5.2). Inevitably with individualism and increased economic 'freedom' there must come some level of economic differentiation or variation in market success i.e. the creation of winners and losers.

How individuals fare, both in society generally and within the household, depends principally on their access to productive resources; as women generally have much lower rates of access than men, it appears likely that they will become one group of economic losers. It could be argued that the introduction of capitalism alters the nature of gender relations to the detriment of women's position in society. This is not to say the pre-existing social order was a model of gender equality; rather that the introduction of market exchange relations has worsened women's positions relative to that of men.

This thesis is concerned with the causes and economic consequences of the social subordination of women in Highlands society. This chapter covers one aspect of the causes; how the introduction of capitalism has altered the social basis of the rural economy. It will concentrate on the general changes and attempt to draw out the implications for gender relations.

5.2 The Creation of the Household

The household has been defined as a "grouping that assures some level of pooling income and sharing resources over time so as to reproduce the unit" (Smith and Wallerstein, 1992: 7). Furthermore these authors assert that households have

"been or become part of an integrated historical system, that of the capitalist world-economy, which is arranged hierarchically in a self-reproducing system and in which so-called core and peripheral zones perform very different roles and are hence structured quite differently" (op cit, 1992: 4)

This seminal work identifies five orientating processes of which three are worth examining with respect to households in the Highlands of Papua New Guinea: (1) the impact of the cycles and trends of the world-economy upon household structures; (2) the role of state machinery in moulding and re-moulding household structures; (3) the household as an entity whose boundaries are subject to continuing change. Before turning to these it is useful to look at some of the patterns identified by this study on households in the periphery.

In areas that are peripheralised, or on the bottom rung of the commodity producing ladder (the South), there has been incomplete proletarianisation. There is wage income but it is clearly insufficient to cover living costs of the household, with wages being too low and often sporadic (Smith and Wallerstein, 1992: 256). An inverse relationship

between wage levels and subsistence activity appears to exist; therefore when wages fall households resort to increased subsistence activity. Peripheralised households combine wages and petty trading (including commodity production) in an ever-increasing search for cash income of which they are always in increasing need as the process of integration reduces, or even destroys, the possibility of obtaining required resources out of traditional subsistence activities (op cit, p.257).

The household in the periphery may be regarded as a creation of the geographical integration of their area into the capitalist world system. Movement away from a subsistence economy to the trading of labour and goods within capitalism after the industrial revolution and its subsequent spread created households throughout the globe. Some parts of the world still had the essence of a 'subsistence economy' as late as the nineteenth century and what defines a household today probably did not exist at this time i.e. the area guaranteeing reproduction tended to be much larger, what is sometimes called a "community" (Wallerstein, 1984). When such areas are incorporated into the world system, one of the many consequences is the disappearance, or at least reduction, in the economic role of such communities and the creation of household structures (Hopkins et al, 1987).

The state has had an increasing impact on the structure of a household, as an income pooling unit¹, even during the two year period of this study. By increasing coffee prices it reduced the significance of subsistence production in overall household incomes (see section 5.6). This is purely a 'snap-shot' at this time, of the creation, and evolution, of the household in PNG. Coffee production is the main link for peasant households to the world capitalist system: trends and cycles in this market (which are of course related to movements in the global macro economy and its

various components) impact considerably on household income levels and structures. Depression in coffee prices, have in the past, led to producers shifting back into subsistence food production (Grossman, 1984: 133-81; Overfield, 1991: 11).

These observations provide support for the notion of an inverse relationship between wage levels (but substituting commodity prices for the wage level) and subsistence activity. Clearly the state in PNG has had a role in determining how much of the external trends and cycles of the coffee market have actually been transmitted to producing households through price stabilisation and support policies. This issue will be a major theme of chapter 7 on coffee production but the basic trend has been to provide large levels of price support² during downturns in international commodity markets (not just for coffee but also for cocoa, copra and oil palm) to try and sustain production levels. The motives behind this are multifarious and include maintenance of export earnings and buying political support; these in turn maintained high levels of market integration within the peasant mode of production.

The creation of the household, as it now exists, in the Highlands may be seen as a direct result of actions of the colonial state with the introduction of cash cropping principally in the form of coffee in the 1950s. Before this time the village "community" had far greater economic importance in ensuring economic reproduction which was systematically undermined by the introduction of market relations associated with coffee and propagation of the *bisnis* (business) ethos. As highlighted in chapter 2 there was already considerable differentiation in rural society, as in big-men and small-men, but this was not on the basis of any market relations and the village was the crucial unit in its own reproduction. Highland households are a product of the introduction of cash cropping and market

relations and their 'creation' provided the basis for individual accumulation; they are a product of the trajectory of global capitalism and a pre-requisite for economic differentiation.

5.3 The State, Indigenous Capital and Economic Differentiation

Highlands society became more differentiated during the colonial period and the early years of independence. One observer noted:

"over the last two decades accumulation of the former (indigenous capital) has become especially pronounced, in the take over of agricultural largeholdings, processing factories, trading firms and other commercial operations from expatriate owner-occupiers and international firms. The indigenous class of capital now owns a substantial proportion of the most important means of production, which are held as concentrated property. " (Thompson and MacWilliam, 1991: 85)

Labour productivity increased, making accumulation (continuous production of surplus labour surplus time) possible, and was aided considerably by the introduction of the sweet potato into Highlands society. As mentioned previously in chapter 2 this innovation made possible substantial increases in human and animal (pigs) populations and was particularly important for extending the amount of land under cultivation in one of PNG's most fertile areas. It allowed for the accumulation of wealth, mainly in the form of pigs which acted as a store of (labour) value, and allowed the creation of 'big-men' and the start of economic differentiation.

Many labels including 'new elite', 'big peasants', 'rich peasants', 'middle peasants', '(educated) petty bourgeoisie' are used to attempt to describe the transformation of primitive into capitalist accumulation. An important element in the PNG experience was the

alliances between various groups as stated by Amarshi et al (1979: 189):

"The tacit alliance between the rich peasantry, educated petty bourgeoisie and metropolitan capital is perhaps the most outstanding social characteristic of Papua New Guinea in the 1970s."

It was the coffee price booms, in conjunction with these alliances, during the 1970s and 80s which greatly aided the indigenous takeover of capital in the Highlands. With high prices, and the provision of state loan funds to meet most, if not all, of purchase prices, localisation was rapid (Thompson and MacWilliam, 1991: 100). Indigenisation of capital was made possible by loans from national banking institutions, and as the development bank and major private (Australian) banks were principal vehicles for the circulation in PNG of international money capital, takeover of plantation operations was made possible by movements of capital on a scale way above that available within the Highlands (Townsend, 1977: 419-22). This localisation of capital was made possible by the international instruments of global capitalism including the World Bank.

The 1976 coffee price boom also increased consumption (household acquisition) on a spectacular scale, accelerating moves by the Highlands section of indigenous capital into coffee processing and trading in the region (Thompson and MacWilliam, 1991: 107). This section of capital also expanded out into other realms including real estate in major towns, the national capital (Port Moresby) and even overseas (mainly north Queensland).

The state, international agencies, and developments in external commodity prices had a clear impact on the formation of an indigenous class of capital in the Highlands. International agencies, in conjunction with the state, were critical in facilitating the jump from primitive to capitalist accumulation. These developments set the parameters for market relations and rural economic

differentiation within the peasant mode of production.

5.4 Rural Economic Differentiation in the Highlands

The issue of arrested transition to agrarian capitalism mentioned in chapter 2 is closely related to the issue of rural economic differentiation, or differentiation within the peasantry. It can be asserted that this 'arrest' or constraint is closely related to the nature of social relations, and land tenure, in rural PNG and Highlands society. One observer argued:

"Customary land tenure has proved significantly adaptable to enable inequalities in coffee holdings to develop, and a small number of 'big peasants' to emerge. Yet the same 'customary' tenure asserts the rights of households to land and, by so doing, precludes the formation of a landless proletariat. At the current conjecture, the small labour supply at peak harvest season, coupled with the exigencies of household reproduction, prevent the inequalities in coffee holdings being fully converted into differentials in income, wealth and capital accumulation, without which social differentiation cannot take place." (Collett, 1992: 157)

These arguments contrast considerably with those advanced by Grossman (1984) concerning development projects (mainly cattle) and how they altered the basis of land tenure and accumulation. This contrast can be explained by the resources required, in particular land, by the two activities and how these mould social relations of production.

Cattle projects require large amounts of land and capital if they are to be commercially feasible i.e. more than an individual household will have access to which requires a change in the method by which people access land (capital being provided by the Rural Development Bank) and which is embodied in the Clan Land Usage Agreement³. These were commercial projects with market exchange relations (paid labour for example) and using large amounts of resources

way above anything used previously. Coffee, on the other hand, can be cultivated in small amounts on land already owned by the household using its own labour with the supply of this acting as the constraint on the cultivated area. Even though it is a cash crop its production does not have to be based entirely on market exchange relations because of the relatively small amount of resources required for its cultivation. It is a relatively scale neutral crop which can be grown under commercial plantation conditions or integrated into traditional production systems as it has been in the Highlands. However, within this integration there is considerable variation as table 5.1 highlights with respect to the households studied.

Table 5.1 Household Land Holdings

Household Number	Food Area	Coffee Area	Total Area	Household Size
1	0.55	0.31	0.84	6
2	0.31	0.09	0.28	5
3	0.24	0.23	0.44	5
4	0.14	0.17	0.31	2
5	0.37	0.02	0.20	7
6	0.16	0.07	0.23	3
7	0.55	0.36	0.91	9
8	0.93	0.27	1.20	6
9	0.85	0.44	1.29	6
10	0.23	0.44	0.67	3
11	0.30	0.11	0.41	3
12	0.46	0.35	0.81	9
13	0.95	0.69	1.64	5
14	0.52	0.97	1.49	10
15	1.81	0.38	2.19	21
16	0.25	0.43	0.55	5
17	0.31	0.51	0.67	5
18	0.35	0.42	0.56	7
AVG	0.52	0.35	0.82	6.5
SD	0.42	0.23	0.54	4.1
COV	91	65	66	63

All areas are in hectares

Considerable variation in the size of landholdings between the eighteen households in this study is found to be observed. Food areas vary between 0.14 and 1.81 hectares, a ratio of nearly 13, but it has to be noted that this is mainly a subsistence activity and is closely related to household size (and therefore total food requirements) which was also established in earlier analysis on this project (Overfield and Irog, 1992: 8, 46) and provided some support for Chayanovian propositions on links between economic differentiation and the demographic cycle of the household (see also chapter 6).

Coffee areas have a much larger variation ranging between 0.02 and 0.97 hectares a ratio of over 45, which is much greater than the ratio of 5 found by Brown and Brookfield (1957: 29) which cannot be explained by household demographics. Earlier analysis seemed suggested that areas were determined by market access, household wealth levels and the availability of female labour (Overfield and Irog, 1992: 45). The availability of female labour was also found to be significant in explaining size of coffee holdings by Johnson (1988)⁴. There is clearly differentiation in land holdings, particularly in coffee but one can ask do these feed through to other income differences?

Table 5.2 on the next page provides some insight on this. Household cash incomes increased considerably between 1992 and 1993 mainly as a result of increasing coffee prices. The ratio between top and bottom cash incomes increased considerably between the two years; from 27 in 1992 to 71 in 1993. This can be of little surprise given the variation in coffee holdings, combined with household labour supplies, and the other determinants of coffee production (see chapter 7). Whether this differentiation reflects permanent variation is not as easy to predict. It appears to be dependent on how much income is actually tied to the land and how accumulated wealth and land will be passed

between generations.

Table 5.2 Household Cash Incomes

Household Number	1992		1993	
	Total Cash Income	Female %	Total Cash Income	Female %
1	3124	56	3026	47
2	1737	57	4859	19
3	529	68	5422	11
4	3233	14	5318	14
5	1000	51	1008	74
6	910	57	1436	57
7	439	32	579	44
8	542	32	2144	13
9	5194	2	7965	3
10	189	82	112	19
11	1697	6	212	19
12	232	60	190	15
13	627	59	885	98
14	1626	39	3095	43
15	1028	55	2171	44
16	577	19	485	23
17	1333	30	991	25
18	793	6	1024	21
AVG	1489	38	2269	33
SD	1278	24	2125	24
COV	87	63	95	72

Income figures relate to annual Kina totals. Female percentages relate to the proportion of household income that is directly obtained by women.

In this area, and generally in the Highlands, large land holdings are not inherited by one person alone, instead they are split up among the sons of the household head, by him, and sometimes (but not usually) by the clan land controller, reducing considerably the chances of permanent differentiation on the basis of land holdings. Incomes which are not tied to the land, such as a small business, would not necessarily be split in this way and may have the potential to lead to increasing differentiation as Grossman (1984) argued in relation to cattle projects in the Eastern

Highlands. This leads to the question is differentiation dependant on what proportion of incomes are not tied to land holdings? In the case of these eighteen households only two had a small business and one access to substantial wage income (all having total cash incomes over K 5000 in 1993). Given the relatively low levels of income, small land holdings, and the social pressures to make gifts to ones *wantoks* (fellow clan members) when you have cash, it is difficult to see how much further differentiation can take place in the rural economy. This would suggest that, despite the widespread introduction and uptake of coffee cropping, the pre-existing social relations of production have been essentially maintained and continue to restrain economic differentiation.

Table 5.2 also takes a look at the issue of differentiation into the household. As household incomes increased between the 1992 and 1993 the proportion that the women directly obtained fell from 38 to 33 per cent. The ratio of the highest female income to the lowest also increased between these two years from 35 to 67 perhaps suggesting some women fared quite well with others bypassed by the income improvements in the rural economy. What determined this will be assessed in detail in later chapters but an indication of what factors may be at play should be mentioned. It most likely comes down to who has control of the coffee enterprise. In households where women had greater access to coffee income they had the chance to gain; where they did not, they lost out considerably.

One of the first actions of the colonial state, pacification, further entrenched the pre-existing social order. By appointing local big-men as policemen in the new order the colonial state strengthened their position. A similar pattern followed with the introduction of coffee (and other cash crops) with extension inputs focused on progressive farmers (who were often big-men). Cash cropping

was presented by the colonial state to peasant society as 'modern' and 'male'. This presentation, and promotion, of cash cropping, has had long-term consequences for both the status of women and the subsistence economy (see chapters 6,7 and 8).

Chayanov stressed household differentiation on a basis of demographic cycles and drudgery aversion. Marxists emphasize differentiation on a basis of ownership and control of the means of production. Highlanders recognise 'rubbish men', 'ordinary men', 'prominent men' and 'big men' (Standish, 1978 after Brown, 1972). There is certainly differentiation in individual status found within Highlands society which was well entrenched before the colonial era and introduction of capitalism and cash cropping.

Marxist notions of differentiation (class formation) are difficult to support in the PNG context because owners and workers are the same people; households own their land and provide the labour. This illustrates the fundamental component of social relations of production in the Highlands - customary and flexible land tenure. This may, as Collett (1992) argues, be one of the main factors which prevents large differences in incomes and wealth developing between households.

The data in this section (generally) supports the Chayanovian concept of household differentiation, though section 5.3 did indicate the jump from indigenous to large-scale capitalist accumulation for a small number of Highlanders. It also brought out one aspect of gender relations in the rural economy; that is, women's general marginalisation from cash generating sectors. This is only one aspect of gender relations in the rural economy; other issues will be dealt with in later chapters. What is important to grasp here is their relative marginalisation which is bound to affect intra-household attitudes to cash

cropping which the next section discusses.

5.5 Incorporation, Resistance and Attitudes to Cash Cropping

Many writers have argued that cash cropping can only damage subsistence production systems; Grossman (1984: 219) in particular cites the replacement of subsistence 'affluence' with subsistence 'malaise' where a:

"previously strong commitment to subsistence production has declined because of a negative comparison to commodity production and other externally derived activities resulting in lower local food production and a deterioration in the resilience of the subsistence systems."

As mentioned previously in chapter 2, high levels of commitment to cash cropping have been observed in PNG and other parts of the world, which contrasts considerably with the findings of other studies which stress the importance of the 'safety-first' principle in livelihood strategies. Table 5.3 shows how these conflicting results may be explained by once more delving inside the household (chapter 8 will also cover this topic with relation to nutrition).

Table 5.3 shows considerable variation in the commitments to cash cropping between households. What is more crucial from the point of this thesis, is to look at the variations within the household. On average women have a far lower commitment to cash cropping than men; commitment also declines with age. It is difficult to ascertain what levels of commitment are - it is therefore necessary to look at actual resource allocation patterns and their explanations, the subject of chapter 6, to gain further insight. Relations within the household are crucial for determining commitment levels to cash cropping. How important (influential) various individuals' attitudes are in decision making will be assessed in chapters 6 (in general) and 7 (in relation to coffee). In turn these concerns

influence intra-household patterns of resistance and incorporation, and the level of autonomy that peasant producers retain in the Highlands.

Table 5.3 Intra-household Attitudes to Cash Cropping

Household Number	Male Head	Wife	Older Children	Older Generation
1	3	3	3	2
2	3	2	3	1
3	3	3	3	3
4	3	2	3	2.5
5	3	1.5	3	2.5
6	3	3	3	3
7	1	1	2	1
8	3	1	2	2
9	3	1	3	1
10	2	1	2	1
11	2	1	2	1
12	1	1	3	1
13	1	1	3	1
14	3	1	3	1
15	3	2	3	1
16	1	1	2	1
17	2	1	2	1
18	2	1	3	1
AVG	2.33	1.5	2.66	1.5

How to interpret the data - 1 to 3 ascending scale of commitment to cash cropping by asking individuals about the priorities they put on particular activities. A 3 would indicate a primary commitment to cash generation, a 1 only secondary commitment, a 2 a fair degree of balance between subsistence and cash activities. Older children and generation - where greater than one individual the figure is an average of all within the category.

Preston's (1989) reworking of Scott's (1985) *resistance* as a micro political economic tool employed by households to reduce their dependence on the economic products of the global system (economic resistance), is a useful concept to explore at this point with reference to the data presented in table 5.3. It appears that women and older generations are resisting incorporation far more than younger men are

(why this is will be examined in chapters 6 and 7). Therefore what is the sum of these differences within the household?

Grossman's analysis argues that, despite the negative impact of commodity production on reciprocal village organisation, peasants have retained a degree of autonomy from the global economic system. He asserts this is essential to community welfare:

"Autonomy implies, among other things, the existence of a viable subsistence system, and it is subsistence production that provides the crucial buffer insulating peasants from inevitable national and international economic cycles." (Grossman, 1984: 250)

Other writers have noted the degree of autonomy of rural households in Papua New Guinea:

"a class of peasants which is not proletarianised, to any significant degree (in the form of wage labour), leads to political and cultural practices among the peasantry which express their oppression as well as autonomy from capital. A majority of households throughout PNG retain their autonomy from the labour process which is essential to the capitalist mode of production and the extraction of surplus value; and therefore are capable of resisting proletarianisation. It is this relative autonomy which suggests the continuing interaction between modes of production and the on-going transition to capitalism " (Thompson and MacWilliam, 1992: 193)

Gender relations seem to be critical in the interaction between capitalist and peasant modes of production. The considerable autonomy that still exists for households in the Highlands stressed by the authors above would therefore appear to be the result of resistance by both women and older generations. Their resistance is key in the 'arresting' of the transition to capitalism. The key questions for household's prospects in the future is why they do this? Will these reasons be undermined by developments taking place in the society? Is this resistance gender based, or is it solely related to who can

access the cash income associated with coffee? A generational factor is perhaps important to recognise with regards to this influence; this will probably decline over time. The influence of this factor is embodied in the quote below:

"Later, your children and grandchildren will be born, and there will be many people here. Where will they live and cultivate gardens? Where is there room for them to live? There will not be enough land. You think only of bisnis You have used all the land for commercial activities. You are only happy with bisnis. You must leave some ground for gardening and other uses" (Magistrate commenting over use of land for commercial reasons leading to a land dispute quoted in Grossman, 1984: 218)

This section has brought out another aspect of gender relations within the household - the lower commitment to cash cropping of women. In the previous section their relative marginalisation from the cash economy was noted: what is the relationship between these two factors? There has to be a notion of intrahousehold resistance related either to a lower commitment to cash cropping in general or (and) as a rational response to low labour returns. This will be assessed in detail in chapter 6. Another important point to note is the variation in commitment by generation; the younger the generation the greater the commitment to the cash economy which must create momentum for increased incorporation as the influence of the older generation declines. Before looking at some of the implications of these findings (particularly potential declines in reciprocity) it would be useful to briefly look at what levels of market integration have been indicated by the data from this study.

5.6 Levels of Market Integration

All the literature with regard to integration in PNG has been concerned with smallholders' relative autonomy from market relations. Authors have stressed notions of 'arrested transition' (Collett, 1992) or even a stage of 'terminal development' (Howlett, 1973) but have not attempted to assess the dependence of the household on market activities by comparing market income to non-market income. Estimates from this study are presented in the next few pages in an attempt to shed some light on this, and on the impact of changing coffee prices on integration. The first question requiring an answer is what proportion of food output is retained for subsistence requirements i.e. not marketed in any form?

Table 5.4 shows that households retain most of their food production for subsistence consumption and increasing household total incomes appear to have little influence on this proportion. The proportion of food retained rarely drops below 70 per cent (with some households in the high nineties). In terms of domestic food consumption households do not appear to be highly dependent on market exchange. However, this is only part of the issue and perhaps what we should be concerned with is the proportion of total household income that is accounted for by subsistence production.

Table 5.4 Proportions of Food Output Retained

Household Number	1992		1993	
	Total Income	% Subsistence	Total Income	% Subsistence
1	4204	69	4064	68
2	2870	68	5919	69
3	2040	71	5960	67
4	3338	70	5387	62
5	1676	78	1612	70
6	1023	64	1629	67
7	1460	87	1419	75
8	1965	91	3140	70
9	6575	86	8902	77
10	607	73	563	95
11	2064	84	753	97
12	1534	96	1293	99
13	1285	84	1756	72
14	2543	76	4095	68
15	2380	88	3338	70
16	960	94	1294	94
17	1820	73	1606	94
18	1209	93	1521	87
AVG	2197	80	3014	78
SD	1331	13	2186	12
COV	61	17	73	16

Total income includes all cash sources plus a valuation for subsistence production. Subsistence percentage is calculated by valuing subsistence production at prevailing market rates and adding this to the value of food sales and dividing the subsistence value by this total. See appendix 5 for breakdown of income sources and split between subsistence and cash incomes. Please note, as outlined in chapter 4, measuring subsistence production is a far from accurate procedure and probably underestimates the actual level.

Table 5.5, on page 66, presents information on total household incomes, coffee incomes, and subsistence production as a proportion of total income for 1992 and 1993. Coffee prices received a major boost when support prices were increased by over 40 per cent⁵ taking with it household incomes and reducing the significance of subsistence income (after including some employment

generation in town and other multiplier effects not just coffee income). If this was simply an 'income effect' rather than a production response then the level of market integration did not really increase (see chapter 7 for more detail). It is clear in this instance that a political decision led to an increase in market integration at least in the short term. This may have long-term consequences.

Table 5.5 Total Household Incomes and Subsistence Proportions

Household Number	1992			1993		
	Total Income	Coffee Income	% Sub	Total Income	Coffee Income	% Sub
1	4204	767	26	4064	1020	27
2	2870	608	39	5919	827	18
3	2040	500	29	5960	643	16
4	3338	218	12	5387	433	9
5	1676	287	40	1612	504	37
6	1023	365	36	1629	797	25
7	1460	160	70	1419	279	62
8	1965	193	71	3140	320	33
9	6575	99	11	8902	250	8
10	607	6	69	563	90	80
11	2064	59	21	753	94	74
12	1534	151	85	1293	174	85
13	1286	404	51	1756	456	50
14	2543	1058	27	4095	1497	25
15	2380	588	57	3338	950	35
16	960	226	40	1294	303	34
17	1821	390	27	1606	571	24
18	1210	493	34	1521	592	24
AVG	2197	368	41	3014	544	37
SD	1331	261	21	2186	491	26
COV	61	72	50	73	83	64

Percentage subsistence is the value of subsistence food production (at imputed market values) divided by total income (both cash and subsistence). HHNO denotes household number. Please note this is a different definition from table 5.4 - see appendix 5 for more detail.

This emphasis placed on subsistence is determined by a number of issues like access and opportunity, and also by (intra-) household objectives (see chapter 6). It is also determined by exogenous factors like market prices and political favouritism (see chapters 7 and 8). An important point highlighted in table 5.5 is that subsistence production accounts for a relatively small amount of total household income which suggests quite a high level of integration into market relations. Rural households in PNG are, to some extent, integrated into the periphery of the world economy; this does not necessarily imply that the capitalist mode of production is dominant or that there is a high degree of market dependence. Integration cannot be established solely on the basis of cash (equivalent) terms; the information presented in section 5.5 highlighted considerable variation between, and within, households in levels of commitment to cash cropping. The influence of these on 'household' objectives and the allocation of resources will be examined in chapter 6. The remaining section of this chapter will examine the general implications of global integration on social relations of production within the rural economy in an attempt to tease out some of the alteration of resource allocation mechanisms.

5.6 Global Integration, Land Tenure and Reciprocity

The degree of monetisation of an activity affects the basis of any exchange within its sphere. Levels of monetisation increased progressively in the Highlands of Papua New Guinea during the colonial period, accelerating with the introduction of coffee in the 1950s. Scott (1976) argued that village level subsistence systems have social systems based on mutual assistance and reciprocity which help alleviate household labour and food shortages and that these are undermined by the spread of the commercial economy. These social relations are as much a part of

production as subsistence techniques with both serving the same purpose of ensuring community sustenance and survival. As cash cropping increases, it has been observed, that villagers sell the food they once shared (Nielschman, 1979) and form communal work groups less often (Gudeman, 1978). Grossman (1984: 246) says that in Highlands society, communal forms of land tenure, which guarantee members access to land, are under increased pressure from those extensively involved in cash cropping who seek more individual forms of tenure to safeguard their investments. It has also been noted that extended family units, which traditionally helped alleviate production problems faced by individual nuclear families, are disintegrating as impoverished extended household heads can no longer satisfy traditional obligations to other members of the extended family (Shenton and Lenniham, 1981).

The expansion of cash cropping has been associated with an increasing emphasis on individualism. Declines in reciprocity and group endeavours and increasing individualism in land tenure, which facilitates differentiation, have been associated with increased commodity production throughout LDCs (Finney, 1965; Nietschman, 1973; Stavenhagen, 1976; Lingenfelter, 1977; UNESCO/UNFPA, 1977; Gudeman, 1978; Klein, 1980). In some cases this has been a response to increased impoverishment as those well off can no longer fulfill traditional obligations; in Kapanara, Eastern Highlands it was the result of the lure of money and commitment to the 'bisnis' ethos (Grossman, 1984: 218-9). Government policy has also played a major role in the emergence of a rural elite in many countries through such things as 'progressive' farmer strategies.

Customary land tenure, the basis of property rights for smallholders, is often portrayed as a means of maintenance of traditions. But in PNG land law describes two forms of

rural private property rights: (1) households as smallholders; and (2) the class of industrial and agricultural capital, holding rights of concentrated property. The law expresses state power at the centre of both forms of rights to land (MacWilliam, 1993: 9). Customary rights of households are legally expressed in forms of private property and represent a break with a non-capitalist past. The previous appropriation of nature - horticultural production and hunting, presumed existence of property including land, but was not private (Kay and Mott, 1982: 21) but rather communal. Increasing individualism in land tenure was also noted in a longitudinal study in Chimbu:

"Over a generation, land was held and allocated within families, among families within the subclan, and to kin and affines in neighbouring groups. As cultivation becomes more intensive and semi-permanent, there appears to be a progression from fluidity of land rights in the clan or sub-clan to anchoring of rights and boundaries to individuals and families. " (Brown et al, 1990: 21)

Where accumulation by chiefs and 'big-men' was based on the cultivation of land by household labour, surplus labour time was appropriated through means which acknowledged land as a particular form of property. The colonial state by eliminating warfare and establishing new terms of political order transformed property rights and changed the basis of household production and reproduction (MacWilliam, 1993: 15). Pacification certainly blocked land acquisition through conquest. Have other state powers or policies been exerted to check shifting cultivation thereby pushing more households into fixed, more intensified systems of agriculture?

The introduction of capitalism to developing societies, and its relation to the international agencies, often bring development projects which further entrench social relations associated with private ownership. The example of

cattle projects in Eastern Highlands Province examined in detail by Grossman (1984) provides considerable insight into this process. There can be little doubt that these projects had a dramatic impact on social relations of production. The projects were concerned with the efficient monetary output of agriculture rather than maintenance of pre-existing social relations within a village. External inputs were focused almost exclusively on project leaders and the introduction of the Clan Land Usage Agreement helped to legitimate the position of cattle bosses (project leaders). As a result of this dual system of land tenure within the village, differential access to resources increased markedly. The traditional land tenure system's openness and flexibility which ensured that everyone had access to environmental resources has been modified significantly. Cattle bosses exercised a degree of control over large areas of land that was unprecedented in the village's history: not only did they restrict other villagers access to enclosed areas (projects) but also increasingly tried to assert individual control over the land (Grossman, 1984: 108). The Clan Land Usage Agreement assists in this. Earlier work also revealed this pattern:

"Once they put a fence around a block of land, cattle project owners tend more and more to say "this is my land" and conveniently forget that permission for use of the land in this way was given by the land controller and others of his group" (Holzknecht, 1974: 71)

Similar land usage agreements were introduced for the Coffee 20 Hectare Blocks in the 1980s; similar changes in village level social relations could well have been experienced, but no such study has been conducted on this programme. Perhaps a more important question for this thesis is what has happened to reciprocity in the peasant mode of production; how have interactions with capitalism changed productive practices particularly with reference to the hiring and reciprocal exchange of labour?

A number of studies have looked at this issue. Work conducted in the mid 1970s by Anderson reported that paid labour was used by one-third of all households surveyed (1976: 22); questions about the use of reciprocal exchange labour (paid in kind or for future 'favours') were not asked so no comparison is available from these data. A survey conducted by the author in mid 1991 produced a similar 31 per cent of households using hired labour to that of Anderson (Overfield, 1991a: 7). Both these studies were conducted in similar fashions across all major coffee producing areas producing similar results to other work in this area e.g. ANZDEC (1992). The results from the two-year monitoring programme in the Benabena produced far lower incidences. Of the eighteen households in the study only two hired-in labour in 1992 with this increasing to four in 1993 (in coffee production only). However nearly three-quarters were observed to be using labour from outside the household but were either paying in kind, usually with some form of food, or not at all with the favour to be reciprocated at a future time⁶.

What could account for the major differences in these labour hiring-in figures? One possible explanation is that the first two relied on interviews rather than observations for their data and the issue of exchange versus hired labour became confused with the proportions of the latter overestimated; this is quite possibly a factor in the earlier Coffee Industry Board survey (see Overfield, 1991a). The incidence of hired labour may also have declined as coffee prices fell⁷ during the period under consideration thereby reducing both the effective demand, and potential gains, from commercially hired workers.

Despite the variations in the evidence concerning the incidence and importance of hired labour, there appears to be clear evidence that reciprocal labour agreements are still common between households. The importance of these

may have increased as a result of a depression in coffee prices which seemed to have placed further emphasis on subsistence production in coffee producing areas (Overfield, 1991a: 11). It may also suggest that the inroads of capitalism into the peasant mode of production have not been as great in some places as suggested by some observers (Thompson and MacWilliam, 1991 for example). The exact context is important here as farmers will respond in different ways to the capitalist imperative. Information presented in section 5.5 suggests that there is some intra-household resistance to this; levels of commitment vary considerably between households. The patterns, and their associated reasons will be considered in chapters 6 and 7.

Marxists see society in terms of horizontal classes principally defined in terms of capital and labour which determine the nature of social relations in production. The introduction of capitalism to a peasant society, whose social production relations were based on mutual reciprocity, would transform these to relations based on market exchange and individualism creating the household and undermining 'community'. These class structures do not really apply to Highlands society; Highlanders view people in terms of vertical divisions, clans, tribes, and language groups and more recently in terms of political-administrative units and regions devised by the state (Standish, 1979: 289). However, it is possible to place these into class divisions to form "class fractions" (or horizontal divisions).

Hyden's (1980) long-term study of Tanzania is very relevant to PNG; his 'economy of affection' is highly compatible with most facets of the *wantok* system. This describes sharing of a common language and symbolic clan brotherhood as an essential feature of society. It can also include within its definition, ties of patronage or brokerage, traditional exchange systems, friendships, nepotism and

misappropriation of funds for 'good' social reasons. It is a mutual support system including those who, even if highly educated and presently in salaried occupations, know they can always return to their homeland and produce enough for subsistence. People in this position, as in Papua New Guinea, cannot be labelled as commercial farmers or capitalists, peasants nor proletarians, because of the nature of their social structure and its overriding value system. Security is rooted in the strength of the clan and its land. This is a crucial social underpinning of Highlands society which constrains social differentiation and class formation.

Where do women fit into the process of class formation associated with changing social relations of production? It could be argued that the major focus of exploitation is the household itself (see chapter 8). Models of interacting sets of social relations could help clarify this. Koopman (1991) for example argues in Africa that:

"men's and women's agricultural production takes place in the context of at least two distinct sets of social relations of production: (1) simple commodity production constrained by the dominance of state policy and capitalist market power, and (2) simple commodity production and subsistence production structured by patriarchal relations of production among household members." (Koopman, 1991: 164)

Patriarchy complicates the conceptualisation of class where duality of social relations exist; this approach provides a useful framework for analysing appropriation of surplus (labour time) within the household, or assessing the political, social and ideological factors that reproduce the ability of a dominant class to set the terms on which a subordinate class may gain access to certain critical means of production where men can be regarded as the dominant class. This point will be developed further in chapter 7 with respect to various areas of policy in the coffee industry and in chapter 8 concerning the household as the primary site of exploitation.

5.8 Conclusion

It could be argued that social relations of production have not fundamentally changed. Cash cropping and the introduction of other commercial activities have not removed patriarchy but rather have strengthened it particularly with regard to coffee production which relates back to methods of introduction in the colonial era and male control of productive resources. However, the increased emphasis that men have placed on coffee, has allowed women to gain some economic autonomy from men in the form of the marketing of fruit and vegetables^b. These economic opportunities do not present themselves for women in the 'high' income earning sections of the rural economy and they generally remain relatively marginalised from the cash economy.

This chapter has set a detailed background with respect to the impact of introduced economic activities in the Highlands of Papua New Guinea. In terms of the central hypothesis it has covered how women have generally been marginalised from the cash economy, how this affects their attitudes to cash cropping and creates the motivation for intrahousehold resistance due to the all pervasive nature of patriarchy which will be the basis of any final 'model' presented in this thesis.

Notes

1. Depends on the definition of the household: income pooling (Smith and Wallerstein, 1992) or productive economic unit which does not include people living outside the village and the resources to which they may have access.
2. Price support levels were way above what could be financed, in terms of the total economic value of the industry.
3. The Clan Land Usage Agreement was a prerequisite for a cattle project loan requiring two elders of the loan applicants' patrilineage cluster to sign acknowledging that their kin group has granted the loan applicants exclusive use of the land enclosed for the purpose of cattle raising (Grossman, 1984: 68-9).

4. In this study Johnson used number of coffee gardens rather than cultivated area. This is a flawed output variable in that it is relatively meaningless. However, analysis from this study produced results which did not contradict hers.

5. Coffee support prices were increased, against the recommendation of government policy advisors, due to the Wingti government winning the 1992 elections having their main support base in the Highlands (the major coffee growing region).

6. Though these may be stored up for repayment of favours in the future.

7. Coffee prices declined considerably over this period (mid 1970s to early 1990s) even though they were supported by the government (up until May 1991 by self-financing price support system).

8. Although this has tended to be an all female preserve noted by a large number of observers now that some operations are moving into the realm of big business men are becoming much more involved even in fairly small-scale operations; this is particularly the case where it is a non-traditional marketing outlet of a relatively high value product e.g. broccoli to a hotel.

Chapter 6

The Determinants of Household Resource Allocation: Mobilisation, Conflict and Market Forces

6.1 Introduction

The purpose of this chapter is to examine the patterns and determinants of resource allocation in Highlands peasant households. It will first cover the 'efficient' peasant debate before moving to other issues in resource allocation. The next two sections will provide a description of individual and 'household' objectives and overall patterns of resource use. The latter sections are concerned with determinants of resource allocation: these will cover household structure, ideology and labour mobilisation, market rationality, as defined by mainstream economic theory, and conflicts associated with food planting, and marketing, decisions.

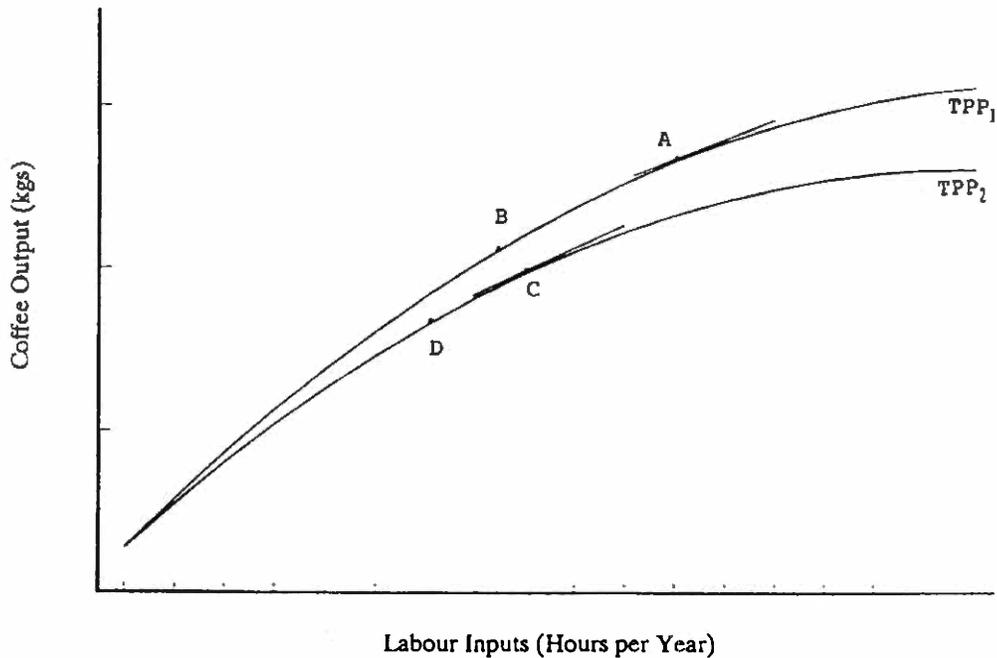
The analysis progresses from the previous chapter which was concerned with one aspect of the causes of the economic subordination of women i.e. global incorporation and the transformation of social relations of production to how this actually affects resource allocation at household level. This will be examined by assessing the impact on resource allocation of market forces and the ideology that they generate: household structure will also be considered.

6.2 Neoclassical Theory and the Efficient Peasant

The concept of economic efficiency in resource use has two elements in the neoclassical model of farm production; technical and allocative efficiency, which are necessary but not sufficient conditions for the attainment of economic efficiency. Economic, technical and allocative

efficiency are characterised in figure 6.1.

Figure 6.1 Economic, Technical and Allocative Efficiency



Only point A represents economic efficiency as it is on the maximum attainable level of transformation between inputs and outputs (the production function TPP_1 for coffee production with respect to labour inputs) and represents the level of relative prices (input to output prices). More formally the rate of technical transformation of factors into products (dY/dX , or the marginal physical product of labour (MPP_x)) is equal to the inverse price ratio (P_x/P_y). However, point C is the most interesting, with relation to peasant agriculture as it represents allocative efficiency (as $MPP_x = P_x/P_y$) but not technical efficiency as it is not on the highest possible transformation curve (production function). It relates to Schultz's 1964 'efficient but poor' hypothesis advanced in 'Transforming Traditional Agriculture'. The major prediction of this hypothesis is that peasant farmers are responsive to both the prices of inputs and outputs. This work concluded that peasant farmers were 'efficient but poor' by the fact that they

allocated the resources at their disposal in an efficient manner but were constrained by traditional technology. This represented a significant shift from previous literature which characterised peasant farmers as backward and lazy. However, the conclusions did rely heavily on the results of only two ethnographic reports and many other studies were rejected and not included (Adams, 1986). The first, Sol Tax's study on Guatemala was based on a highly commercialised village which was not representative of peasant farming. The second was Raj Krishna's work on price responsiveness in the Punjab, but Schultz only mentions cotton which was probably the most commercialised crop in the region ignoring the total set of price reactions. Krishna himself stated:

"a priori beliefs about the responsiveness of the output of individual crops to price movements and other factors cannot be accepted at face value... The responsiveness varies as between crops and regions." (Krishna, quoted in Adams, 1986: 276)

Supply elasticities (responsiveness) will also vary between and within households. Underlying output elasticities are those of variable factor elasticities (inputs) such as labour. Taking labour inputs and coffee production in the PNG Highlands as an example; how coffee supply responds to a change in price is dependent on how labour is able to respond to the new opportunity costs. In turn it is dependent on how opportunity costs to individuals within the household are determined; are the correct market signals transmitted to all people within the household? Table 6.1 provides some insight into this.

Table 6.1 Household Coffee Returns to Labour -1992

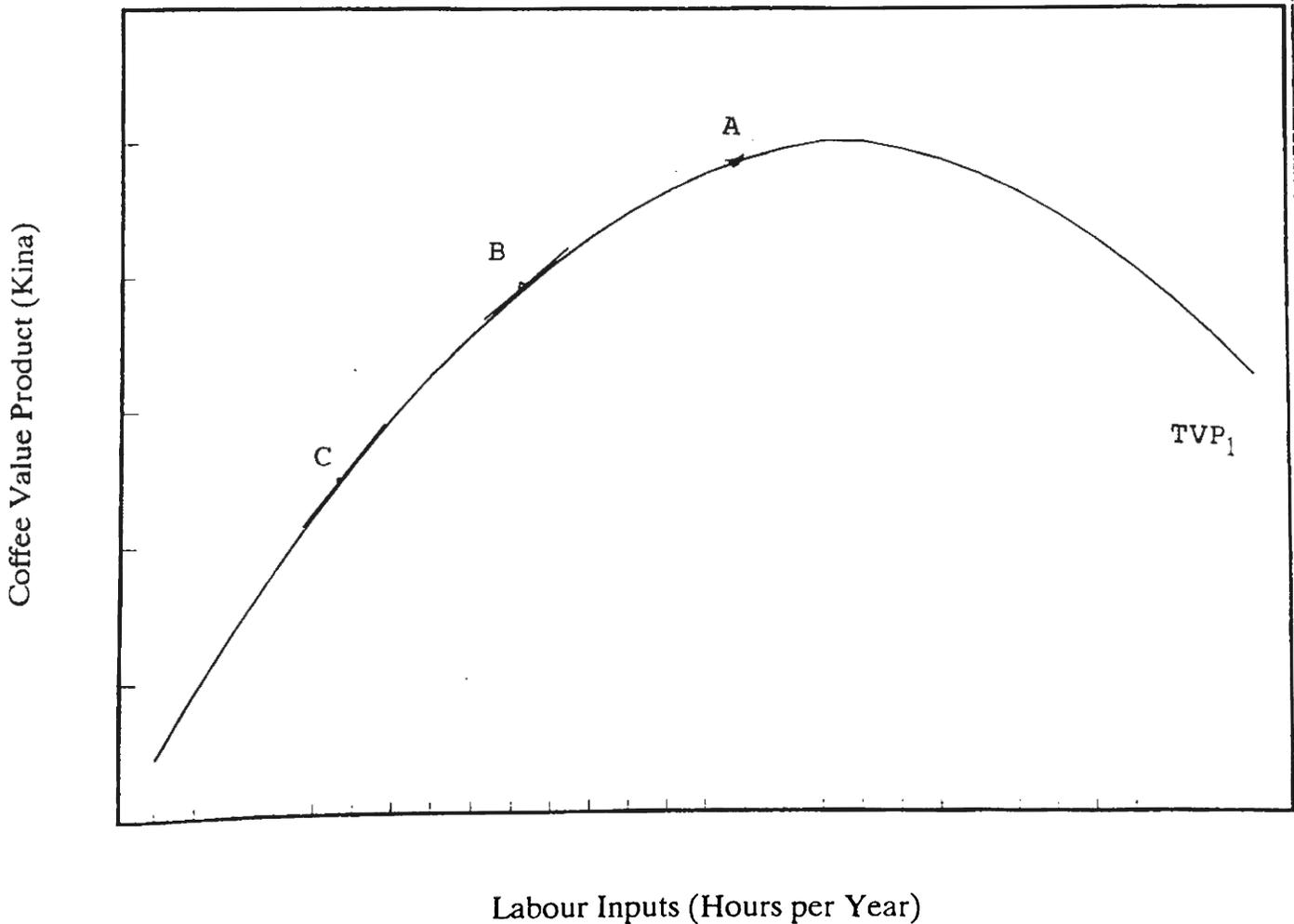
Household Number	Household Return	Male Return	Female Return
1	0.36	1.09	0.03
2	0.87	2.14	0.40
3	0.37	0.68	0.14
4	0.45	0.43	0.51
5	0.90	0.86	1.01
6	0.63	0.59	0.73
7	0.10	0.13	0
8	0.51	0.64	0.18
9	0.17	0.53	0
10	0.04	0.14	0
11	0.45	0.89	0
12	0.11	0.09	0.16
13	0.46	0.53	0.41
14	0.43	0.56	0.21
15	0.35	0.56	0.22
16	0.37	0.35	0.42
17	0.34	0.27	0.47
18	0.44	0.99	0.02
AVG	0.41	0.64	0.27
SD	0.23	0.47	0.28
COV	57	74	105

All returns relate to PNG Kina per hour (during 1992/3 the Kina was on approximate parity with the US\$). Calculated by dividing the cash return by the number of hours worked and segregated by gender.

Interpreting the data in table 6.1 in terms of the analysis relating to figure 6.1 provide some useful insights into the relevance of neoclassical farm production theory to peasant coffee production in the Highlands. By multiplying the values in the coffee production function by the average price of coffee this creates a Total Value Product Curve (TVP_x) for coffee. Allocative efficiency in the use of labour is now represented by the point where the marginal value product of coffee is equal to the wage paid to people engaged in coffee production. Virtually all labour used in coffee cultivation is household labour and does not receive a wage, the return to labour may be substituted instead.

For the neoclassical efficiency hypothesis to hold, all households need to be facing the same set of incentives, or be receiving the same return to labour in this case. Just looking at the variation in household coffee returns shows this not to be the case. Although the 18 households produce an average of around K3.28 per day (8 hours at 0.41) this average is not statistically significant and the ratio of the highest return to the lowest is greater than 20. Furthermore if one looks within the household it is apparent that male returns in coffee production are over twice those of females counterparts producing two different allocative 'efficiency' positions. These are characterised in figure 6.2¹.

Figure 6.2 Gender Based Inefficiency in Coffee Production



If the household is treated as a firm making single production decisions you cannot have two, or other multiple efficiency positions. Differing incentives, or incorrect market signals will produce a misallocation of resources. It is clear that one source of this failure is gender; position A on figure 6.2 would indicate that more female labour will be allocated to coffee production, than would be optimum; the converse is true for men (who are at position C; efficiency is at point B only). This suggests that it is impossible to conduct any meaningful analysis on resource use at the aggregate level of the household; it is necessary to look inside at individual objectives and processes of resource mobilisation before use patterns can be effectively assessed.

6.3 Household Objectives of Resource Use

The information presented in this section is a result of 71 field interviews conducted in June 1993² with various members of the monitored households. These interviews intended to ascertain the objectives of resource use (among other things) held by individuals (see appendix 3 for questionnaire). In this section the information is presented in terms of general patterns rather than by households to assess general views disaggregated by gender and generation.

Table 6.2 presents information on overall objectives of resource use by household members disaggregated by gender. These responses were ranked as the most important by people and does not therefore include all objectives; these will be presented later.

Table 6.2 Objectives of Resource Use (Highest Ranking)

Objective	Male	Female	Total	%
Money	26	9	35	49
Food Security	4	20	24	34
Shelter	4	1	5	7
Leisure	-	7	7	10

These represent the highest ranking objectives expressed by individuals.

The patterns identified above provide some support for the notion of subsistence 'malaise' advanced by Grossman (1984); that money comes highest in individual rankings. This view is predominant only among men; food security is a far higher priority for women. Retabulating this information by generation produced table 6.3.

Table 6.3 Objectives of Resource Use by Generation

Objective	Older Children (1)	Adult (2)	Older Generation (3)	Total	%
Money	17	17	1	35	49
Food Security	3	14	7	24	34
Shelter	-	5	-	5	7
Leisure	2	4	1	7	10

¹ Older teenagers. ² Household head and wives only. ³ Older generation usually non-head or wife and over 50.

Table 6.3 shows that older generations put a much greater priority on food security than teenagers and adults. The other objectives of leisure and shelter receive much lower

priority as a first preference but feature more prominently when all responses are included and this is considered in table 6.4.

Table 6.4 Objectives of Resource Use (all responses)

Objective	Male	Female	Total	%
Money	39	21	60	35
Food Security	15	38	53	31
Shelter	10	10	20	12
Leisure	2	3	5	3
Reproductive	0	6	6	4
Clothing	7	6	13	8
Pig Rearing	2	2	4	2
Future Business Development	9	1	10	6

Table 6.4 shows a similar prominence for money and food security with the same variation by gender. Shelter and clothing have become more important with equal responses from men and women. It is interesting to note that virtually all responses relate to immediate, consumption rather than investment, orientation. Only the last two categories and (perhaps) reproductive activities relate to investment, or deferred consumption which together account for only 12 per cent of all the responses expressed during this phase of field work.

This section has shown the complexity of 'household' goals. In terms of this thesis it has illustrated how these vary within households, particularly by gender. Becker (1990: 169) identified two constraints facing semi-subsistence

households: (1) minimum food constraint; (2) minimum income constraint. The information presented clearly shows that peasant producers in the Highlands are very concerned with meeting these in their resource use. Similarly Carrad (1982: 8) identified five household production objectives: provision of food for consumption, cash earnings, security, status and leisure, all of which appear to be addressed by these smallholders. However the most important point to bear in mind is that these vary considerably within households; they may conflict producing sub-optimal 'negotiated equilibriums' in resource use and strategies. The nature of these will be determined by relative power positions of individuals and their goals: patterns of resource use will indicate what these 'equilibriums' entail.

6.4 Household Resource Use

This section will describe the overall patterns of labour and land use observed by this study in 1992/3. Table 6.5 on the next page presents information on time allocation to food production, coffee production and household activities.

Table 6.5 Labour Allocation 1992/3 (hours per year)

Household Number	Coffee 1992	Coffee 1993	Food 1992	Food 1993	HH 92	HH 93
1	2146	2190	2904	1474	1402	1796
2	686	745	2905	3066	1358	1759
3	1343	1489	2000	2029	1059	1635
4	482	364	1037	978	380	350
5	190	204	2613	2701	2931	3654
6	584	511	1270	1343	1503	1329
7	1635	1752	4395	4862	2920	2555
8	380	657	5139	4129	1781	1927
9	569	745	6862	4555	2701	2570
10	409	226	2073	981	409	642
11	29	146	1022	1387	894	697
12	1329	496	2887	2340	2438	2278
13	883	988	5218	5443	993	774
14	2437	2281	4132	3431	3416	2876
15	1690	1218	5803	5269	5493	4003
16	613	1065	2183	2489	1964	1066
17	1153	1505	1481	1737	861	628
18	1110	937	1679	2489	2788	2671
AVG	967	950	3004	2822	1963	1845
SD	690	657	1808	1485	1278	1070
COV	71	69	60	53	65	58

Estimated annual allocation based on 26 monitoring points per year. Includes labour from outside the household. HH refers to household chores such as cooking and cleaning.

Food production receives the highest overall allocation followed by household activity and coffee. This is slightly at odds with the views expressed: money was generally regarded as a higher priority than food security. Food can also provide a cash income, while other sources such as employment and business activity were not included. Despite these omissions, the data in this table account for virtually all productive and reproductive non-leisure labour activity (not leisure) but does not allow for size or structure of household; before looking at this, the section will first look at land allocation patterns.

Table 6.6 Land Allocation - 1992

Household Number	Coffee	Per Person	Food	Per Person
1	0.31	0.05	0.55	0.09
2	0.09	0.02	0.31	0.06
3	0.23	0.05	0.24	0.05
4	0.17	0.09	0.14	0.07
5	0.02	0.003	0.37	0.05
6	0.07	0.02	0.16	0.05
7	0.36	0.04	0.55	0.06
8	0.27	0.04	0.63	0.11
9	0.45	0.07	0.56	0.09
10	0.44	0.15	0.23	0.08
11	0.11	0.04	0.30	0.10
12	0.35	0.04	0.46	0.05
13	0.69	0.14	0.85	0.17
14	0.97	0.09	0.52	0.05
15	0.38	0.02	1.72	0.08
16	0.43	0.08	0.25	0.05
17	0.51	0.10	0.31	0.06
18	0.42	0.06	0.35	0.05
AVG	0.35	0.06	0.47	0.07
SD	0.23	0.04	0.36	0.03
COV	68	66	77	41

All figures relate to hectares. Per capita figures include all members of the household.

Food receives larger amounts of land resources than coffee production although receiving similar per capita allocation. All these figures appear to be telling a fairly similar story but are slightly at odds with the views expressed by the household members during interviews. A clue to this is provided by the gender breakdown on the responses; this relates quite closely to the figures in the next three tables.

Table 6.7 Labour Allocation Per Worker Unit - Food

Household Number	Male 1992	Male 1993	Female 1992	Female 1993
1	217	248	1040	1076
2	1103	1134	1800	1932
3	300	266	760	801
4	300	303	735	675
5	241	243	823	864
6	483	510	788	833
7	439	547	1154	1246
8	757	555	3700	3164
9	2264	1503	1768	1173
10	1223	373	850	609
11	238	324	1226	1664
12	160	148	2281	1778
13	275	272	7044	7438
14	213	198	745	604
15	100	136	567	487
16	654	672	1528	1817
17	109	122	578	686
18	291	393	923	1468
AVG	521	442	1573	1573
SD	541	360	1568	1609
COV	104	81	100	102

Table 6.8 Labour Allocation Per Worker Unit - Coffee

Household Number	Male 1992	Male 1993	Female 1992	Female 1993
1	415	411	1481	1533
2	192	216	494	529
3	361	326	383	484
4	337	200	145	164
5	35	34	26	35
6	420	358	164	153
7	767	777	128	159
8	142	239	110	203
9	188	246	147	192
10	44	63	102	163
11	12	53	24	136
12	234	81	438	188
13	98	110	883	988
14	473	401	191	208
15	111	78	114	83
16	417	344	196	305
17	250	321	202	271
18	187	155	621	534
AVG	260	245	324	352
SD	192	182	366	372
COV	74	74	113	106

Table 6.9 Labour Allocation Per Worker Unit - Household

Household Number	Male 1992	Male 1993	Female 1992	Female 1993
1	210	281	1065	1347
2	68	141	1289	1618
3	55	72	504	761
4	15	17	364	333
5	44	37	1378	1754
6	195	159	1308	1169
7	146	160	840	719
8	412	436	997	1099
9	189	103	966	949
10	208	148	200	495
11	60	52	1371	1057
12	308	204	1268	1503
13	6	9	1622	1238
14	31	26	720	607
15	19	28	585	418
16	1354	467	609	597
17	17	15	405	292
18	418	370	1701	1710
AVG	209	151	955	981
SD	315	147	451	480
COV	151	97	47	49

All the figures in tables 6.7, 6.8 and 6.9 are calculated on the following basis: labour units were calculated using FAO labour equivalence figures (slightly amended to allow for lower life expectancy in PNG) which were then divided into estimated allocations for the two years. All units relate to hours per annum.

The figures in these three tables indicate that women are working considerably more hours than men in all three areas; this becomes most pronounced in housework/reproductive activities. Coffee is the activity with greatest equity. These figures imply that on average people (worker equivalents) in this study worked around 4.25 hours per day indicating that no overall labour constraint exists. However, there is not an equal division of tasks within the household as these tables point out; women work, in total, around 7.9 hour per day which is over three times that of men at 2.5 hours.

Many other studies have produced similar patterns of inequitable gender work burdens in agrarian societies (McSweeney, 1979; Evenson et al, 1979, Acharya and Bennet, 1982; Hanger, 1973; Cain et al, 1979; Hart, 1980, Barnum and Squire, 1978; Deere, 1982 - all cited by Ellis (1988)) but none seem to produce results quite as extreme as these. Other studies in PNG have looked only at one or two activities rather than the whole range of activities and therefore no comparisons could be made. It should be remembered that the presented allocation figures do not include employment and business activities which are often more male dominated, but these only affected three households, and about the same number of individuals.

Table 6.10 Household Labour Constraints

Household Number	1992 Total	1992 Female	1992 Male	1993 Total	1993 Female	1993 Male
1	0.65	1.23	0.29	0.72	1.35	0.32
2	0.85	1.23	0.47	0.95	1.40	0.51
3	0.42	0.57	0.25	0.49	0.70	0.23
4	0.33	0.43	0.22	0.29	0.40	0.18
5	0.33	0.76	0.11	0.37	0.91	0.11
6	0.58	0.77	0.38	0.55	0.74	0.35
7	0.64	0.73	0.46	0.65	0.73	0.51
8	0.86	1.64	0.45	0.80	1.53	0.42
9	0.96	0.99	0.90	0.75	0.79	0.63
10	0.45	0.39	0.51	0.32	0.43	0.20
11	0.37	0.90	0.11	0.42	0.98	0.15
12	0.47	1.37	0.24	0.36	1.19	0.15
13	0.58	3.27	0.13	0.59	3.31	0.13
14	0.43	0.57	0.25	0.37	0.49	0.21
15	0.30	0.43	0.08	0.24	0.34	0.08
16	0.82	0.80	0.83	0.72	0.93	0.51
17	0.24	0.41	0.13	0.27	0.43	0.16
18	0.53	1.11	0.31	0.58	1.27	0.31
AVG	0.54	0.98	0.34	0.52	1.00	0.29
SD	0.21	0.68	0.24	0.21	0.69	0.17
COV	39	69	69	40	69	58

Figures calculated by dividing number of hours worked per day by the number of available hours per day (worker units x 8). Therefore a figure of greater than 1 implies a constraint, or rather allocation greater than availability.

When the household is considered at an aggregate level no labour constraint appears to exist. Once a household is dissected by gender, the picture becomes rather different: six households are actually facing a female labour constraint; there are no corresponding male labour constraints with male underemployment in the region of 70 per cent. The 'shortage' of female labour became marginally more extreme in 1993. These figures exclude some of the less important economic activities (in terms of overall time allocation) and include non-household labour, so they are not complete. These factors are relatively insignificant³ and do not alter the overall patterns observed.

Another important detail is that the labour constraint data relate to the average situation over the whole of the calendar year. In the Highlands labour use is more intensive during the 4/5 month coffee harvesting period (flush). Labour inputs to coffee (principally picking and processing) increase considerably between April and the end of August. Some labour is redirected from other areas such as food production, within a planned strategy to meet both cash and food security objectives, but use is still higher overall. The impact on these 18 households during the two flush periods was to increase average utilisation rates up to 77 per cent, with four households now facing a constraint. The situation facing women became deteriorated with nine households facing a female labour constraint with an average utilisation figure of around 146 per cent - around 12 hours per day per female worker (see appendix 4). Collett (1992) argued that one of the main factors constraining development and rural economic differentiation in the Highlands was a labour constraint in the peak flush period (although he did not have any time allocation data). These figures support his argument but show that it is not the overall picture which is important, but rather the unequal distribution of tasks within the household which

create constraints upon economic activities.

This section has illustrated overall patterns of resource use in the monitored households. It has shown that patterns remained fairly consistent over the two years and that considerable gender variations exist in labour use. The previous section highlighted the pursuit of money and food security as being peoples' most important objectives. It is apparent that men have a far greater orientation to cash than women. Men still apply less labour to coffee than women; the gender gap, however, is much less pronounced than the gap found in food production and household activities. It may be that men are willing to do more work where money is involved, but never quite as much as women in any area of activity. Indeed of all the work that men do around a third is in remunerated activity compared to around a tenth for women. Women rated food security their highest ranking objective and it is on this that they place most emphasis; while they work longer hours than men in all areas. Why is this? What determines resource use? What mobilisation processes are at the heart of these observations.

6.5 Determinants of Resource Use I: Household Structure

Chayanov (1966) probably produced the greatest theoretical contribution on demographic determinants of household resource use. Though based on research conducted in Russia in the 1920s, it has been applied to a few developing countries. His work has three main aspects: (1) long-run relationships between peasant and capitalist modes of production; (2) explaining economic differentiation between households; and (3) analysis of household resource allocation. All three were explained on the basis of the demographic (life) cycle of the household and his model of resource use was based on the concept of drudgery aversion, or the disutility associated with work. It produces four

major predictions, all of which are testable propositions:-

- (1) There will be higher labour input per worker as the consumer/worker ratio increases.
- (2) The marginal product of labour varies inversely with the consumer/worker ratio.
- (3) More land is cultivated as family size increases.
- (4) Average income per person in the household varies inversely with the consumer/worker ratio.

Hunt (1979) found strong support for some of these propositions based on household data in the Mbere Division of Eastern Kenya. The model does rest heavily on the assumption of an absence of a labour market which questions its relevance in many areas. A labour market does exist in the rural areas of the Highlands but its impact tends to be restricted to cash cropping (coffee) and does not really intrude into food production and household activities⁴. It is therefore useful to test some of these propositions using the data collected by this study. Propositions (1) and (3) are most relevant to this section, the others will be dealt with elsewhere in this thesis.

Table 6.11 below summarises the bivariate linear regression analysis carried out on cultivated areas and household size.

Table 6.11 Cultivated Areas and Household Size - Regression Analysis

Variable	Estimated Coefficient	t-ratio	95% C.I.	R2
Food Area Planted ⁹²	0.08	5.42**	0.06:0.10	0.6476
Food Area Planted ⁹³	0.07	7.25**	0.05:0.09	0.7668
Coffee Area	0.01	1.12	-0.02:0.04	0.0731

The dependent variable is area planted in all three cases. **denotes significance at 95 per cent

The estimated relationships found in table 6.11 produce strong support for the Chayanovian proposition on the positive relation between household size and planted areas. Remembering that these estimations are based on only 18 households with a slight bias to the remoter populations they support a positive relationship found between food areas and household size can be established though the confidence intervals are relatively wide, but retain positive signs throughout. The same cannot be said for coffee; no corresponding relationship could be established for coffee areas. This may be due to either the small sample size, or it may be that the presence of a labour market in coffee production invalidates the Chayanovian model. Strong support exists for the model with respect to food areas. A positive, and statistically significant, relationship between food areas (as the dependent variable) and available labour units was also established; again the same relationship could not be established for coffee.

The first proposition concerning a positive relationship between higher inputs per worker and the dependency ratio was also tested. When taking into account all labour inputs (per worker unit) together (as the dependent variable), no relationship could be established. Splitting these into three areas produced some useful information.

Table 6.12 Labour Input/Worker and Dependency Ratio

Variable	Estimated Coefficient	t-ratio	95% C.I.	R2
Food 92	453	1.96*	35:941	0.1946
Food 93	514	3.04**	156:872	0.3647
Coffee 92	166	1.94*	-14:346	0.1894
Coffee 93	183	2.17**	5:361	0.2266
House 92	369	4.61**	199:539	0.5673
House 93	341	4.37**	176:506	0.5405

Dependency ratio is the independent variable in all cases. *denotes significance at 90 per cent, ** 95 per cent.

Table 6.12 shows a relationship could just be established between inputs/worker in food production and household dependency ratio. A similar, though statistically weaker, pattern appeared for coffee cultivation. Overfield (1991: 11) found that producers regarded school fees as an important determinant of how much coffee they produced which is consistent with a positive relationship between inputs/worker in coffee and the dependency ratio. One would expect to find positive relations between reproductive activities and dependency ratios given the time-intensive nature of children's needs, particularly young children and this is supported by these results.

The information presented so far concerning resource use and household life cycle variations (proxied by dependency ratios) provides some conclusions in support of Chayanov's propositions. Preston (1990) also identified life cycle variations in resource use in a coastal area of Papua New Guinea that are not inconsistent with these findings. Newly established, households consisting of a small number of people used only small amounts of resources (land in particular) with this usage increasing as the household increased in size and larger gardens were established.

Mature households were generally pursuing highly diversified livelihood strategies and cultivating large areas of land facilitated by the relatively large number of household member's labour and the resources at their disposal. Old households were small and were generally concerned with cultivating only small food garden areas. The relationships and observations presented in this chapter provide general support for this pattern with perhaps one exception. In old households coffee is never given up completely (it is also a perennial) though the area does tend to reduce as it is divided up to the sons of the household head.

A recent series of papers on the application of Chayanov's model in India have turned his findings on their head. The Russian data was used to support the proposition that land holdings were a consequence of family size, whereas Krishnaji (1995) argues that in the Indian case the causation is in the other direction. He argues that the explanation lies in differential demographic structures, including the propensity for families to remain joint or undivided over time. Krishnaji is saying that household size is determined by land holdings and not the other way round; rather it is caused by the way people access land and land reform policies. Chayanov assumed an undifferentiated mass of peasants whom had not integrated to any great degree into the capitalist system and Krishnaji argues that this is just not applicable in India due to the entrenched caste system. Another paper based on data from the North-West Frontier Province in India found that, despite the absence of a labour market, that none of the static propositions could be supported; this was ascribed to the notion that agricultural transformation is subject to the articulation of modes of production which have only slowly over time transformed peasants into wage labour. Competing modes of production developing only slowly weakens the applicability of Chayanov's model which

needs more of a undifferentiated mass of peasant farmers (Akram-Lodhi, 1995). As mentioned previously Diana Hunt's work on Kenya found quite strong support for some of the notions; it did not however explain all aspects of resource allocation in this area. She also found that education and the added access that this gave to formal paid employment and individuals' access to resources, principally to land, were important in the overall picture. The variation in findings between these two rather different societies is a reminder of the importance of social relations in assessing the validity of any economic model. It is important to point out that Chayanov was not concerned with the intrahousehold allocation of resources and issues of power which have been shown as crucial in Papua New Guinea; Hunt also suggests this to be the case in Kenya.

This section has mainly been concerned with the testing of Chayanovian propositions. The previous section of this chapter showed that there are very unequal gender burdens within households. Generally the assumptions of Chayanov's model such as flexible access to land and absence of a labour market in food production hold. But the social norms driving the gender division of labour cannot be explained by this model.

6.6 Determinants of Resource Use II: Ideology and Labour Mobilisation

The impact of a new economic activity on individuals depends on the pre-existing social relations of production. In the context of the PNG Highlands the main facets are the institution of the big-man and the social subordination of women. These go some way to explaining women's longer working hours and the low level of economic benefits they receive. We have already seen that women work, on average, three times the hours that men do and that a much smaller proportion of their work time is remunerated. It is also

the case that they receive approximately one-third of the male hourly labour return in coffee production (see chapters 7 and 8). What societal factors allow this to continue?

Men generally own the land in Highlands society, and land was in turn associated with the clan (Barnes, 1979: 267). Control over household labour also rested unequally in the hands of men. The big-man was indeed distinguished by his ability to control the labour of other men and women, whereas ordinary men could generally only mobilise the women within their own household. Larger community projects were controlled by big-men. Women tended to be mobilised rather than mobilisers with co-operation between women being at a low level (op cit: 268). The gender division of labour is clear cut:

"A man does all the preliminary work, though his wife who is to tend the garden he is preparing, generally helps clear it of grass Women plant, tend and harvest the sweet potatoes that grow close to the ground and need constant attention; men are responsible for the trees that yield fruit, nuts, oil and timber they also grow sugar cane and maize Women do the less spectacular but more recurrent work to free the men to build houses, make tools, and exchange valuables" (Reary, 1959: 10, 11, 12)

Women's work tended to be evenly spaced and time consuming. Although men's work was more physically strenuous it was also more sporadic. A wife's labour was essential if a man was to take full part in clan activities (op cit: 269). It is in this setting of gender relations that coffee was introduced in the 1950s under the colonial administration.

Coffee was introduced as male, modern and was actively promoted by the state as they believed correctly that considerable male surplus labour time existed:

"The imposition of peace on the tribes and the introduction of labour-saving tools completely altered the traditional roles of men at an early stage after contact. In combination these innovations eliminated the occupations in which men formerly spent their time, and paved the way for entry into the cash economy." (Howlett, 1973: 100)

The new division of labour associated with coffee was very different from this male-surplus view; the least skilled and the most time consuming tasks (weeding and picking) were mainly allocated to women. The tasks requiring some knowledge of coffee technology (planting, shading, fencing and pruning) were mainly men's work (Barnes, 1979: 276). The state, both colonial and independent, played a key role in this division by providing training in coffee farming at Farmer Training Schools to men only. The position has changed little since; the Coffee Industry Corporation, which is now wholly responsible for coffee research and extension, employs just one person concerned with extension to female coffee farmers⁵.

Big-men used the labour of their wives and other clansmen using the same mobilisation process that existed in the pre-contact era. Most men were not big-men (with small areas of coffee) therefore their crops could generally be managed with family labour alone. It was mentioned in chapter 2 that women have some rights to the income from coffee revenue generated by their labours but not to the coffee trees themselves. These are closely associated with the land and therefore male ownership rights. It is the control of the most fundamental production factor, land, which places men in a position to mobilise labour within the household. This is not just in coffee, but also in food, and shows the importance of perception and ideology in determination of the relative 'bargaining positions' of women and men.

Ideology crept into this gender calculus when cash cropping and other elements of global capitalism were introduced into Papua New Guinea. Fahey (1986) looked at the transformation of gender relations as a result of increased wage labour in a coastal area of PNG. She found considerable gender differentials in wage labour participation: married women were remaining in the village and producing for direct consumption within the household; some single women temporarily entered wage employment but returned to the village upon marriage. In contrast, many men took a new and long-term role in wage employment outside the village and many became involved in cash cropping. This separation of productive activities by gender undermined the position of women because it was also associated with a relative decline in the importance of subsistence production in the village. With increasing land pressure, loss of male labour and the increased need for purchased commodities she argues that women became increasingly alienated from their means of production and material reproduction. In effect women became doubly subordinated, to capital, and to men.

The subordination, or loss of status, of subsistence production has been noted elsewhere in the South Pacific. Finney found that agricultural work in general was often seen as a second choice of young people in Tahiti. Farming was:

"considered dull, dirty, and old fashioned while wage labour is exciting, clean, and a modern way to earn one's living." (Finney, 1975: 188)

These attitudes clearly influence labour supply decisions but continue to marginalise women further as this view devalues what is often their main work.

Morauta found that young teenage males in Gulf Province (PNG) had high expectations of entering wage labour and were less inclined to work on family holdings than female members of the same age; young women were absorbed into

domestic activities at an earlier age (Morauta, 1984: 159-60). In the Papuan Plateau area of Southern Highlands Province it was observed that Kaluli mothers treated sons and daughters differently. Few demands were placed on sons to assist with household chores while daughters (as young as three) were consistently encouraged to take responsibility for tasks such as firewood and water collection, and tending cooking fires. They learnt, more by observation and request, to carry out specific jobs, rather than verbal instructions (Schieffelin, 1990: 206, 208). Women continue to be socialised into subsistence roles at an early age: when combined with capitalist society's devaluation of this activity, it reduces women's ideological armoury of intrahousehold bargaining power.

Subsistence labour was reclassified by men from Golgobip village as a marginal activity in comparison to their paid labour at the Ok Tedi mine (Polier, 1990). Such change leaves the continuing village subsistence work of women in a much devalued position. The process of subsistence devaluation has been as a direct result of the introduction of the cash economy of which the principal agent is coffee in the Highlands. Because of the gender segregation of work activities this reclassification has contributed to the reduced status of women. A paradox is thus created; that even if a women were to contribute a equal amount of cash to the household from sales of fruit and vegetables to that of the man's coffee sales they would not be counted as equal. It is ideologically defined that cash crop sales confer prestige but marketed domestic surplus does not (Barnes, 1979: 280).

This factor is bound to affect labour allocation decisions at household level - the replacement of subsistence 'affluence' with 'malaise'. What is more important, certainly in terms of this thesis, is that this is not gender neutral; ideological devaluation of women's main

work activity reduces their bargaining power. This is probably partially responsible for the observed patterns of their longer working hours and lower returns. Women were always in a weaker position because men had ownership and control of the land; this has weakened further with the introduction of capitalist ideology.

These general points can be understood in more detail by exploring the concept of the conjugal contract developed by Ann Whitehead (1981). She defined this contract as "the terms on which husbands and wives exchange goods, incomes and services, including labour, within the household" (p.88). Exchange is defined in a general sociological sense rather than the more technical use of the term by economists and includes provision for children and general household requirements. One of her principle concerns was to gain an understanding of how men can capture so much of women's product. In PNG households are generally formed upon marriage and the gaining of access to land; the man has primary use rights and is regarded as the 'owner'. Women have no direct access in their own right and this is the principle factor setting the terms for the conjugal contract. In return for access to land women are expected to meet the households food and other reproductive needs (including children) from their own labours and contribute time to work in the coffee gardens, principally in picking during the coffee flush period. The essence of the terms of the contract means that men and women will have rather different "threat points" (or the point in terms of resource and work shares at which they will leave the household) which are the determinant of the intrahousehold distribution of chores and resources i.e. women are in a much weaker position. This issue will be considered further in the next section and also in chapter 9.

6.7 Determinants of Resource Use III: Market Rationality and Economic Theory

Much agricultural pricing policy is based on assessing how farmers will respond to changing price incentives. The debates of the 1920s in the USSR reflected this concern: Chayanov suggested that satisficing behaviour among peasant producers would preclude the efficacy of price incentives, others argued that this was not the case (Antel and Gregory, 1994). Support for some Chayanovian propositions was found in previous sections of this chapter suggesting that responses to market incentives may not be that significant. Less support was found for the propositions in the more commercial activity of coffee production. Does market rationality, as a determinant of resource use, start to become more important to households as the range of economic activities increases and they become more cash orientated? How do ideology and gender fit into the altered household decision calculus?

One of Hunt's (1979) main criticisms of the applicability of the Chayanovian model to Kenya was its inability to incorporate the impact of off-farm activities into the household utility function. The main activity she was concerned with was formal employment which could only be accessed through formal education, generally a result of wealth and social class. Similar results were found by Preston (1989) in Java where land was being used less intensively in some areas as a result of a period of economic well-being, associated work opportunities, and work created by the government in the locale. The use of land remained important in household livelihood strategies but where economically and culturally attractive employment was available land use became less intensive. Levitt (1992) reported intensive use of land for food production in urban areas of Port Moresby due to the need for cash, substitution of brought produce (due to income constraints), and considerable labour availability due to

poor employment opportunities. These findings are consistent with those of Preston's in Indonesia.

Highlands rural households do not generally face land shortages⁶. Labour is also in relative abundance at an aggregate household level. Price elasticities of supply in coffee production have been found to be positive and statistically significant⁷ implying that labour responds to changing economic opportunities. As household structure was found to be an important determinant of resource use it would appear likely that market rationality also has a role to play. It is therefore relevant to examine what household responses were generated by increased coffee support prices at the end of 1992.

There were two aspects to changes in the utilisation of land: (1) coffee plantings were increased in three households (not included in the total figures in table 6.6) as household heads started to clear garden space and obtain new planting material (mainly seedlings); (2) the area planted to food declined in 5 households including all those who started new coffee plantings. This is clearly a rational response not just to an increase in the opportunity cost of food cultivation but also to a belief that coffee prices would remain high for a significant period of time⁸.

Labour application per worker (unit) in coffee increased marginally, on average. In food production application rates fell off marginally, with half the households showing a decline, and three others remaining relatively static. Although these results are consistent with market rationality their aggregate nature masks some intrahousehold changes in working hours; changes by gender (in relation to altering opportunity costs) will be considered later in this section.

The prediction of market rationality has its antecedents in neoclassical models of the agricultural household. They are powerful tools for the theoretical evaluation of behaviour and for empirical predictions regarding the response of households to various public policy measures. They view households as having a utility function which represents preference orderings between a range of final characteristics of home produced goods and services. The household represents a production unit which converts purchased goods and services, as well as domestic resources, into a set of final use values yielding utility in consumption. Several models have been developed on these axioms (Barnum and Squire, 1979; Low, 1986; see also Singh, Squire and Strauss, 1986a, 1986b) and all attempt to explain decision making in terms of a singular household objective; utility maximisation of these final use values, using relative market prices (of inputs and outputs) for the valuation of home production and participation in the labour market.

These models were an advance on Chayanov's as they allow for the impact of a labour market, as well as household demographics. However, the use of a single household utility function remains troublesome. This originates from the fact that they are not the sum of the utility functions of individual household members; a strong assertion therefore is invoked in assuming that individual household members are assumed to subordinate their inclinations to the pursuit of common household goals. Altruism becomes the main behavioural trait and practically amounts to saying that a benevolent dictator (male household head?) sets the goals in the interests of the family unit (Ellis, 1988: 175) and that he has perfect information to facilitate this⁹!

Aggregation of household preferences has been a concern of economists for some time. Samuelson (1956) suggested

consensus for both the aggregation of preferences and the pooling of household resources but unfortunately did not indicate how this could be reached. Sen (1966) suggested that family welfare is the weighted sum of the net utility of all household members in his model of cooperatives but the question of how the weights are determined remained unanswered. The notion of altruism mentioned in the previous paragraph which has obvious shortfalls as highlighted by Folbre (1986) and others. Common preferences would seem to make households operate as a single unit but are highly unlikely. Violence, or the threat of violence is another (Alderman et al, 1995: 3) 'unifying' possibility.

New home economics recognises the value of home work. The gender division of labour is most often explained by static comparative advantage (differential wage rates) in the pursuit of household welfare maximisation (Low, 1986 for example) which rules out explanations concerning social relations of the household. Ellis (1988: 177) concludes that this approach: (1) uses market prices as the sole explanatory force in the gender division of labour; (2) rules out all non-market reasons for labour and resource division; (3) rules out unequal male/female power in deciding household goals; (4) rules out separate decision making; (5) captures only one facet, the market opportunity cost of labour, of a multi-faceted social concept of gender divisions.

Most observed facets of intrahousehold gender relations could probably be explained by the social subordination of women. Papua New Guinea exemplifies this; in fact as earlier analysis in this chapter suggested, things are extreme both in terms of unequal division of tasks, and power within the household. The intrahousehold division of labour cannot be understood without reference to individual bargaining positions within the household.

Within the neoclassical paradigm attempts have been made to address the weaknesses of the new home economics by replacing the household utility function with a Nash bargained objective function (Horney and McElroy, 1988; Jones, 1983; Manser and Brown, 1980; McElroy and Horney, 1981). The argument is that individuals will only enter households when this enables them to do better than using their own resources alone. Hence the formation of the household utility function is explicitly conflictual and dependent upon the 'fall-back' (or "threat points") positions of individuals i.e. their access to resources. As economic opportunities for household members change so does their bargaining power (and fall-back position) and therefore also household preferences. These models resolve the major theoretical weakness of the new home economics i.e. aggregation of the welfare function. They make explicit a prior process giving weight to individual interests in the household and solve the problems of exogeneity and constancy over time by allowing shifts in individual access to economic resources to affect the bargaining outcome and thus preferences and allocational decisions of the household (Katz, 1991: 41).

Labour allocation decisions are negotiated between household members according to their individual preferences and relative bargaining power. Although a substantial advance on new home economics it still remains flawed because individual household members are treated as a priori equal and it is only their access to economic resources that distinguishes their relative bargaining power. There is no consideration of the social basis of gender differentiation in the household; crucially this impinges on how women access resources (Katz, 1991: 42) which in turn determines their bargaining power and fall-back position. Men control the most basic of productive resources in the Highlands weakening the position of women within the household. Furthermore it is difficult to argue

that women actually have a fall-back position when land-use rights can only be activated through their husbands; they could not actually leave the household if the non-existent fall-back position was violated (see chapter 9 for further discussion on this). It is clear women are and remain in a very weak negotiating position; this is both a function of ideology (see section 6.6) and perception.

Sen provided an important critique and extension of household bargaining models. While:

" "bargaining models" have an advantage over others in capturing the co-existence of extensive conflicts and pervasive cooperation in household arrangements they ... are particularly negligent of the influence of perceived interests and perceived contributions."
(Sen, 1990: 125)

We saw in the previous section how the perceived reduction in the importance of subsistence production has 'reduced' the value of women's work weakening their bargaining position within the household. Only this, when taken with their lower rates of access to productive resources, and the further impact ideology has on this, can explain their longer working hours and extremely poor economic returns.

This situation is very much replicated in Africa with women working longer hours and receiving much lower incomes than men (Koopman, 1991: 154-5). The concept of an income pooling, utility maximising household is very much at odds with separate incomes streams and gender segregation in which tasks cannot be explained by comparative advantage. As in PNG, African men tend to control the production and income of the major export crops, or, where these are not grown, the most lucrative food crops (op cit: 156). Male household heads typically mobilise far greater amounts of "family labour" for the cultivation and processing of "male crops" than women can for their individual enterprises (Roberts, 1988). Cash returns for wives and other dependents who work on men's fields or men's crops is

usually far below that realised by a man working on his own land (Carrey, 1988; Crehan, 1984; Jones; 1986).

A series of models assume that individuals cannot enter into binding and enforceable contracts with each other help to explain the observations outlined above (Ulph, 1988; Kanbur, 1991; Carter and Katz, 1992; Lundberg and Pollak, 1993). In these models individuals' actions are conditional upon the actions of others; in Carter and Katz's "reciprocal claims" model the household is conceptualised as largely separate, gender-specific economies linked by reciprocal claims on members' income, land, goods and labour. A wife's budget is separate from her husband's; she responds to changes in her husband's allocation solely according to her own needs (Alderman et al, 1995: 5). Income transfer is the only link between wife and husband. In Lindberg and Pollak's model "each spouse makes decisions within his or her own sphere" (p.994, quoted in Alderman et al, 1995: 5) and responds to the other's decisions by altering the level of voluntary contribution to shared goods. Household bargaining models put across a more cooperative (collective) household arrangement whereby decisions are the outcome of a specific bargaining process; the division of gains from marriage (or household formation) depend upon individuals "fallback" or "threat point". These in turn are a function of extra-environmental parameters or macroeconomic, legal and demographic conditions external to the household. Both of these approaches have insights to bring to this thesis.

Differences in men and women's labour times, incomes and investment capacities are associated with gender differences in access to the means of production. In most cases in Africa, as in Papua New Guinea, men have ultimate control over the most basic productive resource - land¹⁰ and patrilineal land inheritance systems predominate. Within this patriarchal system intrahousehold struggles take place

over the terms on which women access the means of production. In southern Cameroon this was played out in struggles over the amount of time women devoted to "helping" on their husbands cocoa plantations, over who contributes what to household consumption needs, and over the definition of those needs (Koopman, 1991: 166). It is the terms on which women access resources that has the most significant impact on their bargaining power within the household.

Labour allocation decisions are not made in accordance with the pursuit of a singular common household goal in the Highlands of PNG. This is most clear where income is not pooled and this appears to be the dominant household type in Africa (Beneria and Roldan, 1987), Latin America (Katz, 1991) and is probably the case in PNG. In this situation labour allocation decisions have direct consequences for how much income accrues to a given household member. In Guatemala Katz (1992) found that women whose household's maintained quite separate male and female income streams were very reluctant to cut down on remunerated labour activities even in the face of increasing demands on labour time due to the introduction of labour intensive export crops. Jones (1986) and Wilk (1989) both found positive (and significant) relationships between a women's benefit from cash crop production and the amount of labour contributed - a notion that forms of intrahousehold resistance exist.

It is necessary to look at the mechanisms which mobilise people to work in productive and reproductive roles. Labour allocation is not going to be consistent with income maximisation (or else all to coffee production) nor can one assume all women have equal ability to restrict their unremunerated household activity. It is also clear that relative bargaining positions vary between different activities in the Highlands which became apparent during

the course of this study with reference to coffee and food production.

Given these wide ranging views on the nature of the household decision making where does this leave a definition? Becker (1965) wrote:

"A household is truly a 'small factory': it combines capital goods, raw materials and labor to clean, feed, procreate, and otherwise produce useful commodities" (p.496)

Alderman et al (1995) similarly perceive the household as a factory but:

"like all factories, it consists of individuals who - motivated at times by altruism, at times by self-interest, and often by both - cajole, cooperate, threaten, help, argue, support, and, indeed occasionally walk out on each other." (p.15)

It is therefore essential to look at individuals within the household when assessing decision making and the share of benefits; aggregation at the household level is simply inappropriate.

6.8 Food, Conflict and Intrahousehold Resistance

Part of the information collected concerned who within the household had responsibility and control for the planting and sale of crops. In coffee production the universal answer¹¹ with respect to planting, harvesting and selling was the male head of household; women had very little influence. However when it came to the planting and sale of food, women exerted far greater influence. The results are summarised in table 6.13.

These results suggest that women have much more control over food plantings with either their sole control, or joint with their husbands accounting for nearly 70 per cent of responses. This is similar to results found elsewhere, and earlier, in Eastern Highlands:

"Either spouse may suggest that a new garden be planted, and together they decide where it will be located on the land available to them ... Husband and wife initially work together marking the parameters of the new garden and burning off the heavy undergrowth. (Fairthorn, 1976: 88)

Very similar proportions apply to who has control and makes the decision concerning food marketing. Women do appear to be in a much stronger position in food production compared to coffee but this is not conflictual.

Table 6.13 Food Planting and Selling Decisions

	Men	Women	Total	%
Food Planting				
- HH Head	9	11	20	31
- Wife	4	4	8	12
- Both	19	18	37	57
Conflict				
- Yes	8	6	14	21
- No	25	27	52	79
Food Marketing				
- HH Head	8	11	19	30
- Wife	8	9	17	27
- Both	16	11	27	43
Conflict				
- Yes	11	4	15	24
- No	21	26	47	76

All figures relate to actual number of responses to the questions (see appendix 3) and percentages to proportion of the total for that particular question. The same applies to table 6.14.

Women appear to have more decision-making discretion in food production but men still own and control the land. Women can generally keep most, if not all, of the money they receive from selling fruit and vegetables and it is

therefore in their interests to produce a greater surplus to increase their personal incomes even though it produces a lower return for the household compared to coffee¹². This incentive is pitted against the control wielded by the head of household. A considerable proportion of responses mentioned conflict over planting decisions with this being concerned with women wanting to plant greater areas than their husbands. A similar proportion mentioned conflict over the amount to be sold and this generally concerned the dividing up of the proceeds. Was the conflict over plantings about increasing female incomes or variations in individual's emphasis on risk aversion? i.e. being a little more sure about having an adequate food supply. Table 6.14 provides some insight.

Table 6.14 Food Marketing - Surplus or Intentional?

	Men	Women	Total	%
Surplus	32	10	42	60
Intentional	3	18	21	30
Both	1	6	7	10

Surplus relates to 'accidental' domestic (home consumption) overproduction. Intentional is planting with the plan to sell the final product.

If women wanted to increase food production to ensure supplies then marketed food would be entirely accidental overproduction (surplus). Surplus accounts for the largest proportion of responses overall; for women, however most regard the food that they are selling as planted for that intention (18 responses compared to 10). Virtually all men believed the food that was been sold by their households was surplus (accidental overproduction). Information in chapter 4 suggested that men were not actually very well informed about their household's food production as they were not very heavily involved, particularly in marketing.

On the other hand they may be aware that it may be taking place and therefore want to restrict the areas planted. This is perhaps not so much to reduce their wife's incomes but to increase their own; if larger food areas are planted then more labour will be required thus reducing the labour available for coffee to which men gain most of the income.

There is clearly bargaining going on within the household but women are in a much weaker position. This is illustrated by looking at what happened to resource use in 1993 mainly as a result of increased coffee prices. The area planted to food fell on average, labour application (per worker unit) to coffee increased marginally but most of this was female¹³. This suggests that male household heads can mobilise labour, even when households face female, if not overall, labour constraints, to their ends (cash being their main goal), by personal control over the basic productive resource - land.

There are clear elements of market rationality at play in Highlands society. Both men and women try to maximise (increase) their cash incomes but these do not necessarily equate to increasing household income as they form separate income flows which will be assessed in chapter 8. Men have the greater bargaining power through their control of natural and ideological resources.

In many ways the household as an single economic unit does not exist, or certainly not in the fashion portrayed by early writings in neoclassical theory. Even if the household does exist and could be collapsed into a single unit following unified goals resource allocation would still not reach an efficiency position due to high levels of market failure. The basis of this market failure is the social subordination of women; female labour is in relatively short supply yet the price of this labour (cash returns) is extremely low compared to that of men whose

labour is in relative abundance. The price, and therefore supply, of different types of labour is not economically, but socially, determined. Models using the price of labour to explain its allocation are flawed in this context. Markets cannot produce efficient allocation of resources where major sections of the labour force are heavily discriminated against.

6.9 Conclusion

Patterns of resource use have shown that most households have considerable labour surplus at an aggregate level. All households had adequate access to land with the male household head having control of this. There was considerable inequity in labour allocation with women working considerably longer hours than men by a factor of around three.

Resource use was found to be heavily influenced by the structure of the household¹⁴ and ideological influences related to the introduction of capitalism and cash exchange relations. The ideological degradation of subsistence production, the main element of women's work, intensified the weak bargaining position of women within the household and thus further restricted their access to resources. Market rationality as a determinant of resource use, was found to have limited applicability, due to the market failure generated by the extreme level of social subordination of women in Highlands society.

To an extent there are gendered economies within the household but these cannot be regarded as entirely separate. The level of economic linkage between men and women remains high, particularly as men control most of the productive assets. In terms of the current ranges of theory, this places these findings within both the remit of household bargaining models and non-cooperative collective

models; it does however reject the propositions of the unitary models of 'new' home economics.

Notes

1. This is strictly a characterisation and does not represent calculated efficiency positions. The production function estimated by Overfield (1993a) would suggest that the female 'efficiency' position would fall off the scale implying a 'negative' application of labour; male 'efficiency' fell at the other end of the spectrum implying over application of their labour. Patterns of resource use described in section 6.4 indicate that this is not the case with women allocating considerable amounts of labour to coffee production casting considerable doubt upon the predictions of this model of resource allocation.
2. The people interviewed were household heads, their wives, older teenagers (>14) and individuals of an older generation in the household (generally >50).
3. Non-household labour is greatest in coffee with this often receiving payment. In other areas it tends to be on a reciprocal exchange basis.
4. Paid labour in household production is rare outside coffee production. Other areas tend to be on a basis of reciprocal non-cash exchange relations.
5. This is out of total extension staff of around 300. The issue of extension services to women was only addressed in 1993 despite funding from external donors (ADB and AIDAB) over the previous 6-year period. The programme was designed with the intention of influencing the way male extension officers approach women - there has been no evaluation to date.
6. Overfield (1991) did find some instances of land shortages in Chimbu as have other observers (see chapter 2)
7. Jolly et al (1988) estimated a figure of 0.18 and Overfield (1991) 0.27 though these relate to different supply elements and time-lags. Overfield was concerned with smallholders alone but had rather wide confidence intervals (though retaining positive signs throughout).
8. Despite the volatility of the international coffee market this view came from the widespread believe that the newly elected Wingti government being Highlands based would continue to give high levels of price support to coffee over the lifetime of the parliament.
9. See chapter 4 on this point.
10. Davidson (1988) presents ten case studies supporting this notion.
11. In all cases, across gender and generation, bar one which has rather an elderly household head and three younger wives who took considerable control of the family coffee enterprise.
12. Which they can effectively access in non-pooling

households - see chapters 7 and 8.

13. Male applications actually fell on average in 1993.

14. Size, number of worker units and dependency ratios.

Chapter 7Household Decision Making and the Distribution
of Benefits in the Coffee Economy7.1 Introduction

The principle aim of this chapter is to link the determinants of household resource allocation covered in the previous chapter to the wider distribution of economic benefits in society by focusing on one particular element of household livelihood strategies - coffee. It will deconstruct household production and marketing decisions to tease out the intrahousehold processes at play before assessing how these may have influenced the distribution of benefits within Highlands society.

Before addressing the main themes the chapter will first outline the relevant context relating to the PNG coffee industry by assessing levels of household dependency, scale of production, and the general structure and competitiveness of the industry. This will provide a basis for the assessment of welfare in chapter 8.

7.2 Measuring and Defining Dependency

Dependency on coffee as a source of income can be defined at a number of levels: (1) its general importance as a source of income to the PNG economy; (2) as a source of income to Highland households; (3) household dependency as defined by coffee's contribution to externally derived income¹. Each of these will be dealt with in turn.

Agriculture is the main activity and source of income for more than 80 per cent of PNG's population (NSO, 1992). Coffee, cocoa, copra and oil palm account for 90 per cent

of agricultural exports with limited amounts of tea and rubber making up the residual (Bank of Papua New Guinea, 1993: S33). In 1993 agriculture accounted for 27 per cent of GDP (1985 = 35 per cent) and 10 per cent of total exports (1985 = 36 per cent). Most GDP (and exports) is currently accounted for by mining (gold, copper and oil) and logging which equalled coffee in total earnings in 1993. Coffee, by far the most single important agricultural export, accounted for 4.3 per cent of total exports in 1993 (1985 = 12.7 per cent) (Pacific Economic Bulletin, 1993: 92-4).

The importance of coffee, and indeed agriculture in general, has declined in macroeconomic terms mainly due to increased income flows from large mining projects. Stagnant, or even declining, international agricultural commodity prices also help explain part of this fall. Macroeconomic dependence on coffee is currently low, but this does not however, reflect its relative importance to rural communities in the Highlands.

Household income figures in chapter 8 indicate that coffee is, for the majority of households in this study, the single most important source of cash income. However, these figures do not show the effective level of dependency because they do not take account of whether incomes were internally or externally derived. Table 7.1 assesses the importance of coffee as a source of externally derived income, or where output can be sold whatever the internal purchasing power of the Highlands (local) economy.

It is clear from table 7.1 that the level of dependency on coffee is greater than would be indicated by simply viewing its contribution to household income levels. Table 8.1 indicates that coffee accounts for around one-third of total household incomes (1992) but when it is assessed in terms of activities that generate effective demand in the

economy (rather than recirculate income) a far higher level of dependency is apparent. The figures for the 18 households in this study suggest that in the region of 80 per cent of effective rural purchasing power may well be generated by coffee production. For many households it is the only source of externally derived income implying 100 per cent (income) dependency.

Table 7.1 Coffee as a Proportion of Externally Derived Income (Percentage)¹

Household Number	1992	1993
1	44	51
2	65	78
3	87	87
4	99	10
5	100	100
6	89	100
7	100	100
8	100	100
9	100(2)	100(3)
10	22	100
11	12	53
12	92	100
13	96	100
14	79	85
15	86	98
16	63	80
17	80	95
18	89	97
AVG	78	85

¹ Defined as coffee income, sale of artifacts and wage income. See footnote number 1 at the end of this chapter for further discussion of the justification of this definition. The figures in brackets for household no.9 are the percentages when account of their tyre repair business is included in total external income - both are included as it is highly debatable whether this definition is suitable for this income source.

The level of income dependency implied by table 7.1 would be very disturbing if there were not a substantial subsistence base to the rural economy which provides a large degree of insulation from the international coffee

market. These figures do highlight the critical importance of coffee as both an income source for the Highlands economy and as a vehicle for further development and change. It is the principal area within the Highlands economy which is most likely to generate a surplus from which indigenous investment, innovation and further development is likely to flow.

7.3 The Scale of Household Coffee Production

Much reference has been made to the notion of the coffee smallholder in this thesis without making direct reference to the scale of production. Table 7.2 below summarises household production statistics for this study. Household coffee production is on a very small scale, utilising small amounts of land, with most households producing less than half a tonne per annum.

Table 7.2 Coffee Production Levels (Tonnes)

Production Class	1992	1993
< 0.2	6	4
0.21 - 0.34	3	5
0.35 - 0.49	4	5
> 0.5	5	4
Average	0.36	0.38

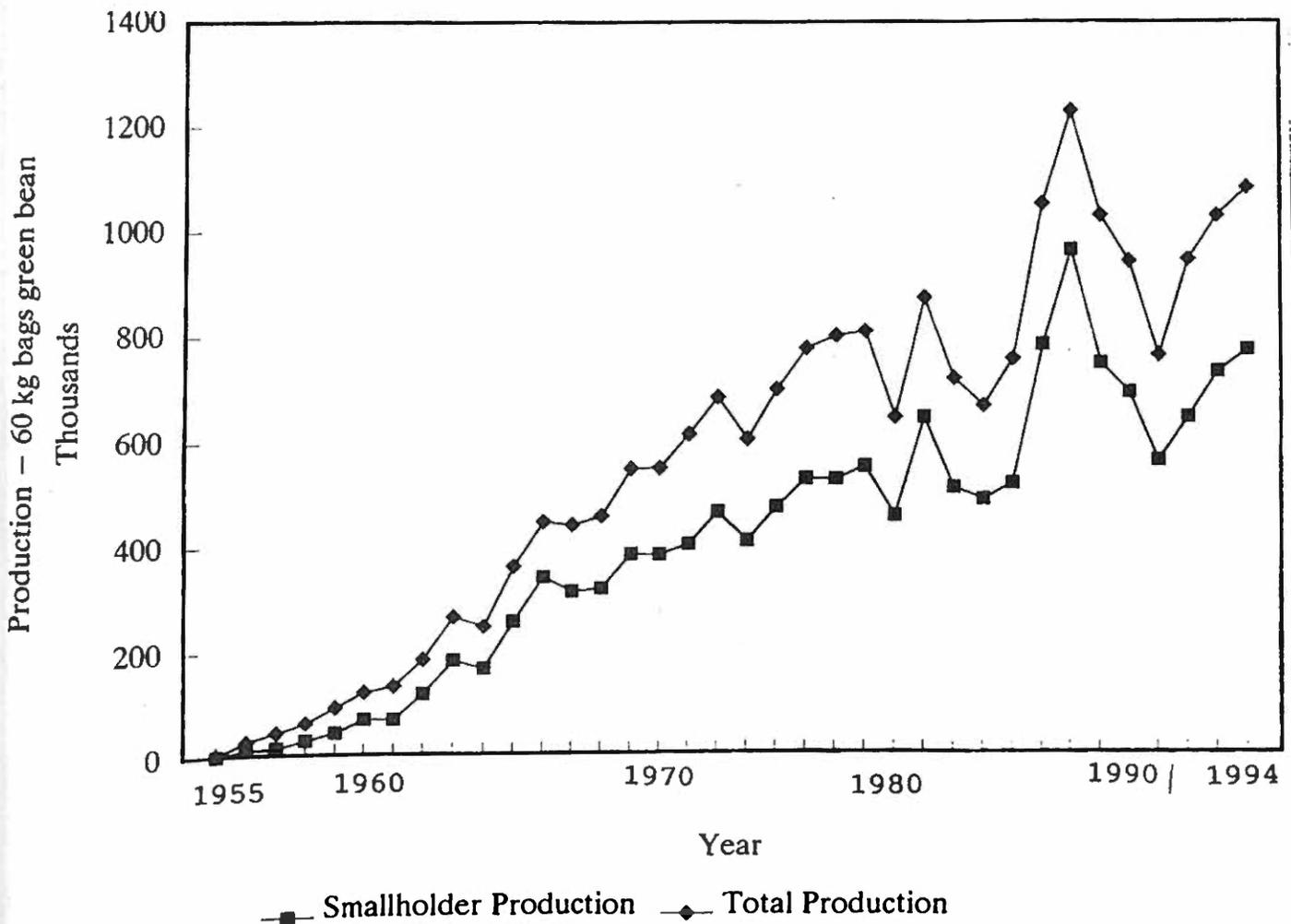
All figures are in green bean equivalent terms (GBE) converted using the ratios of 1Kg = 1.3 (parchment) and 6.5 (cherry). Figures in production classes represent number of households falling within its range. Average production figures are for the 18 households in this study.

7.4 The PNG Coffee Industry: Structure and Competitiveness

This will be a general descriptive section designed to provide information on the structure of the industry and the reasons behind its ability to survive in a competitive world market. It is important to show that the coffee industry is sustainable (in international economic terms) before looking inside the black box of production and marketing decisions.

Smallholders account for over 70 per cent of coffee production in Papua New Guinea and have dominated the industry since the late 1950s as figure 7.1 below illustrates. This split between smallholders and plantations seems set to continue. It is estimated that 277,000 households are involved in growing coffee at a village level which accounts for 1.3 million people or 33 per cent of Papua New Guinea's population (1990 Census and CIC Records)

Figure 7.1 Total and Smallholder Coffee Production Levels



Several costs of production studies have been conducted in the industry, particularly in the plantation sector (Anderson, 1977; Smith, 1990; Irog, 1992; Simmons, 1993; Overfield, 1994a). All have produced broadly consistent results suggesting that plantation costs of production are in the region of K 2300 per tonne (total to the point of export - free on board (FOB) basis). The latest estimate for smallholders place their production costs at K 1201 per tonne to FOB (Overfield, 1994a: 6), or 52 per cent of total plantation costs. This signifies a dramatic difference and was critical at a time of predominantly low international price levels at the end of the 1980s and early 1990s; average plantation costs were, in 1993, 31 per cent higher than the international indicator price². Smallholder costs of production were well below the very low prices of this period. Another point to consider is that more than half of smallholder costs were accounted for by imputed labour costs rather than direct cash costs.

A lot of plantations would have gone out of business if it had not been for price support. The different levels of production costs relate directly to the different productive modes: plantations are capitalist enterprises which have to buy all their inputs (including labour) at prevailing market rates; smallholdings are semi-capitalist in that their returns are determined by world market prices but their most important input, labour, is not generally purchased and is internal to the production unit. They also follow a low input/output system of production which means virtually zero use of variable cash inputs (such as chemicals) and low coffee management which keep production costs low; plantations on the other hand have adopted a high input/output system with significant use of chemicals and paid labour.

A system with higher throughput is sustainable only when prices are high; when depressed, as in the late 80s/early

90s, it increases the level of loss unless production costs can also be adjusted downwards. This was not possible in Papua New Guinea with extensive minimum wage legislation, high transportation costs, and increasing insurance premiums associated with the problem of deteriorating law and order. Plantations remained in business due to price support and their profit situation has improved considerably with the price hikes of early 1994. However it appears over the long-term only a semi-capitalist type of coffee enterprise is economically sustainable in Papua New Guinea.

Smallholder coffee production is underwritten (i.e. it does not have to pay a living wage as such) by subsistence production allowing it to survive at very low price levels; subsistence food production (and therefore mainly the labours of women) in effect subsidises coffee production for the world market. If this production practice is commonplace around the world in coffee cultivation, and in other commodities (in particular competing ones such as tea), this semi-capitalist mode (under conditions of incomplete proletarianisation) undermines capitalist production as it can produce a similar product at a much lower cost. This factor, if widespread, must place downward pressure on international coffee prices. It is an argument that can be applied in a much wider context to all productive activity; all capitalist economic activity is underwritten by some form of household subsistence activity whether it be the basic production of food or the filling and emptying of the washing machine.

Semi-capitalist production may force plantations out of business in the long-term since they can not compete with their very low production costs. This may not happen (i.e. prices falling below long-term plantation production costs) and this only looks at the supply side of the industry but indicates the possibility of a downward shifter for the

coffee supply curve. Demand factors have often pushed prices upwards - a brief examination of the interaction of supply and demand on the world market may be useful here and follows.

The subsistence underwriting of coffee production costs is not the only global factor placing downward pressure on international prices. Perennial tree crops, such as coffee, tend to be planted when prices are high, but are not uprooted when prices fall back. This creates a ratcheting effect and adds further to downward price pressure. Reviews of fluctuations in world prices suggests that the world coffee market is one of an imploding cobweb system, with demand response occurring within a year and supply response lagged by at least one year (Fleming and Antony, 1993: 145-6). The imploding nature of such a cobweb system is supported by the generally higher estimates of price elasticity of world demand than price elasticity of world supply. The price-destabilising effects of external shocks, such as occurred in the mid-1950s, mid-1970s and mid-1980s were quickly dissipated within a couple of years whereas, with an exploding system, such shocks would set off a long period of price instability. The International Coffee Agreement added to this dampening effect. Prices received by growers (at the 'household' level) are not just influenced by the international market but also by the efficiency of the domestic marketing chain.

Coffee growers in Papua New Guinea receive a very high proportion of the final export unit value. This has generally been in the region of 65 per cent which is very high in relation to many other coffee producing countries. For example in Kenya (the best performing African exporter) growers receive only around 35 per cent of the final export price. Marketing margins are a function of two sets of factors; infrastructure and the level of effective competition and the trade-off against economies of scale.

In Southeast Asia, where margins tend to be much smaller than in Africa, infrastructure tends to be well developed (roads and railways) and processing and exporting sectors of commodity export producing tend to be highly competitive (Ahmed, 1989: 67-8). In Africa the situation is rather different, with poor infrastructure and with parastatal marketing organisations often having monopsonistic buying and monopoly selling power. In PNG the situation for coffee probably comes closer to that of Southeast Asia with a good sealed highway from the main producing area to the port of export (the distance is also fairly short) and there are competitive buying, processing and exporting sectors³. This high proportion of value reaching the grower ('household') is another reason behind the positive welfare impact of cash cropping in PNG i.e. much of the value is therefore reaching the people who have decided to cultivate the crop and in the process, risk other elements of their livelihood strategy.

7.5 Inside the Black Box: Deconstructing Coffee Production and Marketing Decisions

7.5.1 The Context of Multiple Intrahousehold Objectives
Households have multiple objectives and face particular constraints, including risk, which influence decisions concerning coffee cultivation since it forms only one component of a livelihood system. Additionally, decisions within the household concerning cultivation of crops are not distributed evenly, nor are they taken by a single person (the male household head for instance) in general. These two factors will often both coincide and conflict with one another because different people within households have different decision-making responsibilities, and put different emphasis on particular objectives, whilst at the same time pursuing their own specific agendas. For example in section 6.8 it was apparent that conflict occurs between

men and women concerning the allocation of land (and hence labour) to food and ultimately therefore coffee production.

Carrad (1982) identified five main objectives of smallholder households: (1) provision of food; (2) earning of cash; (3) security; (4) status; (5) and leisure. It is fairly clear that these can often be complementary; for instance the earning of cash can assist in gaining status and thus pay for leisure activities. They can also conflict; for example large amounts of leisure are unlikely to be compatible with the provision of food or earning cash from coffee or other productive activity. The constraints placed on households by risk avoidance impact upon coffee production strategies. No formal empirical studies have been conducted on risk attitudes of smallholder coffee growers in PNG but it appears highly likely that they are at least mildly risk averse in line with findings of risk attitudes of similar groups of producers elsewhere in the developing world (Fleming and Antony, 1993: 97).

Becker (1990) suggested that a smallholder's objective function is typically subject to two constraints: (1) a survival constraint, to produce a minimum quantity of staple food (mainly sweet potato) that protects the family against the failure of the fresh produce market to supply these staples at a price the household can afford to pay; and (2) a monetary safety-first constraint, to assure minimum earnings to meet basic cash needs, such as school fees. Becker confirmed that modern technologies will seldom be adopted at their potential (optimal) level when producers subjectively perceive the risks of these technologies to be relatively high. In smallholder coffee production the main risk of adopting recommended practices is the commitment they must make to purchasing inputs such as fertiliser exposing themselves to a reliance on cash earnings to survive, and limiting their resilience in bad times. Avoidance of risk influences selection of production

strategies that will be outlined in this section.

7.5.2 Decision Making Power

It is commonly perceived that the male head of household makes all the production decisions relating to coffee. A survey conducted by the Coffee Industry Board in 1991 seemed to confirm this with 98 per cent of respondents (all male household heads) identifying themselves as making coffee production decisions with only 14 per cent mentioning their wife's involvement in the process (Overfield, 1991: 13). The results from this work need to be interpreted with caution as questions were only directed at men (and only household heads) but further work that was conducted for this study appears to confirm this pattern. Table 6.13 confirmed this point; it was clear that men predominate in decisions about coffee and women in food. The responses were consistent for both the men and women interviewed.

It was reported that the decision to plant new coffee was always made by men. In the first instance this may be true but coffee production decisions are not made independently of other activities. The level of resources that are available for coffee production are influenced by decisions made elsewhere in the household. For instance the conflict over area planted to food crops (mainly for selling) outlined in chapter 6 reduces the amount of (mainly female) household labour that is available for coffee production including new planting activity. The determinants of resource allocation were dealt with in chapter 6 and included both subsistence and cash requirements and came down to the relative returns and access for women; it was perhaps not so much a conflict between objectives (i.e. subsistence vs cash) but rather between individuals trying to attain the same objective and being denied access and turning to an alternative activity. Women also tend to show greater concern with the subsistence side of the safety

first principle than men, so perhaps it is also conflict in objectives, where individuals have different levels of access and decision responsibilities. This leads to a different (lower) welfare position for the household; men also lose out as they are unable to mobilise more labour to generate more cash income for themselves.

7.5.3 Security and Uncertainty

A diversified farming system is better able to withstand downturns in the international coffee market as carefully selected farming activities provide smallholders with the ability to minimise the risk they face. Carrad (1982) also reported higher returns to labour in mixed food and coffee systems compared to mono-cropping. These two factors suggest that smallholders are following a rational choice in not concentrating on coffee cropping alone and instead following a diversified system and keeping the degree of specialisation low. The nature of the diversified system is to a large extent derived from a low risk approach, but is also influenced by intrahousehold factors: denial of access to coffee income for women appears to reduce the importance of coffee as a component of the livelihood system.

Taking a low risk approach probably leads to households following an adaptive (gradual) growth path as opposed to radical or entrepreneurial choices. That is they are more likely to make small improvements to the farming system, and to adapt the system to changing circumstances rather than make any radical changes. Also, whilst they are willing to experiment and to innovate, risk aversion tempers the adoption of entrepreneurial strategies.

Choosing to keep both coffee and food production within the farming system implies that households are making decisions concerning the balance between commercialisation and subsistence. Can it be that coffee is seen as a complement to subsistence food production? Carrad (1982: 10) observed

that households commonly resorted to mixed cropping and intercropping. He ascribed this practice to three reasons: (1) it enables continued food production from fertile areas, thereby lessening the impact of the intrusion of coffee into these areas; (2) provides quicker returns in periods/plantings of immature coffee; (3) provides shade for young coffee trees. This mixed subsistence/cash approach is also the rational lowest-cost approach to providing an adequate food supply as well as generating cash income (Overfield, 1994b: 14) in terms of expended labour time. This 'household' rationality only breaks down when it comes to the efficient generation of cash income due to the intrahousehold factors already discussed.

7.5.4 Household Marketing Decisions

Within household coffee enterprises certain degrees of irrationality coexist with generalised rationality concerning the form of coffee sold and point of sale. Table 7.3 summarises the data from this study concerning form (cherry or parchment) and point of sale.

Table 7.3 Marketing Patterns and Coffee Prices 1992/3

Point of Sale	Cherry		Parchment	
	Price Received	%	Price Received	%
Roadside Buyer	17.3 (90)	81	88.8	24
Factory/ Depot	12.5 (65)	17	115.1	61
Marketing	17.4 (91)	2	126	10
Average	16.5 (86)	18	110.3	82

All prices are toea/Kg. Figures in parenthesis are parchment equivalent prices using a conversion ratio of 1kg parchment = 5.2kg cherry. Percentages are proportion of sales accounted for by form and point of sale.

These figures show that most cherry coffee was sold to roadside buyers whilst most parchment was sold either to a factory or a depot (usually factory run). Prices generally increase as coffee is sold further up the marketing chain with cherry obtaining a significant discount to parchment at all levels. The marketing method is almost certainly determined by availability and cost of transport (Overfield, 1991a: 13-4) with form (type) significantly influencing marketing decisions, as it impacts considerably on transport costs due to different value/weight ratios. As coffee is sold further up the marketing chain the costs involved increase in two forms: (1) the labour costs associated with processing (pulping, washing and drying); (2) transport to the point of sale.

According to the figures in this study processing accounts for about 10 per cent of total labour inputs and therefore around 8 per cent of total grower costs. Transport costs to the factory or depot are around 7 per cent of the total, therefore to sell parchment to the depot (the most common choice) would suggest that growers would require prices that are 15 per cent higher than the base alternative. The figures in table 7.3 suggest that these prices, where parchment is sold direct to the factory, are 27 per cent higher suggesting that this is the rational economic choice to make and should therefore account for all marketing. This form and point accounts for just half of all the coffee marketed; why is this rational choice not been taken for such a substantial proportion of the crop?

A survey conducted by the Coffee Industry Board in 1991 revealed that producers were often constrained in their marketing choices by remoteness and lack of access to transport facilities. Further there was a significant statistical association (X^2) indicating that growers who marketed their coffee lower down the marketing chain did so because they had no choice. Conversely those selling direct

to the factory did so because of price thus implying that they had a choice (Overfield, 1991a: 21). This survey was based on qualitative data from male head of households only and should therefore be interpreted with a little caution; data collected as part of this study may shed some further light on these earlier findings and is summarised in table 7.4.

Table 7.4 Marketing Rationale - Form and Point of Sale

Reason	Men	Women	Total	%
Price	28	31	59	66
Transport	10	5	15	17
Equipment Access	3	6	9	10
Not for Women	0	2	2	2
Social	1	2	3	3
Immediacy	0	1	1	1
Total	43	47	90	10

Figures relate to number of responses by individuals. Percentage figures are number of responses as proportion of total responses.

Viewing this data from both household and intrahousehold perspectives provides further insight to why so much coffee is marketed in an 'irrational' manner (i.e. one that does not provide the highest net return). Price does appear to be the most important determinant of the marketing strategy, with availability of transport a close second and influential for more remote households. At this point the findings diverge due to intrahousehold variation in responses. It seems women emphasize issues like access to pulping equipment which men regarded as less important. Women have less discretion in marketing choice than men and

this may help explain the seemingly 'irrational' (sub-optimal) choices (at household level) that are being made in coffee. If women had the access they may market coffee in a different form and to a different point of sale; denial of access by men leads to a sub-optimal outcome for the household.

7.5.5 Variable Cash Inputs, Technology Levels and Risk

Sub-optimal marketing activity is accentuated by similarly directed production behaviour; much of this explained by the intrahousehold interpretation of relative risks. Risk avoiding behaviour almost certainly leads to lower yields, or lower yielding activities are traded off against lower risk; risk aversion dissuades smallholders from undertaking high-yielding but risky economic activities. Average coffee yields in this study at around 1 tonne per hectare (though many are much lower than this) are around half of those in the plantation sector. Much of this yield gap can be accounted for by the virtual non-use of purchased inputs such as fertiliser and pesticides by smallholders. There is heavy reliance on 'family' labour, land and trees and the very limited use of off-farm purchased inputs. Risk aversion lies at the centre of this as it makes producers less vulnerable in periods of economic downturn. Low usage may also be related to other factors such as household budget constraints, preferences for consumption over investment and preferences for traditional rather than market orientated investment to be discussed in chapter 8.

Even though the use of such inputs would yield a positive input/output relation for most smallholders, they tend not to use them; thus getting a positive return from an input is dependent on prices not falling too much between the application and the sale of the final product. Risk management for smallholders has two components: production risk associated with physical growing conditions (floods, droughts etc.); second, price risk linked to exposure to

volatile and unpredictable markets (uncertain prices). As mentioned earlier households are involved in a wide range of cash generating activities which protect them from both price and production risk. They grow most of their own food which further insulates them from variability in their food entitlements which would be associated with dependence on a single international commodity market. More emphasis seems to be placed on the management of price risk through crop diversity and dependence on subsistence food supplies. This then appears to be rational, given the relatively low risk physical environment and the highly volatile international coffee market.

These general observations appear to be supported by the increased planting activity reported in 1993 due to increased prices at the end of 1992. The response (for those who did respond at all; one-third of households) from households to greatly increased production incentives was not to improve the management (and therefore yields) of coffee already cultivated, but served to increase the area planted which does not produce as quick a return. Choosing to expand the area of low yielding coffee, with poorer field husbandry and greater risks of pests and diseases, (but less soil erosion) instead of increasing the level of technology/management is rational when placed within the context of risk avoidance and the resources (particularly flexible access to land) generally available to smallholders.

7.5.6 Further Reactions to Changing Prices

Household coffee production increased by around 5 per cent in 1993, probably in response to increased support prices at the end of 1992. As table 7.5 illustrates, incomes increased by nearly 50 per cent in 1993 but yields only by 5 per cent. Given that areas cultivated remained unchanged (of yielding coffee) most income increases were thus a result of increased prices rather than production. Coffee

prices increased by around 40 per cent⁴ between 1992 and 1993 as a result of increased price support and more effective monitoring of exporter and processor marketing margins (and appropriate interventions) to ensure better returns to growers and public accountability for the large amounts of money being poured into price support⁵.

Table 7.5 Household Coffee Incomes and Yields

Household Number	1992		1993	
	Income	Yield	Income	Yield
1	767	1.42	1020	1.49
2	608	1.95	827	1.92
3	500	1.98	643	2.03
4	218	1.61	433	1.92
5	287	0.93	504	1.00
6	365	2.62	797	2.50
7	160	0.29	279	0.38
8	193	0.30	320	0.35
9	99	0.17	250	0.31
10	6	0.04	90	0.34
11	59	0.16	94	0.22
12	151	0.28	174	0.26
13	404	0.45	456	0.36
14	1058	1.91	1497	2.08
15	588	0.35	950	0.32
16	226	1.00	303	0.85
17	390	1.18	571	1.41
18	493	1.46	592	1.25
AVG	365	1.00	544	1.05
SD	271	0.79	367	0.78
COV	74	79	67	74

All yields are in tonnes/hectare and associated rather than actual - total household production (monitoring data) divided by area cultivated (measured at commencement of the study).

The lack of production response to large price increases may on the surface appear surprising. However, a large production response could not be expected within such a short time frame. Large increases could only be facilitated by increased plantings which would not yield production for three years (not until 1996 if planted early in 1993)⁶. A

picking and pruning response could be expected within this time frame (which could increase production by around 10 per cent under current smallholder management practices (pers. comm., Coffee Research Institute, Department of Agrophysiology)) assuming there exists sufficient household labour to facilitate this (or ability to hire). The figures presented in chapter 6 suggest that although significant surplus exists overall many households face a female labour constraint. Even if a household does not face this constraint, often the incentives for women, in terms of cash returns for their labours, were still lower than their main alternate income source; food (see chapter 8 for further discussion of this). In the absence of economic incentives male household heads will often have to find another avenue of mobilisation, often resorting to coercion. The low overall production response would suggest they were not very successful in this and that women effectively resisted. Without a major change in the incentives women face, this failure can be of little surprise. Further evidence in support of this notion presents itself in the form of coffee being sold by households and how these proportions changed between 1992 and 1993.

Coffee is sold in two forms by households: (1) cherry, the raw and completely unprocessed, product; (2) parchment, with the skin removed (pulped) and dried reducing its weight by a factor of five. Men have greater access to the processing equipment (pulpers) than women and parchment is the higher value product. Therefore selling coffee as parchment should yield a higher return to the household, particularly when it has to be transported a considerable distance.

Table 7.6 Cherry and Parchment Prices

	1992	1993	% Change
Parchment	80	113	41
Cherry	62	102	65
Parchment Premium	18	11	-39
Premium %	29	11	-62

All prices are in Toea per Kg. Cherry prices have been adjusted to parchment equivalent using the conversion ratio 1Kg cherry = 5.2Kg parchment. Prices are the averages reported by the study.

All prices increased with the margin between cherry and parchment prices narrowing significantly. However, there was no corresponding change in the amount of cherry sold and it fell slightly as a proportion of total sales (1.6 per cent across the 18 households) despite the changes in relative incentives. Although cherry is harder to transport, it is the form of coffee sales in which women predominate. These two factors probably kept the sales proportions at similar levels.

Coffee was introduced as a capitalist, plantation based, enterprise into Highlands society in the 1950s. Plantations pay cash wages for the labour they require; smallholders, on the other hand, are semi-capitalist in that they have to pay cash for some inputs but not for the most important input of labour. According to an earlier study of mine (Overfield, 1994a: 4) only one per cent of labour inputs are accounted for by hired (for cash) labour, though nearly half was from non-household sources, being paid either in kind or in obligation (to be repaid at some future date). It is apparent that most labour usage in smallholder coffee production is of a non-commercial variety. Smallholder livelihood systems have amended coffee production so that

its cultivation can be successful within the constraints it faces. Far more labour is used from outside the household than in food production but this tends to be conducted within the bounds of traditional reciprocal exchange relations rather than those of the cash economy. Modifications to capitalist commodity production of this nature could be expected to yield counter-intuitive observations concerning price elasticities as notions of 'target incomes' and backward sloping supply curves come into consideration.

Supply elasticities of price for coffee in Papua New Guinea have been found to be positive⁷ both for the industry in general and smallholders in particular. These results imply that household labour responds positively to price changes (returns) despite the removal of some elements of cash exchange within the smallholder coffee production system. The coffee prices that smallholders faced in 1993 had increased by over 40 per cent from 1992 yet production only increased by 5 per cent for the 18 monitored households. Production response is constrained by environmental factors and the physiology of the coffee tree and by production lags following initial planting. A response of greater magnitude could have been achieved; what factors could explain this 'response' gap?

The labour allocation data presented in chapter 6 showed that overall allocation to coffee production remained around the same in 1993 as it had in 1992 with men doing less (5.7 per cent) and women more (8.6 per cent). In this light it is hardly surprising that production did not increase significantly as applications of labour increased only marginally. On the one hand men were not prepared to work any harder (especially as their cash incomes had increased so much) and on the other hand they could not mobilise significantly higher levels of female labour to coffee production because of the poor returns (absolute and

relative to food) they were been offered. Rationality at an individual level does not necessarily feed through to a unified household response. Through a rational response to relative return rates (economic resistance), set within a context of economic discrimination against women, household coffee incomes are lower than they would otherwise be (see section 7.6.2).

This phenomenon is closely related to the smallholder's mode of production; their semi-capitalist mode internalises the hiring (mobilisation) of labour and associated surplus extraction. As coffee prices increased there was no mechanism for transmission of this to all household members i.e. their relative bargaining positions remained unchanged so individual incentives (for women in particular) often remained unchanged. Similar non-response could be expected within the capitalist mode of production to price changes if the workers incentives remain unchanged; capitalists would generally change these either positively (through incentives/piece rates) or negatively (the sack) to achieve their desired objectives. Neither of these seem to exist within smallholder coffee production - either positive or negative (perhaps apart from some level of female coercion) - which is perhaps the result of the internalisation of market relations and its relation to an adequate and highly resilient subsistence system.

Research into the relationship between coffee cultivation and subsistence food production in this semi-capitalist mode reveals further insights. Fieldwork carried out by myself in mid-1991 throughout all the major coffee growing provinces (when coffee prices were low) revealed that around 20 per cent of households were (or they perceived to be) growing more of their own food as a direct result of coffee price falls. This implies that in this semi-capitalist mode of production subsistence food production (and the therefore the contribution of women) underwrites

cash cropping and modifies household's responses to changing coffee (and other) prices. This is probably the single most important factor behind the generally positive impact of coffee production in the Highlands; even when prices are depressed, trends in individuals entitlements to food are not at risk. Also the way coffee growing spread through the Highlands did not undermine the basis of traditional social and economic relations within village communities.

7.6 Strategic Alliances, Determinants of Household Success and the Distribution of Economic Benefits

7.6.1 Introduction

This section will be concerned with two main themes: (1) the determinants of 'success' in household coffee production; (2) how these influence the distribution of the economic benefits associated with coffee cultivation. It will also attempt to draw out concerns over male alliances between policy-makers and household heads.

7.6.2 Determinants of 'Success'

Definitions of success in coffee cultivation are multifarious; this sub-section will confine itself to multivariate linear regression on the determinants of household yields, production and income levels.

7.6.2.1 Yields

Regressions were run for yields in both 1992 and 1993 and the variables which were found to be significant (in order of importance) were: labour inputs per hectare, returns to male labour and returns to female labour, though the order of significance of the last two switched between the two years. The estimated regression equations explained around 87 per cent of the variation in yields and all variables were statistically significant.

Table 7.7 Yield Regression Equations

Variable	Estimated Coefficient	t-ratio	95% C.I.
Labour Inputs per Hectare 92	0.74(0.89)	8.40**	0.0003:0.0005
Male Labour Returns 92	0.40(0.43)	4.45**	0.35:0.99
Female Labour Returns 92	0.39(0.29)	4.26**	0.53:1.61
R2 F-ratio	0.86 36.705**		
Labour Inputs per Hectare 93	0.80(0.87)	9.38**	0.0003:0.0005
Male Labour Returns 93	0.36(0.42)	4.10**	0.20:0.62
Female Labour Returns 93	0.46(0.30)	5.35**	0.55:1.29
R2 F-ratio	0.88 42.072**		

All coefficients have been standardised in this table. Confidence intervals relate to actual value of coefficient and appear solely to illustrate retention of positive signs throughout. Labour returns are hourly. Labour inputs per hectare are based on annual estimations (25 monitoring days per year). ** denotes significance at 95 per cent. Figures in brackets are the calculated elasticities of the coefficient at the means. All equations have linear functional form.

Calculated elasticities at the means suggest that a 10 per cent increase in labour inputs per area would be associated with an 8.6 per cent increase in yields; a similar 10 per cent increase in labour returns would produce an increase of yields of 4.3 per cent (male) and around 3 per cent for female labour (based on 1992 estimates). Given that no significant multicollinearity appears to exist between labour inputs per area and labour returns it could be

suggested that the returns to male labour are of greater significance in determining household yield levels even though more female labour is actually applied to coffee production (particularly at per worker unit level) and relates to the process of mobilisation rather than underlying resource scarcities (opportunity costs). Returns to female labour did become more important (than male returns) in explaining yields in 1993 perhaps suggesting that those households which did slightly better did so because women were getting a relatively better deal. R-squared values of this level suggest that very little of the interhousehold variation has been left unexplained.

7.6.2.2 Production

Production levels both at household and per capita levels were found to have similar determinants - labour inputs and labour returns. The following variables (in order of importance) were found to exert a positive influence on household production levels and taken together explained 83 per cent (1992) and 85 per cent (1993) of the variation in this dependent variable: female labour inputs, male labour inputs, returns to male labour and returns to female labour; a 10 per cent increase in their value would be associated with 4.9 (5.4), 3.7 (4.1), 3.8 (4.3) and 2.4 (2.3) per cent increase in production levels in 1992 (1993 in brackets). However these R-squared values are a little misleading, in that some degree of multicollinearity is present between labour inputs and returns and this is quite pronounced for men; this does not invalidate the regression equation, but means it explains less of the variation in the dependent variable.

Table 7.8 Production Regression Equations

Variable	Estimated Coefficient	t-ratio	95% C.I.
Female Labour Inputs 92	0.58(0.49)	4.20**	0.0002:0.0006
Male Labour Inputs 92	0.41(0.37)	3.06**	0.0001:0.0005
Male Labour Returns 92	0.40(0.39)	3.35**	0.08:0.37
Female Labour Returns 92	0.35(0.24)	3.24**	0.11:0.54
R2 F-ratio	0.84 22.642**		
Female Labour Inputs 93	0.61(0.54)	4.92**	0.0002:0.0006
Male Labour Inputs 93	0.47(0.41)	3.41**	0.0001:0.0005
Male Labour Returns 93	0.39(0.43)	3.29**	0.05:0.25
Female Labour Returns 93	0.37(0.23)	3.69**	0.10:0.40
R2 F-ratio	0.85 25.465**		

All coefficients have been standardised in this table. Confidence intervals relate to actual value of coefficient and appear solely to illustrate retention of positive signs throughout. Labour returns are hourly. Labour inputs per hectare are based on annual estimations (25 monitoring days per year). ** denotes significance at 95 per cent. Figures in brackets are the calculated elasticities of the coefficients at the means. All equations have linear functional form.

Production is heavily determined by labour inputs of which women's work exerts a greater influence - a simple reflection that they do more of the work as highlighted in earlier sections of this thesis. Similarly it was found that male labour returns appeared more important than those

of women in determining success. This is indicative of the weaker bargaining position of women within the household in Highlands society. This is central to the main hypothesis of this thesis and will be considered further in this section.

7.6.2.3 Incomes

Identical variables were found to explain household coffee income (and per capita incomes) levels in the two years with them appearing in the same order of importance, with broadly consistent elasticities (at the means), and with the regression equation explaining similar levels of variation in the dependent variable (income) though producing slightly weaker models. These equations therefore add little extra to the information already presented in this chapter and it is of more value to look at the factors which explained the changes in household coffee incomes between 1992 and 1993 as a result of price increases. It is useful to look at what factors allowed households to benefit most from these altered incentives

Coffee income increases were found to be positively related to previous income levels and the change in labour (household, not differentiated) returns between the two years, both of which should be expected. One other variable was found to be statistically significant, the female labour constraint, which exerted a negative (though statistically weak) influence on income changes.

Table 7.9 Income Change Regressions

Variable	Estimated Coefficient	t-ratio	95% C.I.
Income Level 92	0.77(0.68)	6.48**	0.21:0.43
Labour Returns Change	0.31(0.21)	2.32**	12:276
Female Labour Constraint	-0.27(-0.26)	-2.05*	-91:2
R2	0.76		
F-ratio	18.63*		

All coefficients have been standardised in this table. Confidence intervals relate to actual value of coefficient and appear solely to illustrate retention of positive signs throughout. Labour returns are hourly. ** denotes significance at 95 per cent. * denotes significance at 90 per cent. Figures in brackets are the calculated elasticities of the coefficients at the means. Dependent variable is the absolute size of income change between 1992 and 1993. All equations have linear functional form.

Taken together these three variables explained 76 per cent of the change in household incomes following the internal coffee price hikes of late 1992. Previous income levels exerted the strongest influence followed by change in labour returns and followed by the female labour constraint.

Those households which already had high incomes benefitted much from the price increases but only if they did not face an internal constraint; it was shown in earlier sections that several households faced a female labour constraint and that this became more pronounced in 1993. The figures presented in chapter 6 suggested that labour allocation to coffee remained fairly static over the two years and production only increased marginally which would suggest

that a labour constraint should have no influence on changing incomes. However, it was a negative (static) association and may indicate that this lack of labour response was due to an internal, socially generated, constraint. The labour allocation figures presented in chapter 6 also suggested that female applications increased whilst male applications fell off; does that mean that women were coerced into working harder whilst men substituted into higher levels of leisure? The female labour constraint certainly intensified in a number of households in 1993 (see table 6.10) and thus restricted their responses to the improved economic opportunities in the coffee sector.

7.6.2.4 Household Success

Despite defining 'success' in coffee cultivation in a number of ways a considerable degree of consensus has emerged from the analysis. All have shown labour inputs and returns to labour to be very important and that there is considerable intrahousehold variation in their level and influence upon household success. Principally while female labour is more influential upon production and income levels than male labour, the converse is true for labour returns. Female labour also appears to act as a constraining factor upon improvement in household performance to changing economic incentives; earlier analysis would suggest that this was due to the unequal division of tasks within the household. This analysis thus provides the basis for the model of constrained rural development, which is central to this thesis based, upon poor incentives, competing alternatives and intrahousehold labour constraints. These determinants are closely related to the distribution of benefits that are generated by policy within the coffee industry: three key areas of policy will be considered in this section; domestic pricing, research and extension

7.6.3 Strategic Alliances and the Distribution of Policy Benefits

7.6.3.1 General Points

The introduction of coffee was integrated with the opening up of the Highlands to the outside world and Highland society's incorporation into the global capitalist system. Coffee cultivation had to be therefore closely tied to the promotion of this 'new' ideology associated with the introduction of capitalism hence its promotion as 'new' and 'modern' mentioned previously in chapter 6. This inevitably led to an ideological devaluation of subsistence food production which began to be seen as backward because it was not associated with the brave new (capitalist) world (see chapter 6).

The economics of the market place, manifested mainly in the form of coffee cultivation, were not imposed into a vacuum but into a pre-existing social and economic order. This order was patriarchal where men and women had very unequal access to productive resources and therefore different bargaining positions. Therefore the distribution of the benefits of any newly introduced economic activity were never going to be even as there was inter and intrahousehold variation in the access to productive resources needed to succeed in this activity.

It is also important to consider the fact that coffee was introduced at the time of pacification (a decline in tribal warfare as the colonial power imposed western style law and order) leading to the virtual disintegration of the main source of male status - their value as fierce warriors to protect the clan. Coffee may have acted as a substitute, to which many observers have argued that the extent of male economic competition, manifested in inflationary tendencies in bride price payments and other cultural obligations (and their monetisation in the first place) was a direct result

of pacification (Standish, 1981; Strathern, 1982). There was a strong incentive for men to become heavily involved in coffee production as a status seeking activity as well as the other benefits associated with increased income streams. The incentive of male status enhancement and their access to basic productive resources, and relative power over household labour supplies, led to men gaining a large share of the direct benefits that came with the cultivation of coffee.

Control of the household coffee enterprises then lies with the male household head who has principal access to land and processing equipment. This thesis has shown this to manifest itself in unequal intrahousehold returns. A brief examination of the history of policy in the coffee industry will illustrate further how this situation has developed by drawing out the key strategic alliances which have influenced policy. Three areas of policy seem to be of key importance in determining the distribution of intermediate benefits: pricing (stabilisation and support), research and extension, all of which exhibit significant gender bias.

7.6.3.2 Pricing Policy

Some form of pricing policy (intervention leading to a variation between the international price and that received by growers) has existed in the coffee industry since 1968. For the period 1968 to 1991 this took the form of price stabilisation with growers paying into a fund (via levies) when prices were high and receiving payments (bounties) when international prices were low. The efficacy of this scheme has been the subject of numerous studies (Kiele, 1987; Guest, 1989; Jolly et al, 1990; SRI, 1990; Overfield, 1991b; Fleming and Antony, 1993) and contentious debate which will not be repeated here. After several years of extremely low international prices, the Coffee Industry Fund (stabilisation) became exhausted in April 1991 and a loan was negotiated with the PNG government (to be

administered by the Coffee Industry Board/Corporation and using Asian Development Bank financing) to replenish the fund. The loan was made on the basis that it was short-term financing only to help the industry to adjust to a regime of lower prices and that support levels would be adjusted on a downward sliding scale over a period of five years with support completely withdrawn in year six. Initial support levels were set at the estimated costs of production of an 'efficient' plantation operation (also for the other tree crop industries who were also in the loan scheme) even though they were the smaller higher part of the industry. The plantation sector wielded significant influence in the setting of initial support levels which probably saved many operations from bankruptcy and, with the improved levels of international prices, many became viable operations again (though with considerable debt burdens). The support levels in this agreement were amended upwards by the PNG government in the run up to the 1992 general election and again when the new Wingti government was installed after the election.

Coffee pricing policy in the early to mid 1990s was determined by political patronage surrounding the 1992 general election and the powerful influence of the plantation sector. Although the plantations almost certainly determined (through influence in the Coffee Industry Board and national government) initial support levels, the largest group of beneficiaries were smallholder (semi-capitalist) producers as they had much lower production costs and accounted for a larger proportion of total output. It is possible to present coffee pricing policy as a symptom of an alliance between Highlands-based politicians and male coffee producers; in return for higher prices their votes and those of their family were promised. Additionally it could also be seen as one between plantation owners (capitalists) and technocrats (petty bourgeoisie).

7.6.3.3 Research Policy

Agricultural research policy in Papua New Guinea has shown the bias existing in many developing countries towards cash crops and away from subsistence food crops. This bias was perceived to have been so great in the past that the Asian Development Bank in 1993 refused to fund any further cash crop research, instead directing the future funds (AREP II) towards food crops. Within the coffee industry this bias was added to the heavily plantation-orientated research which still continues to obtain the majority of research resources (Overfield, 1993b). This bias to high input/output research has long-term implications for the distribution of benefits given the gestation period of most agricultural research projects.

This bias is related to a number of factors: (1) it is supposedly easier to conduct research on plantations and data are much more reliable; (2) coffee research priorities are decided upon by the Coffee Research Advisory Committee (CRAC) and although representatives are drawn from all areas of the industry, the most prominent and forceful members are from the plantation sector; (3) the bias of past research directors; (4) finding out what knowledge is useful (and needed) in smallholder agriculture is hard.

It is only within the last couple of years that systematic economic evaluation of the research programme has been conducted. This work found the coffee research programme misdirected and recommended a redirection of resources towards smallholders and a more farming systems orientated approach (see Overfield, 1993b). Alliances between directors and the plantation sector and indifference from policy makers has created this bias. This issue is now a focus of debate in setting current and future research priorities.

7.6.3.4 Extension Policy

Extension provision in the coffee industry exhibits gender bias as extension agents only tend to approach male coffee producers. The Coffee Industry Corporation which is now responsible for the provision of extension services (prior to 1991 Coffee Development Agency) does not employ any female extension officers (there are very few women who are graduates of agricultural colleges). It was only in 1992 that provision of extension for women appeared on the agenda despite the fact that this was an aid-financed (Asian Development Bank) and run (Australian International Development Assistance Bureau) project (and had been since 1986/7).

Current provision amounts to a single Womens' Liaison Officer, whose role is to sensitise male extension officers (in training courses and whilst on patrol with them) to the needs of female coffee producers. No evaluation has yet been performed on this new project - more research is needed to see how (if) effective male extension officers can be in this provision and how could it be made more effective. This is very important, as this is the reality of provision for the time being until (and if) more female graduates become available. However, just putting women into positions is of course no guarantee of success without other elements of policy support^b.

The current bias in provision is a reflection of the history of coffee in PNG: it was introduced as 'modern' and 'male' and distinct from the subsistence sector of the society. This has produced bias in the current policy environment both in terms of gender and against semi-capitalist production and farming systems approaches. Coffee extension is seen purely as that despite the increasing incidence of intercropping in most coffee producing areas (Ghorkey et al, 1993). Historical male alliances are still exerting considerable influence.

7.6.3.5 Distribution of Policy Benefits

The combination of gendered and class alliances at regional and national level have had a major influence on pricing, research and extension policy in the coffee industry. The bias to plantations is clear; the provision which does go to smallholders is biased towards men and when combined with differential intra-household bargaining strength leads to uneven distribution of the benefits associated with investment programmes in research and extension, and in pricing policy. Policy only generates benefits at an intermediate, or household, level; the final distribution of benefits to individuals is determined by the power structure of the household and the means by which people access productive resources.

7.7 Conclusion

This chapter set out to link the determinants of household resource allocation to the wider distribution of benefits in rural society by focusing on the coffee element of livelihood strategies. It has shown how women are marginalised from the enterprise by their lower rates of access to the necessary productive resources - land and processing equipment - and that this reduces their influence in decision-making concerning production, and in particular marketing, decisions. This leads to women receiving lower rates of economic benefits (labour returns).

The analysis in section 7.6.2 illustrated that women are highly influential and important to the success of household coffee enterprises but are at the same time mobilised (coerced) by the levels of returns that men receive rather than their own economic incentives. This twist is also present in the policy-making arena: in the three key areas of pricing, research and extension policy there were considerable elements of gender bias and some evidence of strategic alliances between politicians and

male coffee producers. This bias is both class and gender driven.

The determinants of resource allocation are clearly linked to the distribution of the economic benefits they generate through allocational processes. This was shown in general in chapter 6 and has been confirmed to be the case for coffee. There is also a gendered distribution of policy benefits which are related, in the generation of final economic benefits, to the power hierarchies of household decision making. All discriminate heavily against women; this in turn reduces household coffee incomes and the ability of households to respond to changing economic incentives. It could be expected, given the importance of coffee as an income source, that this may then reduce the general level of welfare, and development, in Highlands society.

Notes

1. Income which is not determined by the level of effective demand in the local community (disarticulated accumulation). Only income which is derived externally to the village and surrounding area i.e. usually exported onto the world market though not exclusively so. In terms of the data collected for this study this includes coffee income (exported), artifacts (mainly sold to tourists) and wage income (from government sector and private industry - though in the Highlands quite often from the coffee industry in the form of processors or export companies meaning figures may possibly understate the dependency upon coffee - it is still externally derived). All other sources of income (including food and business income) are internally purchased and are therefore dependent on externally derived incomes - in the main coffee.

2. New York "C" futures contract based on a closing price of 76.25 cents/lb (27/10/93). Caution should be exercised when using a particular closing value due to the volatile nature of the coffee futures market. Prices were increasing at this time due to speculation concerning the export retention scheme. Prices increase rapidly early in 1994 after the completion of this study and prices are currently around cents/lb.

3. The Coffee Industry Corporation regulates all aspects of these markets and has the statutory power to act both as a buyer and seller. It has (and its predecessor the Coffee

Industry Board) always chosen to stay out of trading and concentrate on market regulation through the issuing sufficient numbers of trading licences to ensure that returns to growers are maximised. It attempts to produce sufficient competition without compromising economies of scale.

4. 41 per cent for parchment (80 per cent of coffee income) and 62 per cent for parchment. The difference between these two was the result of new quality control measures (and price incentives) which increased cherry prices relative to parchment at the factory door - as much could now be sold as a higher grade (when processed)

5. Increased price support increased domestic prices by around 30 per cent. The rest of the increase is due to more of the final export price reaching growers due to increased surveillance of exporters and processors margins which increased effective competition in these sectors whilst maintaining scale economies. Potential interventions included removal of licences for paying below minimum guide prices - calculated by CIC regulation staff taking into account reasonable costs, current international prices and levels of domestic price support. Also bounty payments (price support) could be withheld (or delayed) as they are paid retrospectively to exporters upon physical shipment who have to pay first and pass them down the marketing chain.

6. For traditional varieties. Some newer dwarf varieties can yield within 18 months of initial planting - these are not on general release to smallholders in Papua New Guinea.

7. See Jolly et al (1989) and Overfield (1991).

8. For a detailed review of the issues associated with the provision of agricultural extension services to women and an evaluation of various programmes see Berger et al (1981).

Chapter 8

Intrahousehold Welfare and Economic 'Transformation'

8.1 Introduction

This chapter will be concerned with the restricted nature of economic diversification in the Highlands and the patterns of intrahousehold welfare that this generates. It will consider heavy household dependence on a small number of economic activities and the intrahousehold acquisition, and distribution, of the income they generate. Five particular areas of welfare will be considered: (1) food security and nutrition; (2) the distribution of economic benefit between household members; (3) intrahousehold income transfers and consumption; (4) labour constraints and leisure goals; (5) economic sustainability and the household trade-off between consumption and investment.

Having explored the distribution of benefits in the coffee economy and the decision processes which generate these it is important to show how these relate to rural welfare generally. As the final chapter of part II, this chapter will provide the final section of evidence concerning the nature of constrained rural development, that is generated by market failure, and the role that gender has to play in this. In terms of the main hypothesis it will prove that women face 'incorrect' market incentives, experience lower levels of welfare than men, and that this provides the most significant basis for the generation of gender based market failure.

8.2 Economic 'Transformation' and Household Income Sources

This section will be concerned with a description of household incomes levels and the range of economic activities which generate them. It has been outlined in

previous chapters how cash was introduced to the Highlands during the colonial period. This intensified with the spread of coffee cultivation in the 1950s and 60s. Household incomes have increased over time, and coffee remains a crucial component as table 8.1 illustrates.

Table 8.1 Total Cash and Coffee Incomes

Household Number	1992			1993		
	Total Cash	Coffee	%	Total Cash	Coffee	%
1	3124	767	25	3026	1020	34
2	1737	608	35	4859	827	17
3	2529	500	20	5422	643	12
4	3233	218	7	5318	433	8
5	1000	287	29	1008	504	50
6	910	365	40	1436	797	55
7	439	160	36	579	279	48
8	542	193	36	2144	320	15
9	5194	99	2	7965	250	3
10	189	6	3	112	90	80
11	1697	59	3	212	94	44
12	232	151	65	190	174	92
13	627	404	64	885	456	52
14	1626	1058	65	3095	1497	48
15	1028	588	57	2171	950	44
16	577	226	39	485	303	62
17	1333	390	29	991	571	58
18	793	493	62	1024	592	58
AVG	1489	368	34	2273	544	43
SD	1301	261	22	2253	491	25
COV	87	72	64	99	83	57

All figures are in Kina per annum. Percentages relate to coffee incomes as a proportion of total cash incomes. Total cash relates to total cash sources only and does not include any imputed valuation for subsistence production. See appendix 5 for more details.

It is clear that household incomes increased considerably between 1992 and 1993: of the 18 households studied, 13 experienced increases with 5 declining. Coffee incomes experienced a similar pattern, increasing on average by 50 per cent, with each household experiencing an increase. Incomes increased further in those households with a business due to the relatively buoyant conditions in the rural economy, themselves a result of coffee price

increases (see table 8.3). The second most important source of income to households, food marketing, changed very little over the two years as table 8.2 below illustrates.

Table 8.2 Food Marketing Incomes

Household Number	1992		1993	
	Food Sales	% of Total	Food Sales	% of Total
1	483	15	472	16
2	521	30	472	10
3	209	8	200	4
4	92	3	130	2
5	187	19	257	25
6	112	12	135	9
7	279	64	300	52
8	349	64	303	14
9	350	7	214	3
10	156	83	21	19
11	85	5	78	37
12	51	22	12	6
13	123	20	341	39
14	222	14	350	11
15	193	19	495	23
16	26	5	44	9
17	185	14	39	4
18	30	4	77	8
AVG	203	23	218	16
SD	144	23	163	14
COV	71	103	74	87

All income figures relate to Kina per year. All percentage figures relate to total cash incomes.

The income from food sales income remained fairly stable over the two year period with its relative importance falling due to income increases in other areas. Even when coffee prices were much lower in 1992, food sales only amounted to around half of the income produced by coffee cultivation; in 1993 this proportion fell to only 40 per cent. Household income dependency on coffee intensified but this was due entirely to increased price support levels.

Coffee and food incomes, when taken together, account for large proportions of most household's income as illustrated

in table 8.3. In the majority of households coffee and food account for over half of all income; for one-third of households this proportion is above 75 per cent. In those households where food and coffee account for a small proportion of total income this was most likely due to the presence of either a business or wage income, thus generating cash far in excess of that which could be produced by agriculture. There was one exception to this, in household number four (in 1992) where it's income came from animal sales which were not considered in great detail, as they generally only produce a very small income¹.

Table 8.3 Coffee and Food Incomes as Percentage of Total Cash Incomes, Wage and Business Income

Household Number	1992			1993		
	F+C as % (1)	Wage Income	Business Income	F+C as %	Wage Income	Business Income
1	40	762	387	49	845	0
2	65	150	127	27	0	0
3	28	0	383	16	50	4200
4	10	0	237	11	3854	36
5	36	0	495	60	0	62
6	52	45	187	48	0	32
7	100	0	0	100	0	0
8	100	0	0	29	1521	0
9	9	0	4950	6	0	7500
10	85	0	0	99	0	0
11	6	97	103	81	83	2
12	87	0	12	98	0	0
13	84	20	0	90	0	55
14	79	268	35	60	250	830
15	76	28	0	67	0	350
16	44	125	13	72	58	87
17	43	54	47	62	0	197
18	66	35	64	65	0	237
AVG	56	88	391	58	370	754
SD	31	183	1148	30	955	1949
COV	55	208	294	52	258	258

(1)F+C as % is coffee plus food incomes divided by total household cash income (gross). Wage and business incomes are gross Kina figures for each household. Business income includes some petty trading.

It should be considered that business incomes produce an 'average' income in excess of that provided by coffee in both 1992 and 1993. However businesses only produced high incomes (i.e. greater than coffee) for household nine (tyre repair) and three (trade store and social club in 1993 only) and are not spread throughout the rural economy, as is the case with coffee and food. Wage incomes increased significantly in 1993 to the point where there produced income, on average, in excess of food sales. But wage incomes were only present in five households and only produced incomes greater than food sales in two households (numbers one and four). Other sources of household income existed including non-economic types (such as gifts, compensation and bride price) which are detailed appendix 5.

The figures presented in this section indicate that the extent of 'transformation' in the majority of households, is limited. Most still depend heavily on coffee and food incomes with only a small number having access to either wage employment or business income. In terms of sources of household income, little appears to have changed since the widespread establishment of coffee in the 1960s (see also chapters 2 and 5 on this point). Interhousehold variations in income have increased with the emergence of a few rural capitalists but, as mentioned in chapter 5, this has been constrained. However, the figures presented in this section only reveal part of the story; in terms of the main theme of this chapter it is the intrahousehold patterns of income sourcing that are of greater interest. This issue will be considered in the next section.

8.3 Intrahousehold Income Acquisition

In chapter 5 it was stressed that, in general, women had a lower involvement in the cash economy in terms of proportions of household cash incomes directly obtained by them. Table 8.4 reveals that in 1992, the situation was fairly mixed with many households having more than 50 per cent of their total incomes directly obtained by women (though not necessarily consumed by them!). In 1993 this had changed considerably in 1993 with only three households remaining in this position, with the average percentage acquired by women, falling from 32 to 24 per cent.

Table 8.4 Proportions of Household Incomes Directly Obtained by Women

Household Number	1992		1993	
	Total Income	Female %	Total Income	Female %
1	3124	56	3026	47
2	1737	56	4859	20
3	2529	68	5422	11
4	3233	14	5318	14
5	1000	51	1008	74
6	910	57	1436	57
7	439	32	579	44
8	542	32	2144	13
9	5194	2	7965	3
10	189	82	112	19
11	1697	6	212	19
12	232	60	190	15
13	627	59	885	98
14	1626	25	3095	43
15	1028	55	2171	44
16	577	19	485	23
17	1333	30	991	25
18	793	6	1024	21
AVG	1489	32	2273	24
SD	1301	39	2253	21
COV	87	122	99	88

Section 8.2 outlined what happened to household incomes over this period: increases in coffee income related to increased support levels was the most widespread and significant factor. This offers an explanation for why female incomes fell as a proportion, because coffee is male dominated; there was no compensating increase in female income areas.

Table 8.5 Proportion of Gender Incomes Accounted for by Coffee and Food

Household Number	1992		1993	
	% Male Coffee	% Female Food	% Male Coffee	% Female Food
1	52	28	60	34
2	54	54	16	49
3	48	12	12	32
4	5	21	6	17
5	24	36	100	34
6	62	22	68	16
7	78	100	100	100
8	100	100	17	100
9	2	100	3	99
10	18	100	99	100
11	1	89	43	100
12	87	37	99	43
13	74	33	11	39
14	71	55	46	26
15	78	34	63	51
16	31	24	69	39
17	22	46	56	16
18	65	60	62	37
AVG	48	53	52	52
SD	31	31	35	32
COV	64	59	67	62

Male % coffee is the percentage of total male acquired income that is accounted for by coffee. Female % food is the percentage of total female acquired income that is accounted for by food sales.

Coffee accounts for over half of male income. Similarly food sales are the main source of female income and contribute a similar proportion to their total income. It

should be remembered that food incomes were much lower than those associated with coffee, particularly in 1993. This factor would be of little concern if the household was an income pooling unit but as mentioned in chapter 6 this is probably not the case in Papua New Guinea, as in many other parts of the world. This issue will be discussed in greater detail in sections 8.6 and 8.7.

Ideological devaluation of subsistence production has been mentioned in earlier parts of this thesis, particularly with reference to its influence on resource allocation patterns. The predominance of women in food selling may thus reflect a hierarchy of evaluation in which food production (particularly for subsistence) is ranked lower in terms of social prestige than export cash crops and other recently introduced economic activities. As will be shown in the section 8.4 it is likely that this ranking correlates closely with the differential economic returns associated with different activities. The rank system is highly gendered; high status (and return) activities are considered appropriate for men and low status ones for women (Hide, in press).

Many studies have shown women to predominate in the marketing of food in the Highlands (D'Souza and Bourke, 1983; Grossman, 1984; Strathern, 1984; Maclean, 1989; Finlayson et al, 1991; Young, 1977). Jackson and Kolta (1974) suggested the predominance of women increased substantially in the late 1960s, at least in the main centres of Goroka and Mount Hagen. They assigned this occurrence to men dropping out of the activity because they had ready access to alternate incomes, in particular coffee. A similar argument is made by Lechte (1978) to the Pacific generally, proposing that women's current widespread predominance in market trade is the result of modernisation opening up new employment opportunities for men but not for women.

In the rural markets of Ol (Nembi Plateau, Southern Highlands Province) the majority of food crops were sold by women, as men selling were subject to a "certain amount of ridicule". Men therefore tended to concentrate on tobacco, pig meat, possums, Highland betel nut and ornaments (such as shells) (D'Souza and Bourke, 1986). In a study conducted in the Benabena District in the mid 1980s, 53 per cent of women respondents stated that marketing was for either men or women, with the remainder saying it was for women only (Dickerson-Putnam, 1988: 210). But then most men were "ashamed to sell produce at market because they considered marketing women's work". Similar views were found in the Daulo area (also in Eastern Highlands Province):

"Marketing is women's work and is slightly demeaning for men, except under certain conditions. A few older men occasionally sell vegetables without risking their masculinity. It is appropriate for a younger man to sell tobacco or to sell unusually large quantities of vegetables in the local market." (Sexton, 1986: 43)

When the scale of production and marketing increases, for example in market gardening or food crop production for contract sale, it appears to become commonly perceived as a male activity.

A number of Highland village studies in the late 1970s and early 1980s estimated that food selling accounted for between 5 and 20 per cent of total household income (see Hide, in press: 12-3, for a summary of these). Dickerson-Putnam (1988: 216) placed food marketing in second place after coffee (out of 10 sources) and this accounted for around a third of all household income (at K 361 per annum). There was a major difference between women selling garden produce only (mean = K 220) and those selling additional items, including most importantly betel nut (mean = K 476). Market income did not vary markedly by season. During the wet season when coffee income is at its lowest, food crops became the sole source of funds for 19

households (63 per cent), and for 7 of the remaining 11 contributed the highest proportion of wet season income (op cit: 218). These are in a range similar to the figures presented in the previous section 8.3.

Table 8.6 summarises the proportion that women directly obtained from the main economic activities in 1993 (figures for 1992 are included in appendix 5). It becomes clear that women receive only a small proportion of coffee income (the main household source of income), while at the same time predominating in food sales. Other income categories are absent from many households, with men predominating² in all categories besides that of artefacts (including bilums) which again produces only low incomes. It becomes apparent that women only dominate income areas that produce small amounts of cash - a factor which must thus influence their level of well-being substantially, especially where household income pooling is either absent or extremely limited. Men continue to predominate in the higher earning areas of the rural economy particularly in coffee which is the most significant, affecting positively their welfare³ relative to that of women.

Table 8.6 Proportions of Incomes Directly Obtained by Women - 1993

Household Number	Coffee	Food	Wages	Business(1)	Animals	Art(2)
1	5	70	100	0	0	17
2	25	89	*	100	9	100
3	12	100	0	1	0	100
4	39	91	0	94	0	*
5	22	95	*	83	0	*
6	25	97	*	64	0	*
7	0	96	*	*	*	*
8	0	87	0	*	*	*
9	0	100	*	0	*	*
10	0	100	*	*	0	*
11	21	100	0	0	*	*
12	8	100	*	47	*	*
13	100	92	*	100	100	*
14	46	86	0	0	*	100
15	20	90	*	100	0	100
16	16	100	1	15	0	0
17	27	100	*	0	100	55
18	14	100	*	0	0	75
AVG	21	94	17**	40**	17**	68**
SD	24	8	**	**	**	**
COV	113	8	**	**	**	**

(1) Includes petty trading - all women's income in this category is petty trading, only men are involved in any large-scale (involving relatively large revenues) business enterprise.

(2) Includes bilums and artefacts and where exists tends to be dominated by women.

** average proportion is meaningless because the activity either being absent from most households or involving incomes which are very small (see appendix 5).

* income source not present in the household.

8.4 Determinants of Household Success and Economic Activity Mix

Household success will be defined solely in terms of total income levels in this section, while trying to answer what factors, from both within and without the household, lead to higher incomes. The most appropriate dependent variables

are household income per capita and per worker unit, as these control for both the impact of household size and the number of dependents, allowing a focus on economic rather than demographic success. These are displayed in table 8.7.

Table 8.7 Household Incomes per Capita and per Worker Unit

Household Number	1992		1993	
	Per Capita	Per WU(1)	Per Capita	Per WU(1)
1	516	1190	456	1053
2	348	869	943	2357
3	506	703	1037	1441
4	1632	1632	2659	2659
5	143	166	144	168
6	303	454	479	718
7	48	83	64	45
8	89	187	357	119
9	857	1428	1286	2143
10	63	94	13	20
11	566	942	71	118
12	29	48	24	40
13	125	149	177	211
14	163	206	310	392
15	49	69	103	145
16	115	289	280	699
17	267	267	397	397
18	113	220	224	436
AVG	329	500	501	731
SD	399	495	650	830
COV	121	99	130	114

All figures relate to total household cash incomes.
(1) Incomes per worker unit. The definition of worker unit is contained in appendix 6.

Income per capita generally increased in 1993, a result of increased coffee prices. The most important point that table 8.7 highlights is the large amount of interhousehold variation. What factors determine this variation?

A number of bivariate linear regressions were run on variables such as market access, size of land holdings, economic returns, gender ratios; none were found to be statistically significant. A weak negative association was established between income per capita and household dependency ratios providing further support for the Chayanovian model of resource allocation and welfare⁴. The greatest influencing factor which appears to be the presence of a significant source of income which is not directly linked with agriculture, nor the land (this cannot be established statistically due to the small number of observations). Generally this is either a business enterprise or wage employment. In 1993, there were only three households which had per capita incomes in excess of K 1000 (numbers 3,4 and 9) two of which had a business (trade store/social club (household 3) and tyre repair shop (household 9)) and therefore were well positioned to take advantage of the increased purchasing power in the rural economy in 1993 (due to increased coffee prices); household 4 also had access to large amounts of wage income via formal employment in the provincial capital. Most other households had per capita incomes of less than K 300 per annum with their incomes sources restricted mainly to coffee, food and small amounts of petty trading. Those falling between K 300 and K 1000 per annum (6 households - numbers 1,2,6,8,14 and 17) either had access to significant wage income (e.g. hausmeri (domestic employee) - household no.1), smaller amounts of business income, or as in the case of household 14, large tracts of land.

Half of the households had income per capita of less than K 300 per annum, with one-third falling between K 300 and K 1000, and only three in excess of K 1000 per year. The only factor which seems to explain these patterns is the existence (or non presence) of non-agricultural income, or in one case only, where large amounts of land were at the household's disposal. These explanations are in addition to

those outlined in chapter 5, thus concerning demographic explanations of household income levels i.e. that large households tended to have large incomes. These figures imply a certain stagnation and dependency in the rural economy with half of households having very low incomes and being highly dependent on only two economic activities (coffee and food). 'High' incomes seem only to be associated with the presence of a business enterprise or formal paid employment.

Previous sections of this thesis have shown coffee to be the most important single source of cash income for households. Returns to labour are much higher in coffee than in food production, but sales in this last category continue to be very important, because they are often the sole, or at least main, source of income for women. As highlighted in chapter 6 a major explanation of resource allocation patterns, in particular why women allocated so much labour to food production despite coffee providing a greater return at household level. Variations in intrahousehold returns will be described in more detail in section 8.5. This part will concentrate on ratios between income sources and their relationship with inter and intrahousehold economic variables. Table 8.8 presents information on some of these factors.

Table 8.8 Coffee/Food Income Ratios and Return Ratios

Household Number	Income Ratios(1)		Return Ratios(2)	
	1992	1993	1992	1993
1	1.59	2.16	0.32	0.46
2	1.17	1.75	1.54	2.22
3	0.34	1.32	0.74	0.84
4	1.11	1.33	1.55	2.98
5	1.53	1.96	2.73	5.38
6	1.27	3.52	1.97	3.52
7	1.64	1.28	0.36	0.70
8	3.11	1.16	1.76	1.48
9	1.04	1.17	0.77	1.36
10	0.04	4.23	0.14	0.83
11	0.70	4.56	1.00	1.60
12	2.93	14.76	0.23	0.73
13	3.27	1.34	3.00	2.09
14	5.78	3.10	1.59	2.13
15	3.05	1.92	1.30	2.44
16	8.84	6.93	1.95	1.57
17	2.11	14.83	0.76	1.00
18	16.44	7.74	1.62	2.74
AVG	3.11	4.17	1.30	1.89
SD	3.94	4.33	1.35	1.98
COV	126	104	104	105

(1) Ratio of household coffee income to food sales.

(2) Ratio of hourly labour return in coffee to food (including a valuation for subsistence output).

The ratio of coffee to food incomes increased considerably in 1993 - a result of coffee price increases at the end of 1992. There was a corresponding increase in the ratio of coffee to food labour returns at household level. However within the household the situation was not quite the same: this ratio increased by nearly 60 per cent for men but only by 16 per cent for women as table 8.9 highlights. It is interesting to note that despite the dramatic increase in coffee prices, female labour returns hardly increased above what they could obtain in food production; this ratio for men was, on average, around three. It must therefore be remembered that these figures include production for home consumption⁵.

Table 8.9 Coffee/Food Return Ratios by Gender

Household Number	Female		Male	
	1992	1993	1992	1993
1	0.02	0.03	0.97	1.45
2	0.68	0.78	3.75	5.74
3	0.28	0.16	1.36	2.12
4	1.76	2.58	1.45	3.30
5	3.06	3.53	2.61	6.31
6	2.25	2.94	1.84	3.77
7	0	0	0.52	0.96
8	0.62	0	2.21	2.15
9	0	0	2.41	4.08
10	0	0	0.5	2.95
11	0	0.60	2.02	2.88
12	0.34	0.15	0.19	1.08
13	2.73	3.50	3.53	0.01
14	0.78	2.32	2.07	1.97
15	0.78	0.78	2.07	5.25
16	2.15	0.53	1.84	2.47
17	1.04	0.74	0.60	1.31
18	0.07	0.70	3.67	5.47
AVG	0.92	1.07	1.87	2.95
SD	0.97	1.13	1.92	3.04
COV	105	106	103	103

All figures relate to ratio of female/male coffee returns (acquired income) to labour returns in food production. For example in the first column this is the female return (female acquired coffee income divided by number of hours applied) in coffee production divided by total labour returns in food production for 1992. Zeros are the result of women receiving no income from coffee.

Market access appears to have a role in determining the level of dependence on coffee incomes. Households 10-12 (village 4) and 16-18 (village 6) had the highest ratios of coffee to food incomes an average of 8.84 or twice that of the overall average. A statistically significant relationship is found between market access and the ratio of coffee to food income - this is summarised in table 8.10.

Table 8.10 Market Access and Ratios of Coffee to Food Incomes

Variable	Estimated Coefficient	t-ratio	95%C.I.	R2
Access92	1.56	2.03*	-0.07:3.19	0.2034
Access93	2.79	4.29**	1.14:4.17	0.5391

Dependent variable is the ratio of coffee incomes to food incomes in the two years concerned. Market access is proxied by an index based on the time taken to reach the provincial capital averaged over the wet and dry seasons (see chapter 3). ** Denotes significance at 95%, * 90%

As market access decreases, the ratio of coffee to food incomes increases; as it becomes more costly to transport produce, the value/weight ratio becomes more critical, bulky produce becomes uneconomic and dependency on coffee as a source of income increases. This then interacts with the limited access that women have to coffee income; as alternative income sources become uneconomic in remoter areas, women's incomes are increasingly bound to decline relative to those who can market fruit and vegetables to the urban area with relative ease.

However, even for those women close to town, access to (coffee) income remains limited and despite their clear resistance to this male economic domination⁶, men still have the upper hand because of their control of basic productive resources. Men continue to have greater influence than women on determining the mix between coffee and food production. While women do ensure that food production levels remain higher than would otherwise be the case; this may improve food security on one hand but is at the cost of reduced household incomes on the other. Greater access for women to coffee returns would probably change this; it is however questionable how this impact would affect the general welfare of households.

8.5 Welfare Impact I: Food Security and Nutrition

It is commonly asserted that the introduction of cash cropping into a subsistence-based economy has detrimental effects upon food security and nutrition. This is explained by four main reasons: (1) that cash crops will reduce food crop areas; (2) cash incomes will not improve family welfare as it will be used on goods yielding overall disutility such as alcohol in male dominated societies such as Papua New Guinea; (3) cash incomes will be consumed rather than invested and therefore continued improvements in production and standards of living are not assured; (4) it will create a dependence on income which falls in value in real terms and whose variation is considerable. Is this assertion and its underlying reasons applicable to Papua New Guinea?

The 1983 national nutrition survey found a very strong positive correlation between nutrition levels and cash crop income (NSO, 1983). Further research by the PNG Institute of Medical Research confirmed these findings showing that when coffee had been recently introduced into areas of considerable nutritional stress, health and nutrition levels have improved significantly (Jenkins per comm., in Shaw, 1991: 8). Similar results were found by Shack et al (1990). There is a general conclusion among nutrition researchers, in Papua New Guinea, that cash cropping can be associated with improvements in nutritional status. This contradicts the common assertions of a negative relationship elsewhere.

Several researchers have asserted the notion of this negative relationship:

"most anthropological studies have shown that as local groups move away from subsistence agriculture towards cash crop production and reliance on purchased food, malnutrition increases." (Messer, 1984: 233)

Pelto and Pelto warn of:

"declines in total caloric consumption (per capita) and in dietary diversity as traditional subsistence systems have been severely disrupted by forces of modernisation." (1983: 529)

More generally Jerome et al state:

"the transition to a fully cash economy and the shift from subsistence crops to cash crops appears to be bringing about even more serious nutritional problems." (1980: 32)

There is no evidence to substantiate any of these claims in Papua New Guinea. Three factors which could account for the positive relationship that seems to be present in PNG, have been put forward by Heywood and Hide (1992):-

(1) Nutritional status prior to the introduction of cash crops appears to have been vulnerable. A major body of literature shows growth retardation, high infant mortality, late menarche, low adult stature, and low intakes of energy and protein to be widely shared characteristics, particularly in the Highlands and highland fringe zones. This 'low' starting point created the opportunity for subsequent beneficial change.

(2) Subsistence systems were not, and have largely not, been destroyed. Smallholders have continued to grow a substantial proportion of their staple and supplementary foods. Figures from this study indicate that households retain a large proportion of the value of total food production for home consumption (see chapter 5) and that this represents the majority of their food supply. Because of this, and that most families have adequate access to land, food security remains high with sizeable surpluses being sold to urban areas. Because of the diverse and dynamic nature of village farming systems there is little danger of falling export prices leading to nutritional stress. According to the 1983 national nutritional survey

(nutritional) stress was greatest in remoter communities, with little or no market access, poor soils and occasionally an unusually high population to land ratio. Where these combined with poor resources, often in areas of endemic malaria, nutritional stress intensified. Cash incomes appear to bring considerable nutritional relief, but 12 per cent of the population still live in very remote communities where food production systems are under considerable strain (UNDP/DPI 1983).

(3) The incomes derived from cash cropping have largely been 'money in the pocket' without major deductions in the form of taxes and rents. Relatively high expenditures on such foods as rice, tinned fish and meat, while partly substituting for some non-cereal staples, have added significantly to Highlanders' intake of dietary protein. Figures presented in chapter 7 also indicated that coffee smallholders received a high proportion of the final export price.

Despite some observers' misgivings about the impact of coffee from various different locations, and scales, it has been clearly shown that the diversion of village labour, during the coffee flush period, does not necessarily result in food shortages, nor have any significant impact upon the variation in the subsistence food supply (Bourke, 1988). Bourke's 1988 model of sweet potato supply found that total supply was the product of planting rate and yield levels. The major yield influence was climatic, in particular, extremes of soil moisture. Extended periods of high rainfall during tuber initiation were found to depress yields and that drought during the rapid tuber bulking phase further depressed yield, if the drought was preceded by an extended wet period (1988: 236). He also found there was generally sufficient flexibility in the system, particularly in the management of pigs, to allow buffering of considerable variation in the food supply. This study

found that everybody who was asked said they had been affected by a food (subsistence) supply shortage at some time in the past. All those questioned replied they had been able to cope with either their own resources⁷ or by drawing on the resources of (mainly) urban wantoks who were in formal paid employment, or some combination of the two.

In chapter 6 the notion of conflict in the determination of food area planted was discussed; this must influence sweet potato planting rates. Many women expressed that they wanted to devote larger areas to food production than their husbands, because they could keep the cash income from food sales but only had limited access to coffee income to which their labour would otherwise be directed. This economic resistance reduced the diversion of labour to coffee harvesting and thus increased household food security though this does not appear to be women's prime motivation for the playing out of this intrahousehold conflict. It is somewhat ironic because it appears that an act of extreme economic discrimination against women actually increases food security. The fact that this would usually be sold is immaterial in this respect; food supplies will always be higher than would otherwise have been the case, providing extra buffering in the event of an adverse movement in climatic conditions⁸.

Bourke (1988) contributed two other findings which provide further support for the notion of a positive relationship between cash incomes and nutritional status. In one part of the Highlands where cash incomes were relatively high, the consumption of rice (the main alternative) varied inversely with the sweet potato supply. In another part where cash incomes were low there was a reasonably strong negative relationship between calculated food supply and the proportion of children who were malnourished. It then could be implied that cash incomes act as an effective buffer when climatic conditions reduced the available food supply;

where these did not exist, in sufficient quantity, child malnutrition increased.

This last finding by Bourke suggests that nutritional status may well vary within the household. There is some evidence that where nutrition is marginal, women's nutrition has been shown to deteriorate with parity though this is not the case with better nourished women in some of such areas. There is also a growing body of evidence showing women's nutritional status has improved, in terms of height, weight and body composition in recent years in many parts of Papua New Guinea, and especially in those areas with significant cash cropping (Heywood and Hide, 1992). There is no general trend, or substantial case evidence, for nutritional deterioration among adult women associated with cash cropping (Hide, in press). Hide points out that this does not mean that the proportion of agricultural labour carried out by women has (not) changed but does indicate that whatever the direction of that change its effects on growth and nutritional status, to date, have been largely positive.

This does not mean that, in those areas suffering from nutritional stress this is not caused by absenteeism, the lure of cash and the business ethos, subsistence 'malaise', or lack of acceptable economic opportunity in the home area. These will affect new food garden preparation but as Allen et al. (1978) found, it was more to do with the general disinterest of men in subsistence gardening⁹.

Despite what appears to be a positive relationship between cash cropping and nutritional status, and its neutrality with regard to food security, Hide et al. urge considerable caution:

"in the absence of good data ... (it) must be assumed PNG agriculture systems have been able to meet the increasing demands placed on them by population increase and economic development. It is likely, however, that during the last 100 years the introduction of new crops and the expansion of agriculture onto land formerly unable to be used imparted advantages which are now reaching their limits. Further rapid population growth, increasing law and order difficulties and a decline in health services may see agricultural production margins being reached sooner rather than later, with accompanying declines in food supply adequacy and increases in the magnitude of the variation in supply." (1992: 176)

Food security may appear to be high, partly the result of economic resistance by women, but this does not necessarily imply that the status quo will remain.

8.6 Welfare Impact II: Intrahousehold Variations in Economic Returns

This section is a brief prelude to the next section on intrahousehold income acquisition and expenditure, or how income is distributed once it enters the household. Its purpose is to show the principle cause of the uneven distribution of incomes between genders in the household. It lies in uneven labour returns specifically in coffee. Tables 8.11 and 8.12 summarise the information on labour returns in food and coffee production from this study.

Table 8.11 Labour Returns in Food Production

	1992	1993
Return/Hour		
< 0.3	11	4
0.3 - 0.39	2	7
0.4 - 0.49	3	4
> 0.5	2	3
Average	0.37	0.39

Table 8.12 Labour Returns in Coffee Production

Return/Hour	1992			1993		
	Total	Male	Female	Total	Male	Female
<0.3	4	4	11	1	2	12
0.3 - 0.39	5	1	1	3	0	1
0.4 - 0.49	5	1	3	6	1	0
> 0.5	4	12	3	8	15	5
Average	0.41	0.64	0.27	0.65	1.09	0.35

All figures in tables 8.11 and 8.12 relate to number of households falling in particular return classes. It is not possible to differentiate labour returns by gender in food production as data on home food consumption was not collected. Average figures are hourly returns across the 18 households. All figures relate to Kina returns per hour.

Generally returns to labour in food production are lower than in coffee production¹⁰ with this gap increasing considerably in 1993 as coffee prices increased. If it had been possible to calculate food returns by gender, it is highly likely that female returns would be considerably lower than those for men, as data presented in chapter 6, shows that women do most of the work in food production.

Gender returns in coffee production are very uneven - the average figures showing that women receive about a third of that of their male counterparts. This became more extreme as coffee prices increased, suggesting that men held onto most of the price increases with only small benefits being passed onto women. Women predominate in the lower return classes with the reverse being the case for men. However, these figures tell us only who directly acquired the income and not necessarily who consumed it which is the topic of the next section.

8.7 Claims on Incomes, Expenditure and Intrahousehold Transfers

This section is concerned with the extent to which women keep control of the income they obtain. First, it is useful to recap on the figures relating to total intrahousehold income acquisition. Table 8.13 presents information on the proportions of total household incomes acquired by women.

Table 8.13 Proportions of Incomes Acquired by Women

Percentage	1992	1993
< 30 %	6	10
30 - 49 %	3	3
50 - 69 %	8	3
> 70 %	1	2
Average	32%	23%

All figures relate to number of households falling into particular classes. Average relates to proportion of total household incomes directly obtained by women.

It is clear that the proportions of total household income acquired by women fell as coffee prices increased with the number of households where women acquired less than 50 per cent of household income increased from 9 to 13. Household

incomes increased considerably in 1993, improving many women's incomes, but by nowhere near as much as their male counterparts. What is of greater concern is what happens to incomes once they are absorbed into the household and what claims on different sources of income individuals have.

Title to land is held by men, and at a higher level by patrilineal clans, but it is common that the planting and tending of crops establishes firm claim to any final produce (Hide, in press). Coffee poses particular problems in these ownership claims because of the differing opinions about the relative significance of land, planting and annual labour inputs (Hide, op cit). In food production this seems rather straightforward as women can claim the major responsibility for both planting and harvesting¹¹. One observer commenting on Pangia (Southern Highlands) stated "women see it as their right to harvest and market their crops and to keep the money if they have planted what they sell" (Strathern, 1984: 79). Dispute remains possible where men require their wives to sell for them, the male crop of sugarcane, with women objecting to turning over all the proceeds, claiming a share in return for carrying the heavy cane to market (Hide, in press)

According to Warry (1987) men did not question women's rights to sell produce and retain profits as long as there was sufficient food for home consumption and for group exchanges. While women used some of the cash for their own purposes, they also shared the proceeds with their husbands and spent the money on household items. In the Daulo area of Eastern Highlands, although food sales income was seen as women's money, half of all women said they regularly shared their earnings with their husbands (Sexton, 1988: 66). In the Benabena in the mid-1980s men did not try to claim this source of incomes from their wives which they generally regarded as insignificant; most women interviewed said they owned and controlled this money, some of which

they saved and some they spent on food (Dickerson-Putnam, 1988: 213-5). Women's rights to retain food sales (market) income is widely recognised. However it has been argued that such incomes tend to be small and women mostly spend it on family support (Kuman, 1987: 91).

Figures presented earlier in this chapter support the fact that women are highly dependent on food as a source of income and that it is relatively small compared to coffee incomes and other areas of economic endeavours, from which they generally seem to be excluded¹². It has been shown in what proportions men and women acquire incomes and these generally tally with the literature outlined above.

Similar gender patterns can be observed in overall expenditure levels. As incomes increased between 1992 and 1993 it could be expected that there would be corresponding increases in expenditure and this was generally the case¹³. It should also be noted that many households have some income which is not accounted for by expenditure (a small black hole!) which therefore reduces the ability of the data to show what the intrahousehold welfare implications of increased incomes may be.

Generally speaking, women spend (directly) much less money than men. The amounts they spent did increase in 1993 but only by small amounts, compared to total household income increases. This is probably related to the fact that most income increases came from coffee or other business enterprises which are male controlled. Table 8.14 summarises these expenditure changes.

Table 8.14 Proportion of Direct Expenditures by Women

Percentage	1992	1993
< 25%	8	13
25 - 49%	7	4
40 - 74%	3	1
> 75%		
Average	29%	21%

All figures relate to proportion of total expenditures made by women within the household with their distribution split into the above classes. Figures relating to individual households are contained in appendix 7.

As household incomes increased, expenditure by women fell in relative terms, by nearly 28 per cent across the 18 households. This suggests that these households are certainly not the 'income pooling units' suggested by areas of neoclassical economics. The main source of household income increase (across the sample) was coffee; only male expenditures increased significantly in 1993¹⁴. These figures only suggest that expenditure is male-controlled and this does not necessarily imply that welfare increases associated with coffee price increases are also male biased. To assess this it is necessary to look at individual expenditure categories and the principle uses of the two main sources of income.

Table 8.15 Principle uses of Food Income

Category	Men	Women	Total	%
Household Requirements	34	37	71	82
School Fees	0	6	6	7
Saving	3	5	8	9
Other Investment	0	0	0	0
Pleasure (Drugs etc.)	2	0	2	2
Gifts	0	0	0	0
Total	39	48	87	100

Table 8.16 Principle Uses of Coffee Income

Category	Men	Women	Total	%
Household Requirement	34	34	68	37
School Fees	9	18	27	15
Saving	15	18	33	18
Other Investment	7	8	15	8
Pleasure (Drugs etc.)	12	8	20	11
Gifts	14	5	19	10
Total	91	91	182	100

All figures in tables 8.15 and 8.16 relate to number of positive responses under each use category. The actual questions are contained in appendix 3 and details of the methodology used are discussed in chapter 4.

The most important point of contrast in these two tables is the proportion of responses accounted for by basic household requirements¹⁵. For food income this was over 80 per cent, but coffee income accounted for only 30 per cent. There are two possible explanations of this: (1) food incomes are smaller and therefore get swallowed up by everyday requirements immediately¹⁶; (2) food incomes are generally obtained by women and are therefore used in far higher proportions for general household requirements. Coffee income is predominantly male controlled, involves larger amounts of money, and tends to be spent far more on men's requirements and pleasures; it is also very seasonal. The responses are generally consistent across gender lines. Earlier fieldwork, across all main coffee producing provinces, revealed that 20 per cent of all male household heads interviewed admitted they kept all coffee income for their own requirements and it was not pooled or shared within the household¹⁷ (Overfield, 1991: 13).

Coffee income is generally used for a far wider range of purposes than food, though the single most important is still household requirements. Various forms of investment were mentioned as end uses as well as pleasure items. To address the question of gendered preferences it is necessary to look at what was actually spent over the two years of the study, how this generated preference orderings for expenditure categories and the observed gender divisions.

The general rank ordering in expenditure in terms of proportions spent in 1992 was food and drink, pleasure, inputs (chemical and labour), savings/other, cultural and family obligations, clothing, and finally school fees. Women spent around 50 per cent in the first category, but generally their proportions were insignificant in virtually all the others except clothing (see appendix 7 for household breakdown). In 1993 when household incomes rose

all expenditure categories increased, the most notable being cultural obligations, pleasure (mainly due to increased male beer consumption) and saving/other (including investment).

There was some trade off between investment and consumption uses of increased household income; both were male controlled and generated predominantly male orientated utility¹⁸. Other studies support this notion of increased male orientated consumption with increasing coffee prices, particularly in beer consumption¹⁹. The conclusion is obvious; income increases associated with coffee prices led to increased welfare for men, bypassing women unless they had unusual control over the family coffee enterprise (as in household number 13). Where incomes are not pooled (or incompletely) what happens to intrahousehold welfare depends on where income increases (or decreases) come from, the nature of their production, and whom has control. This does not entirely explain the distribution of intrahousehold welfare; it is also dependent upon intrahousehold transfers of income.

The last part of this section will briefly examine intrahousehold income transfers across gender; do men claim some of the much smaller earnings of their wives or is there some transfer in the opposite direction? Table 8.17 attempts to summarise the information on this.

Table 8.17 Intrahousehold Income Transfers

Percentage (1)	1992		1993	
	Women	Men	Women	Men
> -50%	3	5	2	4
50 - 0%	2	3	2	4
0 - 50%	7	9	10	10
> 50%	6	1	4	0
Average	38%	-1%	37%	10%

Percentage figures relate to percentages of gender-derived income which is not accounted for by expenditure (by gender) within the household. Other figures are the number of households falling within these particular classes. For example the 1992 average figure for women indicates that 38 per cent of female derived income is not explained by their expenditure and that this is either unexplained or is transferred within the household to men.

What is apparent from table 8.17 is that most women do not appear to be spending all the income they derive (in 13/14 households) directly. In 1992, there was a strong hint that much of this was passing to men in eight households. The level of transfer appeared to drop considerably in 1993 with men also showing an income/expenditure surplus, but this was still much lower than for women. This could have been the result of increased coffee incomes reducing interest in acquiring income from their wives - though this still appeared to occur in the same number of households, but to a lesser extent.

However this interpretation of the patterns is a little dubious due to the data 'black holes'; or the levels of household income that are not accounted for by expenditure. These exist in all households to some extent and are directly related to the number of missed observations on expenditure. Collecting completely reliable data, even whilst using detailed household monitoring, in this area is very difficult due to the large number of events and players involved. Expenditure occurs in a large number of

locations, involves several members of each household, making it rather difficult for the village-based data recorders to collect and collate all the relevant information. This bias applies equally to all household members; it does not exhibit significant gender bias and does not therefore resolve why more female income is 'unexplained' by their expenditure. It may be that there is still a significant amount of intrahousehold income transfer from women to men, particularly when coffee incomes are relatively low due to depressed prices.

If intrahousehold transfers from women to men fell due to increased male incomes this does not necessarily imply that the position of women improved. Their incomes increased, less was taken from them and their expenditures increased; in absolute income terms their position improved in general. However in relative terms they became considerably worse off; their proportions of income and expenditure fell considerably. Improvements in the rural economy bypassed women partly due to their limited access to, and ownership of, productive assets.

8.8 Welfare Impact IV: Labour Allocation and Welfare

Previous sections have shown women to be receiving lower incomes, spending less money and receiving lower economic returns for their labour than men. Chapter 6 presented information on labour allocation patterns and how these varied by gender. At this point it is useful to briefly re-examine this data in terms of leisure as a sole welfare goal.

Table 6.10 provided information on household labour constraints. While labour allocation overall would suggest that less than 4.5 hours per day are worked for each labour unit over the 18 households the position is rather different when differentiated by gender. Men work around

2.5 hours per day (per male worker unit) with a range of 0.6-7.2 hours, whereas women work around 8 hours per day, with a range of 3.1-12.5 hours. On average men have a far greater amount of leisure time than women but with female work hours averaging 8 (including all household reproductive activities) considerable leisure time would appear to exist. There were 5 households where women worked in excess of 10 hours per day (averaged over 7 days) which did not provide much time for leisure activities. For nearly a third of the households under examination the demands of household reproduction and the cash economy preclude welfare derivation through leisure for women. In no household does this exist for men. In terms of hours worked and leisure time available women again lose out to men in Highlands society.

8.9 Economic Sustainability and the Household Trade-Off Between Investment and Consumption

It is commonly asserted that the income from cash crops does not improve family welfare in either the short- or long-term. In the short-term this is because the cash income is mainly spent on alcohol (or other goods yielding overall disutility) leading to the problems associated with binge drinking, including high levels of domestic violence and lower levels of labour productivity. In the longer-term welfare improvements are not sustainable because it is asserted that the income derived from cash crops is consumed rather than invested; continued improvements in production and living standards are therefore not assured.

The points relating to alcohol (and other goods yielding disutility) are relatively obvious; bingeing sessions and the immediate effects are easy to observe. Alcohol consumption, in particular, rises during times of high coffee prices, and during times of peak income flows but other areas of expenditure receive a higher priority. This

has been the finding of several previously mentioned studies and this one; with the category that actually contains alcohol (and accounts for most of it in the majority of households) coming after two others (out of seven). Even with large increases in household incomes in 1993, alcohol consumption remained the third most important area of expenditure (see appendix 7) unchanged in the general priority orderings from 1992.²⁰

Investment requires a broader definition than the norm in peasant (and perhaps other) society. It can be argued that it takes three forms: (1) traditional type I, not requiring cash and includes items like housebuilding, replanting and new planting; (2) traditional type II, requiring cash, including gifts of money (for wantok's school fees for example) which not only create favours which must be paid back in some form but also amount to investing in non-market reciprocal exchange relations (social relations of production), promoting a sense of community and ensuring that the bonds which tie such institutions remain intact; (3) market orientated investment including the purchase of agricultural equipment (to provide future cash flows). This last category appears to receive a lower priority than traditional forms of investment²¹. Considerable amounts of time and money are invested rather than consumed, though not necessarily in strict market terms. Much is directed towards maintenance of social relations, perhaps as a form of economic resistance.

The way in which much income is invested in reciprocal community exchange relations provides the greatest basis for the long-term sustainability of Highlands, agriculture-based, livelihood systems. Investment in more market-orientated items is also significant but probably does less to ensure long-term survival and well-being. The introduction of cash may have led to an inflationary process in the creation and unwinding of social obligations

(see chapters 2 and 5). There is a considerable basis for the sustainability of the current system in terms of sufficient investment. Two problems remain, the first being the very low status afforded to women in Highlands society and the second high rates of population growth, which exist in most Highlands provinces; they are closely related. Will competition for resources reach the point that traditional community relations break down in the scramble?

8.10 Conclusion

Most households obtain the majority of their income from two sources only - coffee and food sales. Economic 'transformation' has been rather limited in this respect; the structure of the Highlands economy has changed little since the widespread establishment of coffee in the 1960s. Social relations within communities have largely remained intact and many of the concerns surrounding the introduction of cash cropping have not manifested themselves in the Highlands particularly in relation to food security and nutrition. Cash cropping has brought positive improvements to the quality of life in the Highlands.

Intrahousehold variations in welfare remain; men acquire most of the household income and also spend, and consume, the largest proportion. This relative gender inequality intensified as coffee incomes increased in 1993. Within this semi-capitalist production system the household has become the primary site of exploitation; men extract high levels of surplus value from women within the household. Because smallholders have much lower production costs than plantations their probability of economic survival is much greater, thus this relocation (from enterprises to households) of the primary site of exploitation seems set to continue. Women have largely been bypassed by improvements in the rural economy because of their lower

rates of access to productive assets; this provides the basis of their exploitation within the household.

Notes

1. For more detail see appendix 5 where breakdowns by household are available.

2. These include animal sales. Business income and wage employment are the main alternate sources but are absent from many households. See appendix 5 for more details.

3. Only the welfare directly associated with higher income.

4. The bivariate linear regressions between incomes per capita (dependent variable) and household dependency ratio (independent variable) produced the following equations:

$$(1992) \quad y = 566 - 107x \quad R^2 = 0.1800 \\ (372) \quad (57)^*$$

$$(1993) \quad y = 823 - 144 \quad R^2 = 0.1217 \\ (628) \quad (97)$$

* denotes significance at 90%

The estimated relationships are rather weak and do not really provide any further support for the Chayanovian model.

5. It is not possible to calculate returns to food production for cash because they are fully integrated with subsistence production. In this study over 80 per cent was retained for home consumption and cannot be regarded as a total alternate competing cash source.

6. Manifested by growing extra crops for sale rather than contributing to coffee production; see section 6.8.

7. Mainly through changes in pig management, selling some (or all) of their animals where incomes were low; where incomes were higher households also drew on cash savings.

8. As overall planting rates are higher and according to Bourke's model (and common sense). Though for different reasons cash cropping in Guatemala also had a positive nutritional impact (see Katz, 1992).

9. They found that men were reluctant to clear new gardens although yields from old and overworked gardens were extremely low. Men were however prepared to work for cash.

10. Although there is a problem with underestimation of subsistence production; this reduces the gap by more than it would otherwise be i.e. food returns should be lower.

11. Remembering that this is women's main source of income and conflict over resource allocation.

12. Because of already considerable reproductive burdens and ownership rights and associated access.

13. By around 52 per cent compared to an income increase of around 60 per cent on average.

14. Men had a 62 per cent increase, women only 18 per cent on a much lower base figure.

15. Reproductive; bought food supplies mainly and clothing.

16. They are also generally available right throughout the year.

17. The proportion was greatest in the Western Highlands and may generally be an understatement of the true figure.

18. Mainly in the consumption of beer and associated socialising.

19. See Grossman (1984) for a very good example of this.

20. Despite this being the result of coffee price increases which were therefore male controlled.

21. Accounting for only 11 per cent of investment in 1993 compared to 89 % for traditional forms of investment across the 18 households. See appendix 7 for details by household.

Part III

Theoretical Implications and Conclusion

Chapter 9

Historical Influences, Competing Paradigms and the Development Impasse

9.1 Introduction

This chapter will place the general results presented in part II within the context of competing paradigms and develop their theoretical implications. The main hypothesis of this thesis is concerned with the intrahousehold distribution of economic benefits, the patterns of resource allocation these generate and the market failure that results. This process of events creates a vicious gendered circle of underdevelopment which underlies the development impasse in Papua New Guinea.

It is impossible to obtain a meaningful analysis of any critical relationships in this area without considering historical household influences. The chapter will therefore first consider the recent history of the Highlands with regard to the pre-existing social order, the impact of colonialism and introduced economic activities. It will then move on to consider how the results fit three competing paradigms; it will conclude with the construction of a model linking the intrahousehold distribution of economic benefits, determinants of household resource allocation and underdevelopment.

9.2 Historical Influences

9.2.1 Women and the Pre-Existing Social Order

This thesis is very much concerned with the source of power inequities between women and men in Highland's households. As noted in earlier chapters the first Europeans to encounter Highlands society noted the high degree of differentiation among men in their access to resources

(Strathern, 1971). Women were generally highly subordinated with only secondary access rights to land through their fathers or husbands; they had no direct access in their own right. This facet of social relations in Highlands society has carried through to the current time and is central to women's much weaker bargaining position within the household.

Integration into global capitalism came in the form of coffee production for the Highlands. It has been argued by Barnes (1981) that its production is facilitated by surviving pre-capitalist social relations of production most notably the institution of the big-man and the subordination of women. Big-men were able to mobilise the labour of wives and kinsmen and had some control of land allocation within a clan (Sahlins, 1963; Strathern, 1971). It also meant they were well placed to take advantage of any state resources directed towards the indigenous production of cash crops.

Within the Highlands, men generally own the land and which is in turn associated with the clan. This idea is expressed through the notion of the clan land 'father' or guardian. Individual ownership is most marked in areas of intensive agriculture such as this area of Eastern Highlands. Land can be used to gain prominence in the clan and to assist in economic endeavour:

"A man can gain prominence by granting land to men (clansmen, kinsmen, affines and non-relatives) who are thereby obliged to help him in his enterprises, from housebuilding to payments of pigs and valuables." (Brookfield and Brown, 1963: 121)

In some parts of the Highlands women did have rights to land in the area in which they were born, but the practice of women marrying into other clans/sub-clans prevented their rights from being expressed very often (Barnes, 1981). It appears that female children were often treated as temporary residents at home and married women had no

rights to land ownership in the clans to which they moved into after marriage. The notion of secondary use rights was first proposed by Newman:

"A women has rights of usufruct over land, dwellings or patches of forest containing usable plants that are contingent upon her marriage or family affiliation, but she has no rights of alienation over these things, for that rests with men, either individually or in groups." (1965: 41)

Highlands customary land tenure was, and remains, predominantly patrilineal; women's access to land is accomplished through activating use rights to her husbands land. Thus, for example, coffee is seen as planted by, and belonging to men (Hide, in press: 29) and women are considered to hold only secondary use rights (Strathern, 1969, 1982; Sexton, 1986; Nihill, 1991).

Control over labour also rested unequally in the hands of men. A big-man was distinguished by his ability to control the labour of other men and women. In food production men and women may co-operate as found in the Henganofi area (Fairthorn, 1976: 88) but it has often been found that they were often working under the direction of their husbands as in the Mt. Hagen area:

"Men grumble when their co-wives quarrel over the allocation of plots; why should they fight? It is men who clear the gardens and men who decide where the divisions ought to be, women should just plant and harvest the food." (Strathern, 1982: 132)

Ordinary men could call on clansmen/household members for making new gardens or housebuilding. Larger projects were controlled by big-men.

Women were 'mobilised' rather than 'mobilisers'. Co-operation between women was at a low level (Barnes, 1981). However, small groups of women might share tasks such as planting new gardens or cooking as noted in one area of Eastern Highlands:

"In theory each women individually cooks food and brings it to her husband, in practice the women combine in small groups to share the work and make provision for the times when one of the group is sick or visiting." (Salisbury, 1962: 55)

The ownership of tools tended to be individual and reflected the social division of labour: men owned axes, spears, bows and knives, larger digging sticks and paddles; women owned smaller digging sticks, needles, cooking utensils and net bags. This situation has become a little more complex as the range of economic activities has increased and the range as assets required has increased (such as coffee pulpers).

This sub-section has generally been concerned with pre-capitalist social relations of production. It has been shown throughout this thesis that women are in a much weaker bargaining position than men within the household and that this manifests itself in their longer working hours and limited access to the economic returns from their labours. One of the major reasons underpinning this phenomenon is the traditional system of patrilineal customary land tenure; it is this that sets the terms under which conjugal contracts are negotiated. Women, in return for access to land (and male protection), must provide enough food for household requirements, provide labour (often unpaid) on 'male' coffee plantings, and complete a large range of household tasks. It is perhaps the access to the most basic productive asset, land, which is crucial in determining the position of women, a factor that has been noted in many other studies, particularly in Africa. This factor is endemic to Highlands society but this does not tell the whole story; society has changed under the forces of colonialism and capitalism to which the next subsection will turn. It is important to note that access to land only sets the general terms under which conjugal contracts are drawn; the 'contract' and what happens in daily life are subject to the influence of many other factors.

9.2.2 The Impact of Colonialism and Capitalism

A major aim of the colonial power in the post second world war period was to pacify the Highlands and bring economic development. By the early 1960s, the Australian administration has been highly successful in its quest to pacify the Highlands; this principally took the form of the cessation of inter-tribal warfare and brought with it a large increase of the mobility of peoples and resources - a pre-requisite for any capitalist economic development. Pacification removed one of the major male roles within society, that of protecting the clan, and one of the major sources of male status. Given the terms surrounding the conjugal contract, it could have been expected that the bargaining power of women would have improved, given that men were not now providing as much of their side of the general agreement (but about what internal protection); it should have provided a basis for renegotiation of the contract. Pacification was accompanied by newly introduced economic activities of which the principal agent of incorporation in the Highlands was coffee; therefore it could be argued that the cash which it generated replaced tribal fighting as a source of male status. As coffee was a land-based enterprise men had the means of access to the major productive asset (land) required for its successful cultivation and still had the relative power to mobilise labour on their plantings. There was no renegotiation of the conjugal contract; things were actually to become worse for most women.

It was noted by Strathern (1971) that there was an inflationary tendency in exchange ceremonies as big-men competed with each other to show themselves to be the most successful. With the introduction of cash into Highlands society this process intensified - or, as Standish (1981) expressed it, the scale of economic competition between men increased markedly. The level of payments for such things as compensation are now several times higher in real terms

than they were in the 1950s (a payment of around \$ 20,000 is not uncommon for death - a few pigs would probably have sufficed 40 years ago). What is particularly important for this study is the implication of the inflationary tendencies in bride price payments upon gender relations. The very name applied to the payment is indicative of the problems that now surround the capitalised system. In pre-contact times it was referred to as bridewealth, or an expression of the reproductive value of women for which respect and compensation were due. Imposing market exchange, inevitable with the introduction of cash, onto this process changes it from a societal expression of the value of women into a simple market exchange and in the process transforms women from subjects to objects to be traded at will. The amount paid in bride price varies considerably both by geographical area (payments are generally higher in the Western Highlands than Eastern Highlands) and by 'market' criteria. For example the more education a women has received the higher her 'price' and 'value'.

The impact of colonialism cannot be separated from that of the imposition of capitalism as in effect they were the same process. Capitalism brings with it the promotion of the individual over any other grouping. Coffee was pushed by agents of the state (extension officers) as 'male' and 'modern' which had to lead to a ideological devaluation of subsistence production - women's main work and therefore, it could be argued, a further reduction in their bargaining power. It can also be argued that this ideology has led to increased individualism in land tenure patterns, but this may just be a function of the fact that land tends to be cultivated far more permanently than it ever was (coffee being a perennial) and this would have happened in any case (Brown and Brookfield, 1990) as a result of population growth (following the introduction of the sweet potato) and hence increasing competition for land resources. It would

however seem likely that coffee, partly because of its land-hungry nature, and partly because it is another land-based competing activity, must have intensified this competition. It would appear that ownership has become more individualistic (less clan) but this change has not allowed women to access land; it still remains predominantly patrilineal.

9.2.3 History and Women's Access to Productive Resources

This section has provided a historical background to women's weaker intrahousehold bargaining position. That women are in a weaker position is evident, but an understanding of the processes that throw up these power inequities between women and men is crucial. People do not move costlessly between one static equilibrium and another as neoclassical economic theory would have us believe but rather move through a process which has positive real costs - both economic and social. The key factor which appears to determine peoples relative bargaining power within households is their access to resources. Women clearly have much lower access to productive resources than men with an associated weaker position, which is the result of two sets of factors. Firstly, there is the highly patriarchal tradition (endogenous) of the society which severely restricts their access to the most basic of productive assets - land. Secondly, introduced market exchange relations have devalued their 'worth' in society but women have not been able to access the considerable economic benefits. The reason women could not access the benefits is that they do not have sufficient access to the necessary productive inputs or control over their own labour time. Patriarchy and capitalism together have 'conspired' to create a very uneven distribution of burdens and benefits.

Consideration of these processes is crucial to any model construction concerning resource allocation, welfare distribution and the process of development. Access to

resources is key in any 'effective' and meaningful economic modelling which implies that models must take into account some notion of power. This chapter will now turn to the three competing theoretical frameworks to see how they measure up to this modelling requirement starting with the dominant paradigm of neoclassical economics in its various guises.

9.3 The Dominant Paradigm: Does it Measure Up?

9.3.1 The General Picture of Neoclassical Economics

Neoclassical economics has dominated the debates on development and growth policy since the turn of the century taking the reigns from earlier schools of political economy first mooted in Adam Smith's *The Wealth of Nations*. In Smith's *Inquiry* he proposed the human model of narrow self-interest guiding individual's behaviour generally, and in particular within the economic sphere. This element of human behaviour was not of concern to Smith because the 'invisible hand' guided the narrow self-interest of individuals to produce wealth for the nation as a whole; capitalists aimed to maximise their personal profits and so in the process create jobs and wealth for the nation as a whole. This was a fairly uncritical analysis of capitalism, developed when the industrial revolution was gaining momentum in Britain and meshed rather well with what were becoming the interests of the dominant class (capitalists rather than landowners). The central behavioural trait of narrow self-interest became an axiom of economic thinking (with wider ideological ramifications for society in general) and was carried into the neoclassical paradigm of economics at the turn of this century and continues today in all neoclassical theories including those pertaining to agricultural households.

The major change that neoclassical economic theory brought was a major shift of emphasis to discussion of resource allocation decisions at the margin. This was closely related to developments in mathematics (principally the development of calculus) which allowed ideas and equilibrium points to be expressed in terms of mathematical formulae. Economics then became, and continues to be, a discipline which expresses its ideas in mathematically elegant forms with the basic assumption of self-interest. This fundamental assumption manifests itself within theories in number of ways; competition over co-operation, no interpersonal comparisons of utility (cannot assess/interpret other individuals benefits) and maximisation of monetary income as the principle objective of economic actors. Theoretical developments of the 1960s and 70s added the notion of rational expectations, or the assumption of perfect knowledge (which is acquired costlessly!), and rational behaviour based upon this. In summary, mainstream neoclassical economics is based upon perfect and costless information and the rational pursuit of narrowly defined self-interest; generally the maximisation of monetary income. It is these principles that drive agricultural household theory rather than notions of power inequalities (and the processes which produce them) which are of prime importance in PNG.

The preceding paragraphs are a simplification of this paradigm but nonetheless highlight the most important assumptions. Agricultural household models within this paradigm range from that of Chayanov and drudgery aversion (or the disutility associated with work) to the contributions of Becker and closely associated models, to the bargaining models (based on game theory) that started appearing in the early 1980s. Models that look at intrahousehold allocation of resources have also appeared within the paradigm. All the major theoretical contributions will be briefly discussed in this section and

assessed for their ability to explain the patterns and processes identified in part II of this thesis. New theoretical developments from the United States in modelling human behaviour will also be considered which question the notion of rationality as defined by neoclassical economics; these may provide an alternative basis for more realistic economic 'modelling'.

9.3.2 A.V. Chayanov and the Theory of Drudgery Aversion
Chayanov (1966) developed his theory during the 1920s based on research in early post-revolution Russia but this was not translated into English until the mid 1960s, producing a considerable amount of interest in the predictions it generated concerning its application to the allocation of household resources in developing countries. His work had three main aspects: (1) long-run relationships between peasant and capitalist modes of production; (2) explaining economic differentiation between households; (3) analysis of household resource allocation. All three were explained on the basis of the demographic life cycle of the household; his model of resource use is based on the concept of drudgery aversion. It was examined in detail in section 6.5.

Statistical support was found for some aspects of this model. A positive correlation was established between food areas planted and household size (but not for coffee); support was also found for a positive relationship between inputs/worker and consumer/worker (dependency) ratio though this was much weaker (see section 6.5). The latter relationship's significance could only just be established in food and coffee, though the relationship was much stronger in the area of household chores. The notion that average income per person varies inversely with the consumer/worker ratio could not be established; this tended to be a function of the presence, or non-presence, of a non-agricultural business enterprise or formal paid

employment. His hypothesis concerning a negative relationship between the marginal product of labour and the consumer/worker ratio could not be established because the marginal product of labour could not be calculated in any meaningful way from the data collected from this study.

Though support has been found for some of the static predictions of Chayanov's theory these may be construed in more than one way as the contradictory interpretations from India and Africa show (see section 6.5). Given relatively flexible access to land, the lack of any formal class system, the predominance of subsistence food production and the limited labour market it would appear that Papua New Guinea comes far closer to the African scenario. This suggests that there is some support for the notion of a life cycle variation of resource use (particularly land) in the Highlands. However, what also becomes clear that this is not the total picture which becomes apparent with the model's poor ability to explain what is happening within household coffee production. It appears that the model is of value within subsistence and reproductive elements of household strategies but breaks down, to some extent, when capitalist (cash) activities are introduced.

These findings do not invalidate the model completely. There are two main modes of production; peasant and capitalist, but they are not distinct from one another within Highlands production systems. It can only remain valid whilst the peasant mode remains dominant, as is currently the case. It cannot really deal with the duality inherent within the livelihood strategies of Highlands households. It also fails on another major point: it has no concern for intrahousehold analysis and the role of power in access to resources. This was found to be a failing of it's application in Kenya (Hunt, 1979: 82). Yet, it has some value and there does appear to be some life cycle variation in resource use, but it takes no account of power

(which is critical), and as Akram-Lodhi (1995) pointed out it cannot cope with the articulation of two modes of production which are moving relative positions slowly over time.

9.3.3 The Contribution of 'New' Home Economics

'New' home economics moves on from the work of Chayanov by assessing what happens when underlying assumptions such as the introduction of a labour market are changed. They draw on the work of Chayanov and from a branch of neoclassical theory originating from a seminal journal paper by Gary Becker (1965) on time allocation in the household, which was complemented by several related theoretical contributions in the late 1960s. These models present households as having a utility function which represents preference orderings between a range of final characteristics of home produced goods and services. The household is the production unit which converts purchased goods and services, as well as domestic resources, into a set of final use values yielding utility in consumption. In turn consumption is determined by the relative market price of any ingredients and the relative cost of its production to the household in terms of time required for its preparation (Ellis, 1988: 123). These models can be used to explore the impact of many different changes to the exogenous variables confronting the household. For example, if the market wage was to increase, this would lower the amount of home production, whilst raising the market component because the marginal cost of home time has increased, relative to the marginal cost of purchased inputs i.e. purchase more of the ingredients rather than growing them oneself. A model based on these axioms would predict that the large increase in coffee prices experienced at the end of 1992 should have produced a similar effect. Effectively, market wages increased therefore households should have grown less of their own food, produced more coffee and purchased more inputs in

1993. None of this actually happened with only very marginal changes in resource allocation rates; income effects were noted rather than serious production effects. This was probably a result of the combination of multiple and conflicting objectives, and intrahousehold economic resistance - something these models do not consider.

This approach is full of theoretical contradictions which have already been outlined in section 6.7. The traditional stance of economics comes out very clearly in this branch of neoclassical thought; but the narrowly defined assumption of selfishness contradicts with that of assumed altruism within the household - this is the main theoretical problem. However, it also has problems bounded in reality such as its inability to deal with multiple objectives and the social determinants of the intrahousehold distribution of tasks and access to resources. It is these flaws which lay behind these models' inability to predict how households would react to the changes in coffee prices; they simply could not deal with the impact of a female labour constraint or the poor access of women to the cash returns and the economic resistance this generates. In the final analysis this approach cannot pass either a theoretical consistency test or mirror what actually happens within (and therefore to) households as the exogenous circumstances they face, such as coffee prices, change. This approach's Achilles heel is its total neglect of (explanations which concern) social and power relations within the household. This is a major shortcoming given that most observed facets of gender economic relations can be explained by the social subordination of women.

9.3.4 The Next Theoretical Advance - Bargaining Models
The main theoretical weakness of new home economics relates to the construction of the unitary household welfare function. Bargaining models propose an alternative

conceptual framework for its construction, that it be considered a product of a previous decision making process which assigned particular weights to members individual preferences. The household welfare function then has its origins in a recognisable process i.e. constructed according to a set of rules. However, Katz (1991) notes a theory of power is key to the determination of the social origins of rules, which govern the formation of the household welfare function, which is rather a long distance from neoclassical economics.

Bargaining models attempt to address the theoretical weaknesses of new home economics by replacing the household utility function with a Nash (1953) bargained objective function (Horney and McElroy, 1988; Jones, 1983; Manser and Brown, 1980; McElroy and Horney, 1981). In this approach individuals only enter households when they can do better than just using their own labour, assets and income. Hence the formation of the household utility function is explicitly conflictual and is dependent upon relative fall-back positions, or "threat-points" of the individuals involved. They contend that the influence of any given individual in the so-called 'bargaining' process which formulates household decisions is determined by their access to economic resources. As economic opportunities for household members change so does their bargaining power and therefore household preferences. This resolves the major theoretical weakness of new home economics that of aggregation (in the household utility function) by making explicit a prior process giving weights to individual interests within households. It also solves the problem of exogeneity and constancy over time, by allowing shifts in individual access to economic resources to affect bargaining outcomes and thus preferences and allocational decisions of the household. All allocation decisions are negotiated between household members according to individual's preferences and relative bargaining power.

Bargaining theory has considerable advantages over new home economics but it retains a major weakness as household members are treated as *a priori* equal and it is only their access to economic resources (control over income could also be one of these) that distinguishes their relative bargaining power (Katz, 1991). Gender has a set of social meanings with a very important power component both in PNG and worldwide. Women's bargaining power within Highland households is not just determined by their lower access to economic resources (though this is an important component) but by a whole battery of factors including power, ideology, culture and recent colonial history. There is a historical process which is social as well as economic in nature.

There is a need to expand the definition of material sources of bargaining power to include not only kinship, education and lifecycle variables, but also non-material sources of bargaining power such as ideological/belief systems and political/social organisation (Katz, 1991). These latter considerations are important measures of individual power because they influence people's fall-back positions and access to economic, political and social opportunities which must affect the intrahousehold allocation process. It is also very important to note that many of these influences in societies recently integrated, such as the case in Papua New Guinea, and are part of a historical process - the transition from the peasant to capitalist mode of production and the ideological competition that this must imply. Not only is it necessary to disaggregate the household to look at intrahousehold allocation patterns and outcomes, but also to assess the intrahousehold processes which create them. These models do allow for different motivations, other than narrowly defined self-interest, which is a major advance on all previous economic models. It is a more realistic reflection

of the many facets of human behaviour which are the subject of new economic research to which the next sub-section will turn.

9.3.4 New Neoclassical Conceptions of Economic Behaviour
Neoclassical economic theory assumes that people are rational and therefore tends to ignore apparently irrational behaviour. This does not just mean the maximisation of monetary income since some models such as Chayanov's model also include the desire for more leisure. Economic rationality has two main ingredients - self interest and consistency, and agents once they have decided then what to seek work out how to get as much as they can. Economists as diverse as Smith, Keynes and Fisher have recognised this approach as unrealistic but it remains widely accepted. Thankfully some researchers have actually started to look at how people make the decisions they do instead of making these *a priori* assumptions.

The first issue worth examining is the supposed disutility associated with work - this is found within many economic theories (implicit and explicit) including that of Chayanov. When this is added to the assumptions of; (1) the purpose of all economic activity is the maximisation of monetary income and (2) all economic agents are infinitely clever, capable of foreseeing all contingencies and ramifications of what they do, and of choosing the best strategy to secure their ends. It generates predictions such as the more people are paid and the less they are taxed the harder they will work. The purpose of life is to consume, not produce. Lane (1993) argues that this is not the case and that production and work are key sources of satisfaction and utility in their own right. Work fosters personal development and provide a focus in our lives. Lane continues the argument by saying that the process of production is a profound source of satisfaction in its own right; money income contributes very little to a sense of

personal well-being. If his arguments have some validity then it calls into question some of the life-cycle variations in resource use predicted by Chayanov; it also has serious ramifications for several other areas of micro and macro economics.

Several researchers are trying to redefine rationality. Some assume that it is bounded or that people are trying to make self-interested choices but are limited by a lack of information and the cost of gathering and interpreting it. These researchers draw inspiration from the work conducted by Herbert Simon in the 1950s. Other models are based around people who are rational most of the time, but not always (Economist, 1994).

Tversky and Kahneman's "prospect theory" was based on psychological research on finance markets. It asserts that people who are making decisions in uncertain conditions weigh prospective losses twice as heavily as putative gains. These findings can easily be applied to Third World agricultural producers. People also like to feel their behaviour has been prudent and this tends to make them pay too much attention to recent data and not enough to long-term trends and statistical odds; this may well explain moods and cyclical behaviour in the world economy, and at a more micro level. But then Hirshleifer and Welsh assert that this is rational because following the crowd cuts down a lot of information costs (all reported in the Economist, 1994). These two factors also generate inertia. All of these points are worth considering inserting into agricultural household models.

Another aspect of human behaviour under examination, is the power of temptation and the difficulty of self control. Thaler (1993) examines savings behaviour and notes that most is compulsory because people are too tempted to spend, very little saving he asserts is discretionary. If people

know themselves to be highly tempted then joining compulsory schemes is highly rational. His analysis is one of internal conflicts. Issues of temptation are agency problems. Agency theory is concerned with what happens when one person (the "principle") delegates the responsibility for a task to another (the "agent"); it asks how the principle can best ensure the agent carries out the task properly. Jensen suggests that it can be applied to conflicts of interest within a single person. The "principle" could be that part of the personality concerned with long-term planning and the "agent" the part that lives for the moment (all reported in *The Economist*, 1994: 97).

These more subtle definitions of rationality are a considerable improvement and have the potential to improve both the usefulness and credibility of economics. However their breadth and complexity make them difficult to use in theorising and few of the new models generate clear testable predictions. They have yet to prove that they work, but then they can hardly be less effective than what they are potentially to replace! Another area of research is also worth considering in this section is that of evo-economics.

The Economist (1993) dubbed this area, evo-economics, as 'Biology Meets the Dismal Science'. The principle argument of this area of work is that pay-offs for economic generosity and inputs may not be economic but rather genetic. This displays a crucial difference between economics and evolutionary theory. Economists assume that consumption is an end in itself (utility); evolutionists see it as a means to successful reproduction and for them money can therefore only be an intermediate stage. This helps to explain, such things as kin selection, and why people continue to save right up to the point of death. Biology can also provide something of a basis for a theory of preferences; it can also help explain how particular

roles compete with one another. Economics and sociobiology teach that people are ruthlessly self-interested. However where the two disciplines come together a sunnier side of human nature has emerged; people may be opportunistic seekers of co-operation (Economist, 1993).

9.3.6 Of What Value is Mainstream Economics?

A wide variety of ideas from the neoclassical tradition have been presented in this section. It is difficult to see much value in models which assume that households have a unitary welfare function which is dependent upon altruism within the household, whilst assuming selfish behaviour in the market place. Household bargaining models which make explicit a conflictual process in deriving resource allocation patterns are a major step forward but stop themselves short of explaining the full picture by focusing on the access of individuals to resources as the sole determinant of their intrahousehold bargaining position. This takes no account of the social determinants of power and how these take a strongly gendered form.

Economic models take no account of the historical transformation of social relations of production and how these can adversely impact upon women. However, it will never be possible to model all of these facets in the traditional economic way. The data that has been collected for this study allows for an analysis of intrahousehold processes as well as patterns and outcomes. A meaningful analysis would require the marriage of a detailed, verbally expressed model of what determines individual bargaining positions within households to a statistically derived model of intrahousehold model of resource allocation and welfare determination based on life cycle variations, gendered bargaining positions and other exogenous factors.

9.4. Competing Paradigm I: Marxism and Competing Modes of Social Relations

Neoclassical economics, because of its antecedents, does not consider the dynamics of the transition from peasantry to capitalism and whether this produces a net gain for societies; it is only concerned with the conditions that lead to efficiency in capitalism under a regime of market relations. This is hardly surprising given that its underlying interest is in the inherent dominance of various capitalist interests. Marxists on the other hand, emphasize economic relationships as the determinants of class and associated struggles. These economic relationships are based in the ownership of production, distribution and exchange thus creating the classes of capitalists and proletarians. As mentioned in chapter 5 these 'simple' class structures are not relevant to PNG society where people recognise 'rubbish men', 'ordinary men', 'prominent men' and 'big-men' (Standish, 1978 after Brown, 1972); women are a separate and usually inferior category. The persistence of individual status has been the matter of some debate - many observers have described Melanesia as traditionally egalitarian (though highly patriarchal!), with individuals having similar life-chances with only low levels of continuity in positions of wealth and influence (but there are some levels of intravillage economic differentiation - detailed in chapters 5 and 8).

There is only a small, fragmented working class in PNG (Standish, 1981: 276). Howlett (1980) points out rural wage-earners and urban workers are peasants who move in and out of the proletariat as required by personal and regional circumstances. Given these observations about PNG society, where individuals are neither capitalists or proletarians, it is perhaps useful to consider the Marxian concept of simple commodity production in which the labouring class owns, or controls, its own means of production (Friedmann, 1980). This idea too has its problems in the PNG context.

A central theme running throughout this thesis is that women have very little control over the basic means of production. Control is governed mainly by male household heads. Women's lack of control (weak intrahousehold bargaining power) is principally the result of the underlying culture of Highlands society, but has been intensified by the process of colonialism, and introduction of market exchange relations, and their interaction with the current provision of government services such as extension (see chapter 7). There would appear to be at least two sets of influence at work here. This is very similar to the position of women in Africa:

"The situation of African women is ... complex: women's access to the means of production and exchange is constrained by their subordination in relations of production with men (patriarchs), capitalists, and the state." (Koopman, 1991: 163)

The mode of production debate raged during the 1970s and early 1980s (within the Marxist paradigm). Some theorists argued that the concept of a "primitive communist" mode of production is appropriate for analysing households whose production is primarily for subsistence (Hindless and Hirst, 1975). Others have emphasized the social, political and economic inequalities within households between senior and junior men (Terray, 1972; Rey, 1979), and between men and women (Meillassoux, 1975; Marie, 1976; Folbre, 1987; Koopman Henn, 1978 and 1988). These require that analysis goes beyond the classic Marxist repertoire of modes of production to develop alternative models such as Rey's lineage mode, Meillassoux's domestic mode or Folbre and Koopman Henn's patriarchal mode. Koopman (1991) argues that, despite the unresolved debates surrounding this approach, it is possible to move forward with an analysis that employs both the fundamental Marxist concept of social relations of production with the "neo-Marxian" concept of the articulation of different modes of production (or, less contentiously, the articulation of different forms of

social relations of production). Models of interacting sets of social relations of production can help clarify the nature of the distinct and multifaceted constraint set within which male heads of household, female heads of household, married women, and dependent men work. She goes on to argue in Africa that:

"men's and women's agricultural production takes place in the context of at least two distinct sets of social relations of production: (1) simple commodity production constrained by the dominance of state policy and capitalist market power, and (2) simple commodity production and subsistence production structured by patriarchal relations of production among household members. (1991: 164)

Mode of production theory takes economic analysis beyond its traditional disciplinary boundaries into the political, social and ideological factors that reproduce the ability of a dominant class to set the terms on which a subordinate class may gain access to certain critical means of production. Koopman has provided a very valuable theoretical framework by which to analyse both the entry to resources and the apparent "terms of access" for men and women in agricultural households. Her central findings in Cameroon are of considerable relevance to the circumstances facing producers in Papua New Guinea. Gender differences in control and access to the means of production within the patriarchal mode imply that intrahousehold struggles will take place over the terms on which women gain access. In south Cameroon this was seen in struggles over the amount of time women devote to "helping" on their husbands' cocoa plantations, over who contributes what to household consumption needs, and over the definition of those needs i.e. preferences. Similar struggles were noted within many households in the study on which this thesis is based though in a slightly different form, over the areas to be planted with food which in turn determines how much labour is available to work on 'male' coffee plantings and the intrahousehold distribution of work tasks. Koopman's model of interacting modes suggests that the outcomes of these

struggles depend upon the terms which women obtain access to the means of production (land, labour, capital, technology) that are controlled outside the patriarchal mode i.e. by governments or capitalists. It suggests that the terms on which women farmers access land (not owned by their husbands), credit, or to labour markets will have a significant impact on their bargaining power in the struggle to improve terms of access to household resources. Policy in the first sphere would repercuss on social relations of production in the patriarchal mode, strengthening women's ability to negotiate better terms of access to their husband's land.

Models which admit multiple sets of social relations of production can analyse the role of state decision makers as a dominant class engaging in relations of production and exchange with rural men and women who themselves have multiple roles both as petty commodity producers and as participants in patriarchal relations of production. Koopman argues further that there is a form of class alliance between male head of households and state policy makers whose differing economic roles are suffused by a mutual immersion in patriarchal ideology. In the Cameroonian case women farmers (the most important in terms of food security) were routinely exposed to severe but absolutely unnecessary risks of losing their essential means of production. This relates to female titles in land registration and re-settlement schemes. Many of these circumstances are common to PNG and the manner in which women access resources outside the direct influence of the patriarchal mode is bound to influence their intrahousehold bargaining power within it. Chapter 7 indicated that provision of extension services by the Coffee Industry Corporation (CIC) was a good example of this concept. CIC's target audience is generally regarded as male coffee producers which strengthens their position within the household on a basis of their knowledge and its

legitimation by the state; this could be conceptualised as a gendered alliance acting as an extra-modal influence. This theoretical framework could provide some greater insights into the patterns of household, and intrahousehold, resource allocation and provide an alternative conceptualisation.

9.5 Competing Paradigm II: Feminist Economics

Feminist economics embodies a large range of ideas and concepts from writers across a large spectrum of ideology and thought. Most energy has been directed towards a critique of neoclassical economics at an ethical level and this will be reviewed first. These ethical considerations have substantive ramifications for model choice.

9.5.1 Feminist and Neoclassical Economics: Ethical Considerations and Model Choice

Feminist economics has a strong ideology driving it, as indeed, has the neoclassical paradigm. This was summarised by Strober at a recent conference:

"Feminist economics is a rethinking of the discipline of economics for the purpose of improving women's economic condition. As a by-product (or external benefit) of this rethinking, feminist economics provides an improvement of economic theory and policy." (1994: 143)

Feminism's basic assumption is that the oppression of women exists and ought to be eliminated and this therefore is a fundamental challenge to the supposed impossibility of interpersonal utility comparisons. It asks how economists know what they assert as true (Bergman, 1987). It also asks questions about economists' narrowly quantitative approach and their scepticism about the value of seeking information from interviews (Strober, 1987). The notion of selfishness, situated in scarcity, has been with economics since *The Wealth of Nations* and tends to be taken as a universal truth by economists. However feminists, and critical interpretative theorists, would argue that Smith was

observing a society with a particular culture; they would argue that in not all cultures and people are as selfish as they may have been in late eighteenth century England. Further points are made by Strober (1994) in that each society has the choice about which characteristics of its people it wishes to endorse, and elaborate, and which it wishes to change (and also ignore). What is needed is an analysis of how we get to know what we think we know.

Many feminists and critical interpretative theorists conceptualise knowledge production as a social process deeply embedded with personal, social, cultural and political values (see Strassman, 1993 for extensive references to this literature). The term that best characterises these theories is "situated knowledge" (Haraway, 1988). According to these theories knowledge is inextricably linked to the lives of its producers and the circumstances of its production and is not an independent object, theoretically ascertainable through a purely "objective" process (Strassman, 1994). In addition to this intellectual communities tend to reproduce themselves in their own image via the selection and training of prospective members and through restrictions on the rhetoric of inquiry (Travek, 1988; Strassman and Polanyi, 1992, 1993). This would predict that the outputs of a profession would change with its composition; is this not now happening in economics as more women enter the economics profession - research output is beginning to change and this is influencing the profession. This will surely influence how it reproduces itself despite the conservative influences of the 'gate keepers'. This conceptualising of the process of knowledge production should assist in model or even paradigm choice. By understanding that economic theory is a product of a personal, social and political process, and an attempt to reproduce itself over time, theory choice is far more than positivism.

Mainstream economics emphasizes selfishness and competition and does not really take into consideration the aspirations that people may have for the well-being of others or about cooperation between individuals. Are people never pleased to see other people's situation improve? Economics teaches that increases in satisfaction only come from one's own consumption and not the satisfaction that someone may gain from the knowledge that someone else is not starving to death. It does not inquire into how reductions in inequality might effect an individuals utility function; many people would probably be prepared to give up some market consumption to feel safer whilst walking on the streets. The questions which it asks and the approach it takes to finding the answers are a product of this intellectual community's reproduction over time and its' social and political antecedents.

Economics appeared at the time of the industrial revolution and was closely associated with the interests of capital (over those of landowners) and the promotion of their interests. Ideas that are expressed by mainstream economists should be viewed with this in mind including their total neglect of power structures in their inquiries and their influence on economic outcomes. Patterns and processes identified in this thesis suggest that this actually removes the credibility of economics to explain (and generate predictions) much at all.

The neglect of power in formal economic models of the household can also be ascribed to the inability of "power" to generate an analytical structure which they require.

"Instead, power is a large elastic backpack into which one can cram criticisms of various shapes and sizes. Flexibility, however, can be a weakness as well as a strength. Once one is convinced that economists should investigate the determinants of variables such as institutions and practices or preferences and values, the notion of "power" provides little guidance in building the necessary models." (Pollak, 1994: 152)

It is easy to find fault with this position. On the one hand it has been persuasively argued by feminists that power is central to any questions of resource allocation and distribution of economic benefits, while on the other hand there are the household bargaining models (within the neoclassical tradition) which ascribe intrahousehold outcomes to variations in individual's access to resources. These positions are not really that far from one another; the problem comes down to removing the blinkers as to what constitutes a "model" or theory.

Within neoclassical economics, theory is defined as a model; model in turn, means ideas expressed in mathematical form i.e. models have a recognisable form, and should be presented in mathematically expressed definitions, with assumptions with theoretical developments clearly laid out. Models are necessarily incomplete and as Strausmann (1994) points out it is bad manners to engage in excessive questioning of simplifying assumptions. What is required is a realisation that all matters economic cannot be dealt with in this fashion and the "model" form needs to be more flexible. Intrahousehold power cannot really be fully expressed in mathematical formulae (in any meaningful way) especially when the dynamics (as opposed to the comparative statics) of the impact, of the introduction of market exchange relations, on gender relations are under consideration.

Models need to be expressed verbally and be based on both qualitative and quantitative data. But this expression can

also be part of a larger, all encompassing, parent model of which some of components may be quantitative. The dynamics of the system are expressed verbally and are an input (as well as an explanation) into the quantitative models of resource allocation and benefit distribution. For example a quantitative relationship (or model) could be estimated for the intrahousehold supply of labour to say a change in the coffee price, of which a major input would be a verbal input concerning the position of women in the society and how this influences their cash returns. The verbal input would serve as an explanation but also operate as the dynamic i.e. an expression of how their position has changed over time. The approach of duality in model building will be a useful avenue to explore, as it is impossible to have one all embracing quantitative-based explanation when trying to analyse all the factors influencing intrahousehold economics.

9.5.2 Feminist Models of the Agricultural Household

Although operating mainly at an ethical level, some recent research can give some more concrete foundations relating to agricultural households that have been developed within this feminist paradigm. Feminist household economics takes as its starting point the acknowledgement that decisions and distributions are not made in accordance with a common household goal; labour allocation decisions thus are closely related to intrahousehold income allocation and expenditure.

Labour allocation decisions have direct consequences for how much income accrues to any given household member; economic actors can be expected to act accordingly and a number of studies have supported this notion. Jones (1986) and Wilk (1989) found significant relationships between women's benefit from cash crop production and the amount of labour they contributed. Jones also regressed the value of women's consumption for work on their husbands' rice fields

onto the number of days worked in the fields which produced a positive (and significant) coefficient which could be interpreted as an implicit daily wage. Wilk also found that households which had more egalitarian income pooling patterns were better able to mobilise, and sustain, family labour contributions to agricultural diversification and investment projects. Katz (1992) in Guatemala found a crucial link between labour and income allocation patterns: women in households which maintained quite separate male and female income streams were reluctant to cut down on remunerated labour activities even in the face of increased demands on labour time due to the introduction of labour-intensive export crops. Similar patterns were observed throughout the study in PNG, on which this thesis is based.

It is important to look at the mechanisms which mobilise household members to work in productive and reproductive activities. Jones (1983; 1986) pointed out one cannot assume that labour allocation decisions are consistent with household income maximisation but neither can one assume all women have equal ability to resist unremunerated household labour demands. It is not possible to generalise on this point as Wolf (1990) stresses the cultural specificity of labour (and other) allocational mechanisms.

Though not conducted in agricultural households an interesting relationship was established by Hersch and Stratton (1994) using US household data, with their results suggesting that husbands do less housework than their wives, as their relative earnings and hours spent in the labour market increase. These findings are consistent with the predictions of household bargaining models where individual power is related to their next best alternative (the "threat point"); husbands typically have higher market wages and can therefore afford to purchase in the market many of the services provided by his wife. If we assume

that housework is not entered into voluntarily, this stronger male bargaining position may lead to the observed greater share of women in housework time. Furthermore the authors also found that the greater the time spent on housework, the greater the earnings differential, which they ascribed to both direct and indirect factors. The anticipation of greater household responsibilities for women over their lifetime leads to different investment decisions and outcomes than for men of equal market ability. Thus women earn less because they have less ability to invest in the human capital necessary to increase earnings. Even after controlling for gender differences in human capital, and other wage-related characteristics, the amount of time spent on housework was found to have a direct negative effect on earnings, an effect which is most pronounced for women.

9.5.3 Feminist Economics and Papua New Guinea

This paradigm offers much in meaningful analysis of peasant producers in PNG. The disaggregation of household activity and intrahousehold distribution of economic benefits inherent within this framework, provide a conceptual basis for the rather different economic positions of women and men. These differences are the result of a number of processes relating to power and ideology which manifest themselves in a number of intrahousehold patterns. Any model purporting to analyse the behaviour of this group of people must have at its centre an understanding of these historical, and gender orientated, processes. The next section will produce a model based on analysis in this thesis and draw out its theoretical implications with regard to household resource allocation, welfare and development.

9.6 The Model of Household Resource Allocation and Market Failure

9.6.1 Principal Modelling Concerns

The model is principally concerned with the explanation of the patterns of resource allocation, the determinants of the underlying intrahousehold distribution of benefits which largely determine them and the gendered market failure which results. It has implications for the perpetuation and intensification of the societal conflicts which first produced the gender inequities at the heart of this market failure. This in turn provides an alternative explanation for the widely recognised development impasse in Papua New Guinea.

9.6.2 The Duality of Household Influences

This sub-section is concerned with the modelling implications of the pre-contact social order, colonialism and the impact of the introduction of market exchange relations. It has been shown in previous sections that women were heavily subordinated within the pre-existing, pre-contact, social order. This appears to have intensified during the colonial period with pacification and the introduction of the cash economy. These led to increased male economic competition, the transformation of bride wealth into bride price, its subsequent inflation, and the objectification of women.

Endemic patriarchy was intensified by market exchange relations as they were introduced at the time of pacification (warfare being a major source of male status). Some of these effects were negated by the fact that women could now access the cash associated with food sales as men turned their attention to coffee with its higher returns and status; however, the cash generated by food is not endowed with the same positive ideological valuation as coffee (see section 6.4) and therefore does not confer the same level of intrahousehold bargaining for women. Food

also represents a much smaller source of income.

Two modes of social relations jointly set the terms on which women and men can access productive resources: (1) patriarchy within the subsistence mode of social relations (the pre-existing order); (2) market exchange relations (and associated policy). These continue to interact with one another, producing a social dynamic which sets the terms of the conjugal contract: women are in the much weaker bargaining position because of their objectification (following colonialism and the introduction of market exchange) and their subordinated position within the pre-existing order. An ideological and gendered competition exists in resource mobilisation and access to productive assets; it is one of capitalism versus subsistence economics, and men versus women.

9.6.3 Competing Objectives within the Household

Can the notion of a household strategy be supported when women and men find themselves in very different situations concerning their relative factor scarcities due to the nature of the conjugal contract in this society? The findings of recent behavioural research complicate this further by suggesting, rather strongly, that there are considerable conflicts of interest within, as well as between, individuals (see section 9.3.4).

The expectations expressed within this conjugal contract suggest that the amount of work that is required by women will be far greater than men and this was borne out by the labour allocation figures (chapter 6) and that their access to capital, such as coffee pulpers, is much lower (chapter 7); their labour and capital factor scarcities are much greater than their male counterparts. Adding to this are conflicts between the several economic goals all of which need to be met by the household: (1) provision of food; (2) provision of cash; (3) security; (4) status; and (5)

leisure. These may present conflict between individuals who are facing rather different resource endowments and burden expectations. It was clear in chapter 6 that women expressed greater desires for maintenance of food security, rather than cash income, and a desire for greater leisure - hardly surprising considering their rather long work hours. Men, on the other hand, had greater desires for cash (and the status that this generated) but also thought food security to be an important goal. Of course one of the main reasons women did not mention cash, is that it is not easy for them to gain access to the money derived from coffee production as they have neither the access to coffee pulpers (highly necessary to increase its market value) nor control of the marketing. Managing risk is also regarded as important by all individuals and is inherent in the balance of activities entered into.

Trying to define an ordering of household goals in the context of power inequities and the different priorities this generates seems a fairly meaningless exercise as it is difficult to untangle conflicts within individuals. It is more important to focus on the allocational mechanisms and the patterns of resource allocation they generate. It should therefore produce a more comprehensive understanding of what are regarded as most important and whose preferences carry weight.

9.6.4 Allocational Mechanisms and Resource Use

Allocational mechanisms reflect the nature of PNG society and the duality of its social relations. Resources are allocated in response to market prices and the opportunities these express, but are also critically dictated by the system of patriarchy. These, together with other expressed objectives (such as risk avoidance), determine the observed pattern of resource use. How do these influences interact and which have greatest prominence?

The first important point is that the system of patriarchy is all pervasive; it is the only phenomenon that can adequately explain the much longer working hours of women. Market rationality would suggest that as a factor becomes relatively short in supply (such as female labour in this case) its price will increase, and as a result there would be substitution into a cheaper alternative. Taking the example of coffee returns (to labour), despite the fact that female labour is in much shorter supply (and in many households forms a binding constraint), its return (or market price or hourly wage) is only one-third of that of men on average. It is impossible that this opportunity cost is being determined by the market; because all transactions and allocations, except the selling of the final product, are internal to the household. This therefore means that it is the conditions pertaining to patriarchy which determine the intrahousehold distribution of economic returns. Thus gender (labour) opportunity costs are socially, and not economically, determined. This is a very important point within this model which implies that the system of patriarchy dominates that of market relations especially determining who gets what, or how the surplus is divided. This could then in turn reasonably be expected to determine who does what, or what type of 'rational' response is generated. Market forces (and national policy interventions) determine the prices which households face but they do not determine individual incentives: patriarchy can therefore be conceptualised as a form of market failure.

It has been well documented that women do most of the work and that most of this is often unremunerated or at least way below market or 'average' labour returns. It was also indicated that overall household patterns of resource use represented the most rational household strategy - it costs less in terms of both land and labour expended - to generate sufficient entitlements to food and generate

sufficient cash to meet requirements such as school fees and cultural obligations, and manage various elements of risk effectively. One anomaly is produced by the strategies being pursued by households which concerns the amount of food that is been sold for cash when coffee produces a much higher return to labour (at the household level).

This supposed irrationally, within a general context of rational household strategies that minimise risk and labour inputs, appears somewhat of an enigma. This strategy requires far greater labour inputs to produce the same amount of cash which is in turn inefficient especially considering that most of the extra labour used would be female, a resource that is in rather short supply. The underlying reason becomes apparent once the intrahousehold distribution of coffee returns are examined. Not only are women only receiving one-third of the returns of their male counterparts, on average, but this is a lower return than that which they can access from selling food. Under these circumstances, where income pooling is non-existent or effectively insignificant, this is a very rational choice for women to make on the basis of the relative incentives they face. A result of this is to reduce overall household incomes for the same level of inputs. However, is the notion of household income relevant? Yes, because it reduces the overall funds available to pay for school fees and high protein foods (and other items), no matter to whom they are accruing within the household. Patriarchy would therefore appear to produce highly inefficient outcomes and thus lower welfare for society.

These patterns of resource use are not reached without some conflict within allocational mechanisms. The principle conflict observed in this study concerned the area planted to food - a decision that generally seems to rest in the hands of women. Within one-third of the households in this study, some level of conflict was registered; women wanted

to plant greater areas than their husbands thought were necessary. The principle reason for this was so they could generate more marketable surplus (rather than increasing food security); men resisted this as it would reduce the amount of labour time to work on 'their' coffee plantings. This was a major point of negotiation within households, but this conflict appeared to be absent in the majority of cases. This could be an indication that women are either 'winning' a silent battle of resistance utilising *weapons of the weak*, particularly the considerable male ignorance (knowledge gap) of food marketing incomes (see chapter 4). Alternatively patriarchy may be effectively crushing all resistance whose mobilising armoury includes violence, and the threat of violence, along with the general access to productive resources. Labour allocation figures would indicate that women are not winning the war but perhaps the occasional battle.

When women lose so does society. Unequal intrahousehold burdens have been shown to generate effective female labour constraints in half of the households in the study which affects their ability to respond to changing relative incentives, and hence their ability to produce Pareto optimum outcomes which would maximise welfare. This is illustrated by the virtual non-response of labour inputs to a 40 per cent increase in coffee prices at the end of 1992; this constraint was found to be a statistically significant constraint upon increasing incomes between the two years (see section 7.6.2.3). Where cooperation and sharing of coffee 'surpluses' appeared more apparent (as measured by relative male/female labour returns and labour inputs) then households appeared to be generally more successful in coffee production in terms of the amount produced, yields, incomes and more importantly how they managed to successfully increase incomes when coffee prices improved (see section 7.6.2). Where intrahousehold cooperation existed economic performance appeared to be enhanced

significantly.

Patriarchy alters the terms on which market values are being translated into individual incentives which then produces a pattern of resource allocation which is inefficient and discriminates very heavily (both economically and ideologically) against women. It also produces a positive spin-off in the form of increased levels of rural and urban food security as women concentrate their efforts more on food. This maintains the safety-first principle in resource use by producing a lower risk environment - but this is at a severe cost to women. The dominance of male power leads to the controlling influence of their objectives and their ability to substitute into leisure and gain most of the cash income and the status that it produces.

9.7 Further Notes on the Success of Coffee

Before concluding it is relevant to mention the factors that led to the successful cultivation of coffee in the Highlands of Papua New Guinea as well as mentioning those that are preventing it from progressing further. Firstly, coffee production fits succinctly into the pre-existing social relations of production: coffee can be cultivated on small plots of land (and does not require a change in the traditional land tenure system) and it was promoted as 'male' and 'modern' by the agents of the colonial state. Secondly, its cultivation coincided with male objectives which, following pacification, were looking for an alternative source of status. Thirdly, there was the efficiency of the marketing system (itself a function of the colonial state) which ensured that a high proportion of the final export price reached the grower which led to higher incomes and their positive relationship with such concerns as nutrition in the PNG case. In addition it did not have a negative impact on the areas planted to food and

hence the amount produced. This was largely because women were excluded from the economic benefits associated with coffee cultivation and were only used as exploited labour within the household.

It is the level of overextraction (exploitation) that could prove to be the Achilles heel in the PNG Highlands, as it produces perverse incentives sending women and other disempowered individuals into different and less efficient economic activities. Coffee, as only one component of the farming and livelihood system, also faces another consequence of patriarchy where highly unequal work burdens create effective household labour constraints. Both conspire to limit any further improvements in the level of its success in PNG.

9.8 Conclusion

World markets and domestic pricing policy set the general prices facing households. These 'efficiency' prices are transformed by the pervasive nature of patriarchy within households which generate individual incentives that do not equate to economic efficiency. They generate a very uneven intrahousehold distribution of economic benefits which discriminate very heavily against women. In this case women were marginalised from household coffee production to such an extent that the returns from food production yielded a higher direct (and accessible) return despite having an 'average' labour return that was only one-third that of coffee. If women are allowed to act as rational economic beings this necessarily reduces household incomes unless other household mobilisation processes can outweigh the effect of this intrahousehold economic resistance. The evidence presented in this thesis would suggest that these are only partially effective and therefore considerable market failure exists within this production system. The market cannot provide efficient outcomes whilst such heavy

economic and social discrimination exists against women.

This model provides a different, but perhaps not competing, explanation of the development impasse in Papua New Guinea. Previous authors have tried to explain the nature of 'arrested transition' or even 'terminal development' by the general social structure of the Highlands which constrains the acceptable level of intravillage economic differentiation. Collett (1992) suggested that economic transformation was also limited by household labour constraints during the peak coffee harvesting period (flush). However, no one appears to have analysed, on the basis of intrahousehold data, the gendered nature of this phenomenon. The arrested transition to capitalism is to a large extent explained by female intrahousehold resistance (in response to poor labour returns in coffee) and binding female labour constraints (the result of uneven work distributions) which prevent households from responding to changing economic incentives. This has provided further protection for the subsistence base of the Highlands economy, improved food security levels but this has been at a severe cost to women. The inefficient allocation of resources that this implies has a large cost to the PNG economy. Coffee incomes and export earnings are reduced and with them the positive benefits associated with cash cropping in the Highlands. Household surpluses are also reduced, lowering investment from which future development may come; taxation revenue is also cut thereby reducing the funds to provide public services. These directly result from economic, social, cultural and ideological discrimination against women.

This model incorporates the neoclassical, neo-Marxist and Feminist paradigms. It presents an explanation of household resource allocation, market failure and the development impasse, centred on gender discrimination, located within dualistic social relations of production. It shows that

meaningful analysis of household economies require a detailed investigation of intrahousehold processes set within the context of the historical and cultural influences pertaining to the society in which they are located.

Chapter 10Conclusion and Policy Implications10.1 Introduction

Chapter 9 concluded that there was considerable 'market failure' within Highlands production systems with respect to the allocation of household resources, which was a result of considerable economic and social discrimination against women. This discrimination has been shown to be the result of power inequalities which stem from a number of reasons; policy recommendations therefore need to address a number of issues beyond that of 'getting prices right' as individual incentives are not determined by the market alone, they are also a product of the prevailing patriarchal nature of society. Therefore the reasons underlying the unequal positions of people, dynamic societal processes, need addressing.

The neoclassical economic paradigm generates a general concern with 'getting prices right' in order to generate Pareto optimality which will then generate the highest possible level of utility and welfare in any given society; this is particularly present within 'new' home economics. Household bargaining models are a major theoretical advance on this position with their emphasis upon the impact of individuals' access to resources on final resource allocation patterns and the intrahousehold distribution of benefits. They are not concerned with what actually determines these positions and how those may change over time. Dynamic societal processes are therefore ignored in both the predictions they generate and their policy implications. The findings of this thesis, as well as other studies, suggest that this is a major shortcoming given the importance of the many processes on the relative positions

of people in society. This standpoint generates policy concerns over research, extension, and marketing programmes. It also has implications for the competing interests of food and cash crops (and other economic activities), ideological evaluation of individual contributions and access to land.

10.2 Policy Considerations

This section will mainly consider issues related to female empowerment in a patriarchal society. To take a realistic view, it has to be recognised that some aspects of a male-dominated society are not easily open to change; these can only be altered by changing attitudes which are more likely to be a result of other policy interventions, for example; education. It is important to remember that dualistic social relations of production relating to both the pre-existing social order and colonialism (the latter associated with the introduction of capitalism) exist. The latter is probably easier to influence than the former.

10.2.1 Land Reform and Women's Access

Much reference has been made to this issue in earlier chapters. The fact that women only have secondary use rights is a key determinant on which the conjugal contract is negotiated and explains much of women's longer working hours and their poor labour returns. Much can be made of the negative impact of this factor; one solution would be to increase women's access to land thus improving the position of women and society in general. To make a direct assault on current practices of land tenure is not feasible. Land is associated with the clan, a patriarchal institution, and men directly own the land - there is no basis from within villages for women to become landowners. Movement to a more formal, state-imposed (legislation with title deeds) tenure system would most likely make things worse as this would create the potential for the creation

of an effective rural land market which does not currently exist. The deeds would almost certainly fall into the hands of male household heads and could potentially lead to land being sold literally from under women's feet as in Kenya (Mackenzie, 1995) and may lead to increased inequities in individual land holdings and therefore at some point access to land not being available for everybody; neither of these currently occur. Additionally, such a system would probably be administratively infeasible in PNG.

Direct access to land for women is unlikely to be generated by any policy intervention in the foreseeable future. The current system is so ingrained and male-dominated that significant change is unlikely. Influence upon this can really then only be indirect; for example, reducing the ideological importance of direct access to land, and therefore the influence this would have upon the terms under which the conjugal contract is negotiated. This could lead to improving the (ideological) importance of labour time and women's principal economic activities. Policy, therefore, needs to be directed towards those areas in which women already dominate and build upon these foundations.

10.2.2 Food Crop Research

Women dominate food production and marketing and are therefore likely to be principle beneficiaries of a shift of research resources from cash tree crops to food crops. Research which focused on reducing labour inputs and increasing yields could then increase women's incomes and reduce their work burdens which may have a positive impact upon their relative bargaining positions within households. This crucially depends on the ideological evaluation that is given to this increased income by society in general. The focus of state policy on such areas may so endow it - particularly if complementary inputs are significant and are effectively targeted towards women.

Within the PNG context many of the problems associated with agricultural research are institutional. Tree crop research is dealt with by industry corporations and boards which are relatively free of the constraints of government. More significantly they are well funded as the result of international aid programmes and the fact that they can easily raise their own revenue via grower levies at the point of export. The corporations and boards also tend to be smaller and far more focused, responding to the needs of their industries (generally via directly elected representatives) and are thus more effective than most government departments. Food crop research, by contrast, is the responsibility of the Department of Agriculture and Livestock (DAL), which gains its revenue from the general taxation, does not have industry representatives influencing its research priorities and also tends to be relatively underfunded. Therefore, part of the problem is that aid flows need redirecting (this is already occurring to some extent). Food crop research should then perhaps be carried out by an 'independent' food crops research institute (this is also currently being considered) and directed by representatives of the industry. Additionally there is an argument for bringing all agricultural research into such an organisation to allow a much broader focus on the farming system and provide a more effective way of raising revenue, for instance from all export crops. Research can only provide positive benefits in collaboration with the provision of other complementary inputs.

10.2.3 Extension and Marketing Projects

Research cannot be successful without the extension of the results to the field and some effective outlet for the produce. Food extension therefore needs a kick-start: it is currently the responsibility of provincial government and has been largely ineffective since the early 1980s when the Department of Primary Industry (DPI) was split up - with

research going to DAL (and therefore being organised at the national level) and extension to regional DPIS; communication between the two is fairly non-existent. This aside, if extension could be reorganised, started-up effectively, and targeted at women, it may improve their relative position by sending out the message that women's main work and source of income is both highly valued by the state and worthy of considerable attention. The same arguments apply to food marketing projects and these could be closely tied into any extension programme as they currently are applied in coffee production. It is thus essential to target these services towards women. At the present time however the method of extension remains a problem to which I shall return later in this section.

If food marketing was to become a larger industry, principally (following successful policy interventions in research, extension and marketing) benefiting women, it is bound to attract the attention of men. How much attention would depend critically on how successful programmes were and the relative economic returns they generated. It is highly probable if labour returns in food production increased above those associated with coffee production then there would be a quick relative ideological reversal of the two and men would move in and try and dominate this 'new' source of income. This reversal would be unlikely with current, relatively high, world coffee prices (and an efficient marketing system) but if these were to change, then this could become a distinct possibility. Providing that inputs were targeted effectively at women (with perhaps men having no direct access, in their own right, to extension and marketing programmes), men would have to negotiate with their wives and daughters to get access to these - as women currently have to do to get access to land. It would then, to some extent, change the terms on which the conjugal contract is negotiated.

Where women had access to highly valued income sources (such as paid employment) this has often led to competition over resources; including the manifestation of domestic violence (and threat of) as Clarke (1990) found with nurses in Tari, Southern Highlands. It was proposed as the reason for most of those women surveyed now being divorced. This highlights the importance of considering the negative impacts that may be generated for women by gender policies; policies from one sector may easily spill over into another. It is therefore important to consider establishing a gender planning framework at a national level to try and pre-empt such problems and adjust projects and programmes accordingly. The importance of effective targeting cannot be overstated.

It is very hard to target women in extension programmes in Papua New Guinea as virtually all extension officers are male and will probably remain so for the foreseeable future. This is because virtually all graduates from agricultural colleges are male (of course itself a function of the patriarchal system and valuing of male over female education) which is unlikely to change quickly. Female extension agents could not serve as an answer in themselves, but could represent a move in the right direction; this most likely being a slow process. The immediate problem then becomes; how can male extension agents effectively target women producers, given the patriarchal nature of the society to which all its members attitudes are subject. Is it possible for male extension officers to be sensitised under these circumstances? This is what is currently being trialed in coffee extension but no evaluation of this project is yet available. Another method that might be worth considering; using the agricultural equivalent of traditional birth attendants. This would involve giving training, and access to resources, for experienced women farmers in newly developed agronomic techniques etc. and using these women to

distribute new planting materials. How effective such programmes could be depends critically upon how effective communication channels and co-operation are between rural women. It is an avenue well worth investigating especially as it is something which could probably be run at a relatively low cost.

10.3 Other Policy Concerns

Other more general policy issues have also been suggested by the research. These relate indirectly to the central findings of the thesis but influence the overall environment in which any policy interventions would take place: these are considered in this section.

10.3.1 Coffee Extension

It is fairly clear that coffee extension needs to reach women far more effectively than it currently does. As male extension officers regard their target audience as mainly male coffee growers, given the labour allocation data presented in chapter 6, increased female targeting can be justified on efficiency grounds alone. Additionally providing women with more information may provide them with access to more power, especially if combined with the distribution of new planting material targeted towards women, and the employment of female village based farmer trainers (who are currently all male). Concerns must remain about how effective extension provision to women can ever be under current circumstances of a patriarchal society. It may alter the power situations in coffee production, but only marginally, especially given how men managed to capture all the extra economic product associated with increased coffee prices in 1993. Improved targeting of extension may reduce women's work hours as a result due to increased efficiency which could provide spin-off benefits for them in other areas.

10.3.2 Population Growth and Land Productivity

Rates of population growth in the Highlands provinces will necessitate, at some point in the near future, some level of agricultural intensification and improved land productivity. Research would point to intercropping (principally of sweet potato and coffee) as the best alternative under conditions of low cash inputs. Current DAL research would indicate that yields of both coffee and sweet potato could increase by over 50 per cent under particular planting densities. If this avenue is to be pursued further, it will require a reorganisation of both research and extension services to focus effectively on the farming system; independent components thus become obsolete. It may also alter social relations within society (as what would now be men's and women's work) particularly as extension services would need to be targeted at the whole household. The social consequences of this potential development are fairly uncertain.

10.4 Conclusion: the Cost of Doing Nothing

It is difficult to draw conclusions concerning the policy recommendations in this study. They are all concerned with female empowerment in some form or other and the ideological 'strengthening' of women's activities and sources of income, whilst bearing in mind some of the possible negative spin-offs. What is perhaps more important to consider at this point is the cost of doing nothing. The analysis presented in this thesis would suggest that the development impasse and the circle of exploitation (principally of women) will continue along with the economic cost of the market failure that it will generate. This loss will become more crucial as population growth requires that land productivity also increase.

Virtually all the policy considerations are concerned with improving the intrahousehold bargaining positions of women.

Much of their weaker bargaining position is not determined by actual contributions but by perceptions, or ideological valuations of contributions (or main activities) and the resources that men and women bring into marriage with them. These differential perceptions define the power that individuals possess and the terms on which conjugal contracts are negotiated. It is clear that land has a far higher social valuation than labour and this then determines who captures most of the economic product of the household. It remains akin to the higher valuation of capital over labour (and wage over household labour) in the 'developed' world. It is ideologically determined and to change these perceptions is where most energy needs directing. The 'value' of individual contributions is not objective, but rather the product of an ideological battle which capitalism has largely won. The market is good, subsistence is bad - men predominate in the former, women in the latter; it therefore becomes a gendered battle. People's contributions to society should not be valued on the basis of whether they take place within the confines of the market place.

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Appendix 1

Agricultural Systems Information

All the information presented in appendix is taken directly from Bourke et al (1994b)

PROVINCE 11 Eastern Highlands	AGRICULTURAL SYSTEM No. 1	Subsystem No. 1 of 1
Districts 1 Goroka, 2 Henganofi 3 Kainantu, 4 Lufa	Subsystem Extent 100 %	Area (sq km) 1116
Population 57,682	Population density 52 persons/sq km	Population absent 9 %

System Summary

Located in a series of valleys in the northern part of the province between Goroka and the Morobe provincial border, including the Upper Ramu, Karmanuntani, Bena and Asaro Valleys. Short grass is the most common fallow type, typically 4-5 years old. Fallow vegetation is cut, dried and burnt. The most important crop is sweet potato. Other crops are banana, taro, cassava and yam (*D. alata*); peanuts and corn are widely grown. Between one and ten plantings, with a mean of about four, are made before land is fallowed. Short fallow periods of less than 12 months are common between plantings. The soil is tilled completely prior to the first and subsequent plantings. Sweet potato is planted in small mounds about 30 cm high, on long drained beds orientated up the slope. Within gardens, peanuts, yam and winged bean are each grown in separate plots from sweet potato; corn, common bean and vegetables, such as Chinese cabbage, are interplanted. Sweet potato is grown in a rotation with peanuts, winged bean and yam. Mixed vegetable and household gardens are common. Pig husbandry is important.

Extends across provincial border to System(s) None

Altitude range (m) 1200-2200 Slope Gentle (2-10 degrees)

CROPS

STAPLES DOMINANT	Sweet potato
STAPLES SUBDOMINANT	None
STAPLES PRESENT	Sweet potato, Banana, Cassava, Taro (<i>Colocasia</i>), Yam (<i>D. alata</i>)
OTHER VEGETABLES	Corn, Highland pitpit, Oenanthe, Rungia, Peanuts, Bean (winged), Bean (common), Chinese cabbage, Amaranthus spp, Cucumber
FRUITS	Marita pandanus, Sugarcane
NUTS	Karuka (planted)
NARCOTICS	Betel nut (highland), Betel pepper (highland), Tobacco

FALLOW & CROPPING PERIOD

FALLOW TYPE	Short grass
SHORT FALLOW	Very significant
LONG FALLOW PERIOD	1-4 years
CROPPING PERIOD	3-5 plantings
R VALUE	57 (medium)

GARDEN SEGREGATION

GARDEN SEGREGATION	None
CROP SEGREGATION	Significant
CROP SEQUENCES	Significant
MIXED VEGETABLE GARDENS	Significant
HOUSEHOLD GARDENS	Significant

SOIL FERTILITY MAINTENANCE

LEGUME ROTATION	Very significant
PLANTED TREE FALLOW	Minor
COMPOST	None
ANIMAL MANURE	None
ISLAND BED	None
SILT FROM FLOOD	None
INORGANIC FERTILISER	None

CASH EARNING ACTIVITIES

1 Coffee Arabica	Very significant
2 Fresh food	Significant
3 Betel nut	Minor
4 Cattle	Minor
5 Firewood	Minor
6 Potato	Minor
7 Tobacco	Minor

OTHER AGRONOMIC PRACTICES

<i>Water Management:</i>	
DRAINAGE	Very significant
IRRIGATION	None
<i>Soil Management:</i>	
PIGS PLACED IN GARDENS	None
BURN FALLOW VEGETATION	Very significant
TILLAGE	Very significant
MECHANIZATION	Minor
DEEP HOLING	None
MULCHING	Minor
SOIL RETENTION BARRIERS	None
<i>Mounding Techniques:</i>	
VERY SMALL MOUNDS	Minor
SMALL MOUNDS	Very significant
MOUNDS	None
LARGE MOUNDS	None
<i>Garden Bed Techniques:</i>	
BEDS SQUARE	None
BEDS LONG	Very significant
<i>Other Features:</i>	
FENCES	Very significant
STAKING OF CROPS	Minor
FALLOW CUT ONTO CROPS	None
SEASONAL MAIN CROPS	None
SEASONAL SEC'DARY CROPS	Significant

PROVINCE 11 Eastern Highlands	AGRICULTURAL SYSTEM No. 15	Subsystem No. 1 of 1
Districts 1 Goroka Population 17,240	Subsystem Extent 100 % Population density 111 persons/sq km	Area (sq km) 155 Population absent 11 %

System Summary

Located in the Asaro Valley and centred on the Goroka-Asaro station area. Fallow vegetation of short grass, typically 2-3 years old, is cut, dried and burnt. Sweet potato is the most important crop; banana, corn and peanuts are commonly grown. Soil is tilled completely before the first and subsequent plantings. Sweet potato is planted in small mounds about 30 cm high on long drained beds, typically 1.5 m wide. Corn is interplanted with sweet potato. Peanuts and winged bean are planted in separate plots within sweet potato gardens, and are grown in rotation with sweet potato. Typically 5-6 (and up to 8) plantings of sweet potato, peanuts and winged bean are made before land is fallowed. Short fallow periods of up to 12 months are common between plantings. Pig husbandry is important.

Extends across provincial border to System(s) None

Altitude range (m) 1400-1800 Slope Gentle (2-10 degrees)

CROPS

STAPLES DOMINANT	Sweet potato
STAPLES SUBDOMINANT	None
STAPLES PRESENT	Sweet potato, Banana
OTHER VEGETABLES	Amaranthus spp, Bean (common), Bean (winged), Highland pitpit, Peanuts, Corn
FRUITS	Marita pandanus, Sugarcane, Avocado
NUTS	Karuka (planted)
NARCOTICS	Betel pepper (highland), Tobacco

FALLOW & CROPPING PERIOD

FALLOW TYPE	Short grass
SHORT FALLOW	Very significant
LONG FALLOW PERIOD	1-4 years
CROPPING PERIOD	6-14 plantings
R VALUE	77 (high)

GARDEN SEGREGATION

GARDEN SEGREGATION	None
CROP SEGREGATION	Significant
CROP SEQUENCES	Significant
MIXED VEGETABLE GARDENS	Minor
HOUSEHOLD GARDENS	Significant

SOIL FERTILITY MAINTENANCE

LEGUME ROTATION	Very significant
PLANTED TREE FALLOW	Minor
COMPOST	None
ANIMAL MANURE	None
ISLAND BED	None
SILT FROM FLOOD	None
INORGANIC FERTILISER	None

CASH EARNING ACTIVITIES

1 Coffee Arabica	Very significant
2 Fresh food	Significant
3 Firewood	Minor
4 Potato	Minor
5 Tobacco	Minor

OTHER AGRONOMIC PRACTICES

Water Management:

DRAINAGE	Very significant
IRRIGATION	None

Soil Management:

PIGS PLACED IN GARDENS	Minor
BURN FALLOW VEGETATION	Very significant
TILLAGE	Very significant
MECHANIZATION	Minor
DEEP HOLING	None
MULCHING	Minor
SOIL RETENTION BARRIERS	None

Mounding Techniques:

VERY SMALL MOUNDS	None
SMALL MOUNDS	Very significant
MOUNDS	None
LARGE MOUNDS	None

Garden Bed Techniques:

BEDS SQUARE	None
BEDS LONG	Very significant

Other Features:

FENCES	Very significant
STAKING OF CROPS	Minor
FALLOW CUT ONTO CROPS	None
SEASONAL MAIN CROPS	None
SEASONAL SEC'DARY CROPS	Significant

Appendix 2

Baseline Questionnaire and Garden Survey Forms

INITIAL SURVEY FORM FOR MONITORING SYSTEM

Date:.....

Enumerator:

1. Nem bilong yu
2. Nem bilong ples (viles) bilong yu
3. Ol lain bilong yu husat i stap wantaim yu na kisim kaikai long gaden bilong yu na kisi: moni long kopi gaden bilong yu.

(Lukim narapela page stap long baksait tru)

4. Hamas gaden kaikai yu gat
5. Givim nem bilong ol lain husait i wok long gaden kaikai bilong yu. Stat long husait i mekim bikipela wok na pinis long husat i mekim liklik wok.

- | | | | |
|----------|----------|----------|-----------|
| 1. ----- | 4. ----- | 7. ----- | 10. ----- |
| 2. ----- | 5. ----- | 8. ----- | 11. ----- |
| 3. ----- | 6. ----- | 9. ----- | 12. ----- |

6. Husait i ken kisim kaikai long gaden bilong yu: Ol lain bilong yu tasol Tikim
Ol arapela man/meri tu Tikim

Sapos ol narapela manmeri i kisim kaikai long dagen bilong yu, inap yu tok kilia long wanem as tru na ol narapela i ken kisim kaikai long gaden bilong yu.

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7. Hamas kaikai yu save groim long wanpela yia.

Nem bilong kaikai

Hamas (makim long rais bek, kopra bek, marasin bek, o kilo)

- | | |
|---------|-------|
| 1. .... | ..... |
| 2. .... | ..... |
| 3. .... | ..... |
| 4. .... | ..... |
| 5. .... | ..... |
| 6. .... | ..... |
| 7. .... | ..... |

8. Hamas long ol dispela kaikai yu salim.

Nem

Hamas

- | | |
|---------|-------|
| 1. .... | ..... |
| 2. .... | ..... |
| 3. .... | ..... |
| 4. .... | ..... |
| 5. .... | ..... |
| 6. .... | ..... |
| 7. .... | ..... |

9. Yu salim ol kaikia we.

Nem bilong kaikai

Ples

Yu kisim hamas moni

Ples

- | | | | |
|-------|-------|---------|------------------|
| ----- | ----- | ----- | ----- |
| ..... | ..... | K | - Market |
| ..... | ..... | K | - Bikpela Stoa |
| ..... | ..... | K | - Skul |
| ..... | ..... | K | - Haussik |
| ..... | ..... | K | - Narapela givin |
| ..... | ..... | K | - |

10. Hausait long famiii o lain bilong yu i go het long salim ol kaikai, frut na kumu long market:

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11. Wanem kain hevi yu bungim long wok gaden:

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12. Hamas kopi gaden yu gat

13. Husait i save wok long kopi gaden. givim nem long husat i mekim bikpela wok igo inap long man i mekim liklik wok.

Nem

- | | | |
|---------|---------|----------|
| 1. | 5. | 9. |
| 2. | 6. | 10. |
| 3. | 7. | 11. |
| 4. | 8. | 12. |

14. Husait i save salim kopi:

Hamas moni yu kisim long dispela yia:

15. Yu salim kopi we:

16. Yu salim hamas seri kopi:
- Yu kisim hamas long seri kopi:
- Yu salim hamas drai kopi:
- Yu kisim hamas long drai kopi:

17. Yu save masinim seri kopi bilong yu long masin bilong husat - Yu
 Grup
 Yu kisim long ol arapela man

18. Yu gat masin bilong spreya - Yes No.
 Sapos yu gat yu save mekim wanem kain wok wantam spreya:

.....

19. Yu save yusim pam bilong husait -
 Yu yet
 Yu wantam narapela man
 Yu save boroim

20. Yu gat so tu: Yes No

21. Yu gat sisis bilong katim kopi Yes No

22. Yu gat kar tu Yes No
 Yu bungim moni wantaim ol sampela lain na baim kar Yes No

23. Yu gat radio tu: Yes No
 Long wanem ol taim yu save harim radio:

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24. Yu memba long wanpela grup tu -

Nem bilong Grup

Wok bilong Grup

1.

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2.

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3.

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25. Ol wokman bilong CDA ibin kam long ples bilong yu tu. Yes No :

- Givim mun na yar ol CDA ikam lastaim -----

- Hamaspela taim ol ikam lukim yupeta long las 3 yar igo pinis

- Ol i soim yupeta wanem kain wok:

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- Ol o kirapim sampela kain grup tu; tok kilia long en

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- Ol i stretim ol kopi gaden bilong yu tu:

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26. Igat sampela we yu na ol lain bilong yu save kisim moni.

Kain Wok

Hamas moni long
Wanpela Yar (1991)

1.

.K.....

2.

.K.....

3.

K.....

4.

K.....

OL TOKTOK YU LAIK MEKIM

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OL TOKTOK MAN WOKIM SEVEY I LAIK MEKIM

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	Nem	Em Wanem bilong yu	Man Meri	Yar	Skul	Wok em i mekim we em i spendim bikpela taim	Wok em i mekim we em i spendim liklik taim
1.							
2.							
3.							
4.							
5.							
6.							
7.							
8.							
9.							
10.							
11.							
12.							
13.							
14.							
15.							

Yar

- 0-6
- 7-10
- 11-16
- 16 na antap
- Lapun

Wok

- Kaikai
- Kopi
- Lukautim kakaruk
- Lukautim pik
- Lukautim Sipsip
- Salim kaikai
- Salim kapis
- Helpim papamama long ol liklik wok long haus
- Arapela wok - givim kaln wok ol i mekim

FOOD GARDEN SURVEY FORM

Measure all gardens and state whether in use or not (ignore Q8 if not in use)

1. Name of respondent
2. Name of Village
3. Garden number Keep numbers separate for food and coffee garden
4. Proximity of garden to family dwelling -
 - Next to dwelling
 - Less than 5 minutes walk
 - 5 - 15 minutes walk
 - More than 15 minutes walk State exact minutes
5. Garden area - measurement by tape and compass -
 - (i) Observe/walk the perimeter (and mark the corners) with the respondent
 - (ii) Sketch the garden in the space below (indicate the direction north, draw the position of the path to the village and mark any other important features near the garden).

Date:

Enumerator:

COFFEE GARDEN SURVEY FORM

1. Name of respondent
2. Name of Village
3. Garden Number
4. Proximity of garden to family dwelling -
 - Next to dwelling
 - Less than 5 minutes
 - 5 - 15 minutes walk
 - More than 15 minutes walk State exact number of minutes
5. Garden area - measurement by tape and compass -
 - (i) Observe/walk the perimeter with the respondent
 - (ii) Sketch the garden in the space below (indicate the direction, north, draw position of the path to the village and mark any other important features the garden)

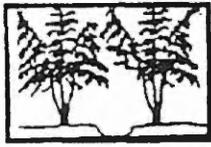
PART 2. GARDEN MEASUREMENTS AND OBSERVATIONS

C. GARDEN OBSERVATIONS

PUT A "X" IN THE BOX NEXT TO THE CORRECT PICTURE.

8. A GARAS

Em i kilinim garas



Em i no kilinim



Em i bus tumas



8. B BANIS

I nogat pik.



Gutpela banis i pasim pik



Banis i nogat o bagarap na pik i bagarapim gaden

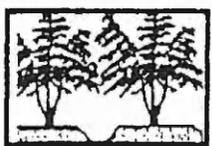


8. C BARET

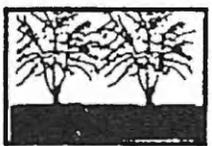
Graun i nogat wara tumas.



Gutpela baret.



Planti wara tumas i stap long graun.



8. D PLANIM YAR

Wanwan yar i sanap. Gutpela san i kam.



Yar i pasim san.



I nogat planti yar



I nogat yar



8. E KATIM HAN

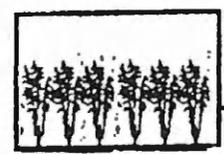
I no stretim



I stretim hap.

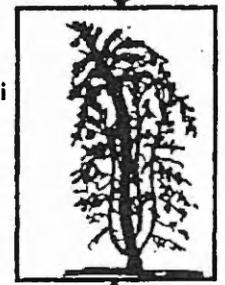


Stretim pinis.



8. F

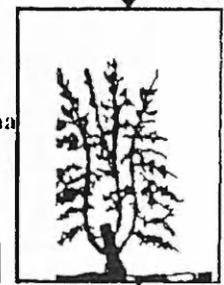
Nupela kru karim seri pinis, ol i no rausim mama lung.



Planti kru i stap. Ol i no makim tri pela strongpela.



Nupela kru karim seri pinis, na ol i rausim mama lung.



Appendix 3

Monitoring Forms

COFFEE SALES FORM

=====

INSTRUCTIONS.

1. Makim hevi bilong kopi mak bilong bek, liklik bek em 25 kg rice bek na bikpela bek em waitpela marasin bek. Makin hamas bek i pulap, hap bek na i kota bek. Na raitin pras bilong kopi klostu long namba bilong bek.
2. Lukim fama long olgeta tupela dei na askim na rekotim.

NEM BILONG FAMA _____

VILES _____

NEM BILONG REKOTA _____

POTNAIT FRAIDE ____/____/1992.

* DEI:: BAG SERI # BAG DRAI KOPI :

* : LIKLIK Bag BIKPELA Bag #LIKLIK Bag:BIKPELA Bag:

* FRI:: : # : :

----------*

* SAT:: : # : :

----------*

* SUN:: : # : :

----------*

* MON:: : # : :

----------*

* TUE:: : # : :

----------*

* WED:: : # : :

----------*

* THU:: : # : :

----------*

* FRI:: : # : :

----------*

* SAT:: : # : :

----------*

* SUN:: : # : :

----------*

* MON:: : # : :

----------*

* TUE:: : # : :

----------*

* WED:: : # : :

----------*

* THU:: : # : :

----------*

*TOTAL:: : # : :

OFFICE USE ONLY	
DATE	
RTNO	
VLNO	
HHNO	
SERIKG	
SERITYR	
SERPLS	
SERSEL	
SERSEX	
PARKG	
PARTYR	
PARPLS	
PARSEL	
PARSEX	

OL SALIM KOPI WE: Baiym long rot, Faktory, Maketing grup, Rotsait depo.
 *Putim tik antap long ples we ol i salim kopi.

NEM BILONG HUSAIT SALIM KOPI _____

EM MAN NA MERI _____

HAMAS MONI OL I KISIM LONG DISPELA TUPELA WIK K _____

FOOD/HARVEST/CONSUMPTION/SALES FORM

POTNAIT FRAIDE ____/____/92.

NEM BILONG FAMA _____

VILES _____

 DEI NEM BILONG HAVESTIM SALIM HAMAS MONI
 KAIKAI HAMAS HAMAS YU KISIM

FRI				K
SAT				K
SUN				K
MON				K
TUE				K
WED				K
THU				K

FRI				K
SAT				K
SUN				K
MON				K
TUE				K
WED				K
THU				K
TOTAL				K

Klostu long nem bilong kaikai raitim :-
 (1) Naim bilong husait i salim
 (2) Raitim ples o wanem maket i salim kaikai

FOR OFFICE USE ONL	
DATE	
RTNO	
VLNO	
HHNO	
KK1	
KK1AW	
KK1US	
KK1S	
KK1Y	
KK2	
KK2AW	
KK2US	
KK2S	
KK2Y	
KK3	
KK3AW	
KK3US	
KK3S	
KK3Y	
KK4	
KK4AW	
KK4US	
KK4S	
KK4Y	
KK5	
KK5AW	
KK5US	
KK5S	
KK5Y	
KKPLS	
KK6	
KK6PNS	

HOUSEHOLD SPENDING RECORD SHEET.
=====

POTNAIT ENDING FRAIDE ___/___/92

NEM BILONG FAMA _____

VILES _____

DEI NEM BILONG SAMTING HAMAS MONI
 OR WOK YU SPENIM MONI YU SPENIM

FRI	_____	K_____
SAT	_____	K_____
SUN	_____	K_____
MON	_____	K_____
TUE	_____	K_____
WED	_____	K_____
THU	_____	K_____

FRI	_____	K_____
SAT	_____	K_____
SUN	_____	K_____
MON	_____	K_____
TUE	_____	K_____
WED	_____	K_____
THU	_____	K_____
TOTAL		K_____

OFFICE USE ONLY	
DATE	_____
RTNO	_____
VLNO	_____
HHNO	_____
HHE1	_____
HHE1S	_____
HHE2	_____
HHE2S	_____
HHE3	_____
HHE3S	_____
HHE4	_____
HHE4S	_____
HHE5	_____
HHE5S	_____
HHE6	_____
HHE6S	_____
HHE7	_____
HHE7S	_____

Raitim nam bilong husait i spendim moni klostu long ol samting dispela famili i spendim moni long en na raitim M sapos em i man na F sapos em i meri.

*Na tingim rekota mas lukim fama na famili olgeta tupela dei na askim na rekotim

LABOUR INPUT MONITORING FORM
=====

OFFICE USE ONLY

DEI NA DATE REKOTA LUKLUK LONG GADEN ____ - ____ / ____ / 92

NEM BILONG VILES _____

NEM BILONG FAMA _____

NEM BILONG HUSAIT I WOK _____

WOKMAN EM WANEM BILONG FAMA _____

FAMA I PEIM WOKMAN O NOGAT yes ____ no ____

SAPOS YES HAMAS MONI _____

HAMAS KAIKAI O NARAPELA SAMTING :

NEM BILONG SAMTING _____ HAMAS _____

HUSAIT I WOK EM MAN O MERI MAN ____ MERI ____ tikim.

WANEM MAK BILONG SKUL WOKMAN I PINISIM _____

EM KEN RIT NA RAIT TU YES ____ NO ____ tikim.

HAMAS KRISMAS BILONG WOKMAN _____

KAIN WOK EM I MEKIM TAIM EM SPENIM

MONING _____

MONING _____

MONING _____

MONING _____

MONING _____

APINUN _____

APINUN _____

APINUN _____

APINUN _____

APINUN _____

APINUN _____

Date	
RTNO	
VLNO	
HHNO	
WRSEX	
WREDU	
WRAGE	
IPCOF1	
IPCOF2	
IPCOF3	
IPCOF4	
IPCOF5	
IPFOD1	
IPFOD2	
IPFOD3	
IPFOD4	
IPFOD5	
IPHH1	
IPHH2	
IPHH3	
IPHH4	
IPHH5	
FLUSH	
WRPAYREL	

MONING EM 6 O KLOK MONING IGO INAP LONG BELO 12 O KLOK, NA APINUN EM BELO IGO INAP LONG 6 O KLOK APINUN. MAKIM TAIM OLSEM LONG WANEM TAIM EM I STATIM WANPELA WOK NA PINISIM.

IGAT SAMPELA KAIN WOK O PASIN I KAMAP LONG FAMILI O PLES WE I SENISIM O KISIM TAIM LONG WOK LONG GADEN. SAPOS IGAT ORAIT TOK KILIA _____

DISPELA FOM REKOTA MAS REKOTIM WOK WANWAN MAN O MERI I MEKIM LONG GADEN KAIKAI. KOPI NA LONG HAUS LONG OL DISPELA DE MIPELA I MAKIM. OL FAMILI MEMBA NA HUSAIT OL NARAPELA MANMERI I WOK LONG DISPELA GADEN MAS IGAT WANWAN FOM.

TRI-ANNUAL SURVEY (SMS 1992)

DISPELA SEVEY I KAM ANINIT LONG SMOL-HOLDA MONITORING SISTEM NA BAI MIPELA LONG KOPI INDASTRI KOPRESIN I KARIM AUT LONG

- 1: NAMBAWAN WIK BILONG MAY 1992
- 2: NAMBAWAN WIK BILONG SEPTEMBER 1992 NA,
- 3: NAMBAWAN WIK BILONG JANUARY 1993.

DISPELA SEVEY BAI PAINIM AUT OL SENIS I KAMAP INSAIT LONG FAMILI BILONG FAMA LONG 4 MUN IGO PINIS LONG SAIT BILONG MARIT, BEBI I BON, FAMILI MEMBA I DAI NA OL KAIN SENIS OLSEM NA TU LONG ASKIM NA SAVE LONG OL SENIS I KAMAP LONG WOK KOPI NA KAIKAI.

OL ASKIM

1* Igat wanpela memba long famili i dai long las 4 mun? Yes No
Sapos Yes, orait givim Nem, Yar, na em wanem bilong fama

2* Wanpela bebi i bon long famili o nogat ? Yes No
Sapos yes, givim wanem dei em i bon na bebi i boy o gel.

3* Long las 4 mun, wanpela long famili i lusim ples na go stap long narapela hap? Yes No.
Sapos yes orait tok kilia long nem bilong em, yar, em man o meri, em go we na long mekim wanem.

4* Igat wanpela man o meri kam stap wantaim famili naw? yes no
Sapos yes givim nem, em man o meri, em stap liklik taim na go bek o em bai stap olgeta, na wanem as na em kam stap.

5* Wanpela lain long famili i kisim bikpela sik we em i no inap long wok ? Yes no. Sapos yes givim nem, wanem kain sik em kisim.

6* Wanpela meri long famili gat bel tu? yes no

 7* Ol wokman long CDA, na DPI i kam lukum yu long las 4 mun o
 nogat? Yes No. Sapos yes ol i kam mekim wanem kain wok o ol i
 helpim yu long wanem samting o wok.

8* Givim nem bilong ol tuls na masin yu baim long wok long kopi
 na kaikai gaden na wanwan tul o masin yu baim long hamas moni.

9* Yu bin yusim fetilaisa, marasin bilong kilim gras, o ol arapela
 kemikal tu? Yes No. Sapos yes givim nem na hamas moni yu spendim
 long ol.

10* Yu yusim ol samting olsem pipia, gras o pekpek bilong anomol
 long planim kaikai o long kopi gaden tu? Yes No.
 Sapos Yes orait tok kilia.

11* Hamas moni fama na famili i kisim long kopi long las 4 mun?

12* Hamas moni fama na famili i kisim long ol kaikai ol i salim
 long maket?-----

13* Hamas moni fama na famili i kisim long ol arapela samting
 olsem animol na ol samting ol i mekim long han?

14* Long las 4 mun, wanem kain bikpela hevi yu bungim we i mekim
 hat long wok bilong yu long kopi na kaikai na ol arapela rot
 bilong kisim moni?

15* Ol rekota i lukim yu na famili na askim long wok yupela mekim
 long kopi na kaikai gaden hamaspela taim olgeta long 3 wiks.

16* Ol rekota i lukim yu na famili hamaspela taimdei? long
 olgeta 3 wik na askim long:

- (a) Kopi yupela salim-----
- (b)Kaikai yupela i kisim long gaden,hamas yupela salim .-----
- (c) Wanem kain rot famili i spendim moni-----
- (d) Hamas moni famili i kisim long narapela rot.-----

SMS Fieldwork - June 1993

Purpose

This phase of fieldwork is designed to collect qualitative data on why households engage in the economic activities they do. Interviews will be conducted with all adult household members and teenagers (greater than the age of 13) - all questions relate to the views of the individual and not the household.

Personal Identifiers

1. Name and position in the household (and gender)
2. Approximate age and education level.

Questions

1. Who decides how much food is planted? (both for household consumption and selling). Is there any conflict between household members (or outsiders) over this decision?
2. Who decides how much food is sold? What determines where the food is sold? Is there any conflict between household members over this decision?
3. Is the food you sell surplus to the household's consumption requirements?
4. Is some food grown purely with the intent of selling?
5. Who receives the cash income from food sales?
6. How is the cash income from food sales divided among the household (and others)? Are there any conflicts over this?
7. Have you planted any coffee recently? If yes, why? Who was responsible for making this decision?
8. In what form do you sell your coffee? Why?
9. Where do you sell your coffee? Why?
10. Who receives the cash income from coffee sales?
11. How is the income from coffee divided in the household? Are there any conflicts over this?
12. What do you spend most of your time doing? (list the three most important activities)
13. From what economic activities do you receive cash income? (list in order of

importance - all sources of income)

14. How do you spend the money you receive? (list all items in order of importance).
15. Who receives (which household member/others) these items you buy with your cash income?
16. Have you ever experienced any food shortages? When? What happened (weather, tribal fight etc.)? How did you get enough to eat at the time?
17. Do you have enough money to meet basic cash requirements (school fees etc.)? If not, how do you manage? (or do things just not get bought)
18. Can you grow enough food for your household?
19. Does your land provide you with enough cash income (from coffee and food)? to meet your basic cash requirements (school and hospital fees)?
20. What do you regard as being the most important use of your land (list in importance of use)?
21. When did you last hire labour from outside your household? Where they paid in cash, or kind or was it on a swap basis (to be paid back later)? If no outside labour go to question 24.
22. Do you plan your households production of food and coffee with access to outside labour in mind?
23. Why did you use this labour and not your own family labour?
24. What do you think are the most important uses of labour? (list in order of importance).
25. What are your main aims from the use of the household's land and labour?
26. Do you have any other aims from the use of the households land and labour? (list in order of importance)

Appendix 4

Labour Constraints During Coffee Harvesting
Period (Flush)

Household Number	1992 Total	1992 Female	1992 Male	1993 Total	1993 Female	1993 Male
1	1.48	2.76	0.69	1.74	3.27	0.77
2	1.45	2.23	0.67	1.96	2.95	0.97
3	0.91	1.27	0.46	1.23	1.54	0.86
4	1.24	2.08	0.40	1.16	1.88	0.45
5	0.49	1.07	0.20	0.57	1.20	0.25
6	1.78	2.49	1.06	1.83	2.19	1.46
7	0.29	0.32	0.24	0.28	0.34	0.15
8	0.31	0.56	0.18	0.48	0.89	0.26
9	0.36	0.36	0.36	0.26	0.26	0.26
10	0.44	0.38	0.50	0.31	0.29	0.34
11	0.56	1.34	0.17	0.58	1.29	0.23
12	0.47	1.26	0.27	0.27	0.90	0.10
13	1.04	6.20	0.18	0.93	5.45	0.19
14	1.01	1.43	0.41	0.83	1.14	0.39
15	0.37	0.54	0.11	0.30	0.43	0.10
16	0.90	0.74	1.06	0.86	0.95	0.76
17	0.30	0.47	0.18	0.35	0.56	0.20
18	0.44	0.91	0.26	0.47	0.95	0.28
AVG	0.77	1.47	0.41	0.80	1.47	0.45
SD	0.47	1.41	0.29	0.57	1.32	0.37
COV	61	96	70	71	89	83

Figures calculated by dividing number of hours worked per day by the number of available hours per day (worker units x 8). Therefore a figure of greater than 1 implies a constraint, or rather allocation greater than availability.

Appendix 5

Household Income Sources and Female Shares

Household Income Sources - 1992

HH	Coffee	Food	OSY1	OSY2	OSY3	OSY4	OSY5	OSY6	OSY7
1	767	483	24	201	762	0	500	387	0
2	608	521	160	172	150	0	0	127	0
3	500	209	85	72	0	0	0	384	0
4	218	92	2520	4	0	0	0	237	57
5	287	187	11	0	0	0	0	495	19
6	365	112	0	0	45	0	0	187	24
7	160	279	43	2	0	0	0	0	0
8	193	349	0	0	0	0	0	0	0
9	99	350	0	0	0	0	0	4950	0
10	6	156	6	21	0	0	0	0	0
11	59	85	0	0	97	0	1300	103	54
12	151	51	4	14	0	0	0	12	0
13	404	123	0	0	20	0	0	0	80
14	1058	222	0	18	268	0	0	35	65
15	588	193	0	70	28	0	0	0	150
16	226	26	100	5	125	0	10	13	73
17	390	185	0	42	54	480	22	47	114
18	493	30	10	27	35	5	10	64	119
AVG	368	203	165	36	88	27	102	391	42

Household Income Sources - 1993

HH	Coffee	Food	OSY1	OSY2	OSY3	OSY4	OSY5	OSY6	OSY7
1	1020	472	178	153	845	262	0	96	0
2	827	472	164	240	0	820	2300	37	0
3	643	200	322	45	50	0	700	3174	0
4	433	130	420	0	3845	0	0	249	36
5	504	257	20	0	0	1	0	163	62
6	797	135	112	0	0	0	5	263	33
7	279	300	0	0	0	0	0	0	0
8	320	303	0	0	0	0	0	0	0
9	250	214	0	0	0	0	0	7500	0
10	90	21	1	0	0	0	0	0	0
11	212	78	0	0	83	0	0	13	2
12	174	12	0	0	0	0	0	4	0
13	456	341	8	0	0	0	0	20	55
14	1497	350	0	16	250	0	0	20	830
15	950	495	300	20	0	0	0	56	350
16	303	44	22	20	58	40	0	12	87
17	571	39	4	27	0	150	2	2	197
18	592	77	30	16	0	70	0	2	237
AVG	544	218	88	30	286	75	167	645	105

Household Income Sources (Female) - 1992

HH	Coffee	Food	OSY1	OSY2	OSY3	OSY4	OSY5	OSY6	OSY7
1	41	324	0	160	762	0	0	246	0
2	196	453	0	167	0	0	0	87	0
3	107	207	0	62	0	0	0	61	0
4	74	92	0	0	0	0	0	157	18
5	52	168	0	0	0	0	0	273	2
6	119	112	0	0	0	0	0	98	11
7	0	271	0	0	0	0	0	0	0
8	20	300	0	0	0	0	0	0	0
9	0	336	0	0	0	0	0	0	0
10	0	142	0	0	0	0	0	0	0
11	0	85	0	0	0	0	0	11	0
12	70	51	4	14	0	0	0	0	0
13	215	116	0	0	12	0	0	0	20
14	187	180	0	18	18	0	0	0	0
15	227	183	0	70	28	0	0	0	48
16	82	26	0	0	0	0	0	0	0
17	188	183	0	32	0	0	0	0	0
18	10	30	10	0	0	0	0	0	0
AVG	88	181	1	29	48	0	0	52	6

Household Income Sources (Female) - 1993

HH	Coffee	Food	OSY1	OSY2	OSY3	OSY4	OSY5	OSY6	OSY7
1	50	330	0	26	845	0	0	0	0
2	208	420	14	240	0	0	0	37	0
3	80	200	0	45	0	0	0	8	0
4	169	118	0	0	0	0	0	234	36
5	79	244	0	0	0	1	0	136	62
6	140	131	0	0	0	0	0	169	33
7	0	288	0	0	0	0	0	0	0
8	0	264	0	0	0	0	0	0	0
9	0	214	0	0	0	0	0	0	0
10	0	21	0	0	0	0	0	0	0
11	20	78	0	0	0	0	0	0	2
12	14	12	0	0	0	0	0	2	0
13	455	314	8	0	0	0	4	20	55
14	686	301	0	16	0	0	0	0	830
15	193	446	0	20	0	0	0	56	350
16	48	44	0	0	1	0	0	2	87
17	154	39	4	15	0	0	0	0	197
18	84	77	0	12	0	0	0	0	237
AVG	132	197	1	21	48	0	0	37	105

Key

- OSY1 - Animal sales
 OSY2 - Artifacts and Bilums
 OSY3 - Paid employment
 OSY4 - Compensation
 OSY5 - Bride Price
 OSY6 - Business income; including petty trading
 OSY7 - Gifts from family, wantoks and electoral candidates
 (1992 general election)

HH	Total - 92 Income (1)	Total - 92 Cash (2)	Total - 93 Income (1)	Total - 93 Cash (2)
1	4204	3124	4064	3026
2	2870	1737	5919	4859
3	2040	2529	5960	5422
4	3338	3233	5387	5318
5	1676	1000	1612	1008
6	1023	910	1629	1436
7	1460	439	1419	579
8	1965	542	3140	2144
9	6575	5194	8902	7965
10	607	189	563	112
11	2064	1697	753	212
12	1534	232	1293	190
13	1286	627	1756	885
14	2543	1626	4095	3095
15	2380	1028	3338	2171
16	960	577	1294	485
17	1821	1333	1606	991
18	1210	793	1521	1024
AVG	2197	1489	3014	2269

(1) Total income includes an imputed valuation for subsistence production.

(2) Total cash relates to cash sources only.

Where total income is used in the text this refers to the total valuation of household production including subsistence production. Total cash refers to cash incomes only

Appendix 6

Labour Scaling - Subjective Weights

Subjective labour units were attached to different elements of household labour to define the total number of worker units as follows:-

Adult male/female (18-50 years old) Working full-time in the village	1.0
Adult male/female (> 50 years old)	0.6
Non-adult (10-17 years old)	
- Not at school	0.6
- At school locally	0.3
- At school locally	0.0
Child (0-9 years old) living in the village	0.0

Appendix 7

Expenditure Levels and Gender Patterns

Household Expenditure Areas - 1992

HH	HHE1		HHE2		HHE3		HHE4		HHE5		HHE6		HHE7	
	Tot	Wom	Tot	Wom	Tot	Wom	Tot	Wom	Tot	Wom	Tot	Wom	Tot	Wom
1	289	233	12	0	15	15	190	14	378	0	10	0	99	19
2	163	99	0	0	39	0	222	7	509	41	31	6	54	7
3	197	80	0	0	46	12	318	0	254	20	9	0	10	0
4	491	229	0	0	112	4	16	0	26	0	0	0	50	0
5	546	365	0	0	94	30	50	0	29	3	0	0	31	17
6	478	192	0	0	98	21	1	0	70	0	0	0	44	16
7	171	75	0	0	0	0	9	0	5	0	36	26	32	8
8	79	27	8	8	2	0	0	0	0	0	0	0	12	0
9	123	95	0	0	0	0	0	0	2	0	0	0	16	0
10	107	40	0	0	16	0	3	1	14	0	0	0	7	0
11	257	84	1	0	160	46	4	1	19	0	33	12	62	3
12	264	96	0	0	196	4	6	0	39	0	28	6	16	9
13	253	222	0	0	32	14	5	2	93	21	23	5	8	4
14	958	219	28	28	173	24	467	0	122	16	150	0	566	33
15	337	236	21	0	62	25	11	11	270	122	150	0	210	66
16	9	6	0	0	2	0	0	0	1	0	0	0	0	0
17	53	34	3	3	15	0	5	0	0	0	11	11	2	0
18	15	10	0	0	4	1	0	0	0	0	0	0	1	0
AVG	266	130	4	2	59	11	73	2	102	12	19	4	68	10

Household Expenditure Areas - 1993

HH	HHE1		HHE2		HHE3		HHE4		HHE5		HHE6		HHE7	
	Tot	Wom	Tot	Wom	Tot	Wom	Tot	Wom	Tot	Wom	Tot	Wom	Tot	Wom
1	476	381	0	0	17	0	9	9	89	63	0	0	99	0
2	327	173	0	0	102	100	7	0	52	0	32	0	58	35
3	549	90	0	0	122	0	183	0	1082	0	7	0	760	0
4	736	262	0	0	263	4	27	0	50	0	6	0	93	6
5	471	132	0	0	85	7	5	0	38	4	0	0	59	10
6	652	231	1	1	353	0	14	0	49	5	0	0	81	17
7	93	44	2	0	0	0	0	0	0	0	0	0	0	0
8	154	10	0	0	10	0	0	0	0	0	0	0	5	0
9	132	68	0	0	0	0	0	0	9	0	0	0	2	2
10	48	6	0	0	4	0	2	0	1	0	0	0	4	0
11	102	46	0	0	49	15	3	0	12	0	0	0	39	4
12	302	133	0	0	169	0	0	0	1	0	10	0	58	4
13	275	231	6	0	31	6	0	0	63	40	15	0	54	33
14	582	294	0	0	190	8	111	0	241	77	100	10	275	22
15	435	276	0	0	14	8	30	0	264	45	0	0	299	166
16	11	3	0	0	0	0	0	0	0	0	0	0	0	0
17	37	25	0	0	0	0	4	0	0	0	3	0	2	0
18	31	11	0	0	0	0	0	0	0	0	0	0	0	0
AVG	301	135	1	0	78	8	22	1	108	13	10	1	105	14

Key

- HHE1 - Food and drink
- HHE2 - School fees
- HHE3 - All cultural (and family) obligations
- HHE4 - Inputs; chemicals and labour
- HHE5 - Pleasure; alcohol, tobacco, gambling plus other
- HHE6 - Clothing
- HHE7 - Saving/other/transport

Tot - Total for the household

Wom - Female total for the household

All figures relate to annual totals. Numbers have been rounded to the nearest Kina.