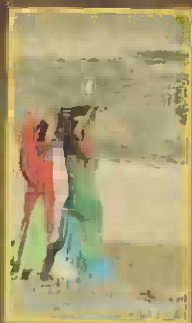


RESEARCH PROJECT REPORT



**Household Livelihood and
Coping Strategies in Semi-arid India
Adapting to Long-term Changes**

Czech Conroy
Sudarshan Iyengar
Viren Lobo
G. Bhaskara Rao



Natural
Resources
Institute



Society for Promotion of Wastelands Development

DFID Department for
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Czech Conroy
Sudarshan Iyengar
Viren Lobo
G. Bhaskara Rao

With contributions from
Ann Gordon
Rajiv Kumar
Uma Rani
Ajay Bhan Singh

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Writers

- Czech Conroy
- Sudarshan Iyengar
- Viren Lobo
- G.Bhaskara Rao

Contributors

- Ann Gordon
- Rajiv Kumar
- Uma Rani
- Ajay Bhan Singh

Editor

Sujata Kaushic

Cover photos

Prayatna Samiti, Udaipur

Publisher

Society for Promotion of Wastelands Development,
14A, Vishnu Dignaber Marg., New Delhi - 110 002
Tel : 323 6440, 323 6387
Email : spwd@vsnl.com

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CONTENTS

EXECUTIVE SUMMARY	5
CHAPTER A INTRODUCTION	10
A1 Background and Objectives	10
A2 Methodology	10
A3 Structure of the Report	12
CHAPTER B GENERAL TRENDS	14
B1 National Trends	14
B2 General Trends in Anantapur District	15
B3 General Trends in Udaipur District	17
B4 Discussion	19
CHAPTER C TRENDS IN AGRICULTURE	20
C1 National/Regional Trends in Agriculture	20
C2 Agricultural Trends in the Focus Districts and States	23
C3 Discussion and Explanation of Trends in Crop Production	27
C4 Discussion and Explanation of Livestock Trends	28
CHAPTER D TRENDS IN THE RURAL NON-FARM SECTOR	30
D1 Classifications and Definitions	30
D2 Patterns and Trends at the National/Regional Level	30
D3 Trends in Focus Districts and States: Anantapur and Andhra Pradesh	32
D4 Trends in Focus Districts and States: Udaipur and Rajasthan	32
D5 Discussion and Explanation of Structural Trends in Rural India	34
CHAPTER E DESCRIPTION AND EXPLANATION OF LIVELIHOOD SYSTEMS	37
E1 DFID's Sustainable Livelihoods Framework	37
E2 Livelihoods in Semi-arid India	39
E3 Livelihoods in Anantapur District and Survey Villages	40
E4 Livelihoods in Udaipur District and Survey Villages	42
E5 Livelihood Adaptation in Response to Long-term Trends	46
E6 Explaining Changes in Livelihoods	49
CHAPTER F RESPONDING TO SHOCKS: HOUSEHOLD COPING STRATEGIES	53
F1 Coping and Adaptation in General	53
F2 Household Coping Strategies in Anantapur District	55
F3 Household Coping Strategies in Udaipur District	57
F4 The Impact of Long-term Changes on Coping Strategies	60
CHAPTER G GENDER AND LIVELIHOOD STRATEGIES	63
G1 Gender Differences in Literacy, Education and Health	63
G2 Gender and Farm Work and Management	64
G3 Gender and Off-farm Work	64
G4 Gender and Diversification into the RNFS	66
G5 Decision-making in Financial Matters	66
G6 Changes in the Status and Position of Women in Anantapur District	67
G7 Effects of Drought on Men and Women	67
CHAPTER H POVERTY IN SEMI-ARID INDIA	69
H1 Introduction	69
H2 Poverty Line Trends	69
H3 Broader Aspects of Poverty and the Poor	72
H4 Poverty and Vulnerability in the Focus Districts	76
CHAPTER I IMPROVING LIVELIHOODS: CONSTRAINTS AND OPTIONS	78
I1 Constraints on NR-based activities	78
I2 Constraints on Non-farm Sector Activities	80
I3 Improving NR-based Activities: Opportunities and Research Constraints	80
I4 Opportunities and Research Constraints in the Non-farm Sector	84
References	85
Abbreviations	88

FOREWORD

Nature has blessed all living beings with intelligence and capacity to develop coping strategies for their survival under stressful environment. Human beings are no exception to it. Nature has also provided opportunities and resources. Wise and sustainable use of these resources enables the humans to cope with such stresses on short and long-term basis.

In arid and semi-arid regions of the country land productivity is poor, agriculture is in the back seat, livestock production with almost zero inputs is a widely adopted enterprise and sources of employment and income are meager. People have, over centuries of their persistent encounter with scarcities and struggle with the vagaries of nature, developed short and long term coping strategies to suit the highly variable unpredictable climatic and inhospitable environmental conditions. A detailed study of this subject can provide useful information to the policy-makers, researchers, planners and implementers of development programmes to strengthen these locally fabricated time tested strategies with technical, financial and institutional inputs.

With this objective in mind, the Society for Promotion of Wastelands Development collaborated with the Natural Resources Institute of UK, Gujarat Institute of Development Research (GIDR) and partner NGOs in Udaipur, Rajasthan and Anantapur, Andhra Pradesh for a study on 'Household Livelihood and Coping Strategies in Semi-arid India : Adapting to Long-term Changes' with financial assistance from DFID during 2000-2001. The study reveals how people develop coping strategies to make the best use of the scarce resources they have, what impact these strategies have on the status of natural resources, socio-economic condition of the families and the area and various other factors influencing structuring and adapting to these strategies.

The study is probably the first milestone atleast in India in the direction of understanding the ability of the people to cope with environmental stress for their survival. Conducting similar studies in other ecofragile regions of the country would further enrich our knowledge on this subject so as to make natural resource regeneration programmes more need based and sustainable.

V.K. Misra
Executive Director
SPWD

Executive Summary

This report summarises and synthesizes the findings of a research project on household livelihood and coping strategies in semi-arid India, and how they have been changing over time. The project adopted a twin-track approach, combining desk studies with survey work in selected villages. The study is a multi-tiered and nested one. Using secondary data, the desk studies have described and analysed trends at different levels : (1) regional (semi-arid India), (2) focus district, (3) block and (4) village; while the survey collected primary data from groups and individuals within selected villages.

The macro-level (regional) desk studies were undertaken by Gujarat Institute of Development Research (GIDR), and the micro-level desk studies and survey work were co-ordinated by the Society for the Promotion of Wastelands Development (SPWD). The micro-level work focused on Udaipur district, Rajasthan, and Anantapur district, Andhra Pradesh.

Semi-arid areas of India do not correspond with administrative areas of India, which made it difficult to review trends in the semi-arid regions as a whole. To get around this problem, GIDR divided 16 major states into drought-prone (D) and non drought-prone (NDP), according to the proportion of districts within each state that were categorised by the government as drought-prone. Thus, DP states were used as a surrogate for semi-arid regions.

National Trends

In the broadest terms, the national data point to less reliance on agriculture as a livelihood in DP areas and a greater tendency towards migration (rural-rural and rural-urban migration). This finding is principally based on:

- (a) lower population densities but higher rates of urbanisation in DP states; and
- (b) lower employment shares in agriculture in DP states.

It appears that this diversification has been due to a mixture of "push" and "pull" factors, and has had long-term benefits. The DP states have lower poverty rates and higher per capita net state domestic product (NSDP). Perversely, there is now a lower incidence of rural poverty in the DP states than in the NDP states, but higher urban poverty (though this difference is less marked than the rural poverty differential). However, DP districts have lower literacy rates than NDP districts.

The national-level data also give some clues to agricultural strategies in DP areas relative to NDP areas. There is a smaller area share devoted to forest and tree crops in DP areas, and a higher percentage of area is sown. DP states devote a smaller share of area to cereals and a higher share to oilseeds. Coarse grains are much more important in DP states than NDP states. A smaller percentage of the cropped area is irrigated. Cattle are more important in NDP areas and sheep markedly more important in DP areas. Although agricultural production strategies are less intensive in the DP areas, there is nonetheless a clear trend towards intensification and greater use of purchased inputs.

Average land-holding size is falling particularly rapidly in DP areas (though holdings are almost twice as large as those in NDP areas). Land distribution is less equitable in DP areas than in NDP areas. Boxes 1 and 2 summarise the distinguishing characteristics and trends in DP areas.

Box ES1: How are DP Areas Different from NDP Areas?

- Lower population density
- Lower literacy
- Larger holding size
- Smaller share of the population employed in agriculture
- Less urban (in the immediate area)
- Agriculture less intensive
- Smaller percentage of the rural population is poor
- Higher percentage of urban population is poor
- Higher migration rates (though much of it seasonal)
- Less forest
- Less irrigation
- Higher percentage of area is cultivated (annual crops)

Box ES2: What are the Trends in DP Areas?

- Becoming more densely populated
- Holding size becoming smaller
- Agriculture becoming more intensive, more monetised and more market-oriented
- Agriculture becoming more specialised - less diversity in varieties and species
- Extreme pressure on groundwater resources
- Permanent or seasonal migration and daily commuting becoming more common
- Better road and transport links, facilitating migration, commuting and market access
- Less CPR and whatever is there has to be shared among more people
- More farms worked almost exclusively by women, elderly and children

There are several aspects of this analysis that give rise to concern over the future sustainability of rural livelihoods in DP areas:

- (a) on average, land holdings are rapidly becoming smaller, and this is accompanied by a trend towards more unequal distribution of land; it implies an increasing incidence of landlessness or near-landlessness;
- (b) the sown area share is already much higher than in NDP areas, so scope to increase production from increased area is becoming more limited;
- (c) forest area is less in DP districts and limited forest cover also means less use of CPR as an income supplement;
- (d) groundwater is becoming less accessible; DP areas depend substantially on water from borewells
- (e) populations in DP districts are less literate than those in NDP districts - exacerbating their inability to access the more remunerative categories of non-farm employment.

Changes in Household Livelihood and Coping Strategies

As a result of some of these trends, both crop production and animal husbandry are generally making smaller contributions to people's livelihoods than they did in the past. Secondary data at both the macro and micro-levels, and primary data from the project survey, show that a large proportion of households with farms have been diversifying into off-farm work of various kinds during recent decades, most of it outside the village of residence.

Table ES1 summarises changes in livelihood and coping strategies in DP areas.

In the past	Present → future trend
<ul style="list-style-type: none"> ● More subsistence and food crops ● Own storage of food crops ● Quasi-protective patron-client relations ● Reduce risk through crop diversification ● Low-yielding drought-tolerant species ● Use own stores and livestock as savings ● Credit from local lenders in community ● Low interest rates but other obligations ● More attached labour ● Migration an activity in crisis ● Less irrigation ● More surface and groundwater ● More land-based CPRs 	<ul style="list-style-type: none"> ● More market-oriented and cash crops ● Purchase of food crops ● More dependence on the state and PDS ● Specialise to increase income ● More use of HYVs and purchased inputs ● Use cash savings, also land and home ● Wider choice of lenders including banks ● Higher interest rates but fewer conditions ● More wage labour and seasonal migration ● Migration a normal or preferred option ● Uncertain (conflicting trends) ● Growing scarcity of water resources ● Less availability of land-based CPRs

However, the situation in the two survey districts (Anantapur in Andhra Pradesh and Udaipur in Rajasthan) was somewhat different. Andhra Pradesh has made significant inroads on poverty and this seems to partly explain very marked improvements in rural livelihoods in Anantapur over the last 20 years. In Anantapur groundnut has become the dominant crop and significantly boosted incomes in the study area during the 1980s and early 90s.

Focus district	1985	1993
Anantapur	65	92
Udaipur	57	53

In sharp contrast to the situation in Anantapur (and Andhra Pradesh as a whole), Rajasthan has a very poor track record in tackling poverty. Udaipur district experienced only limited development during the last 15 years. The contrast between the two districts is summarised in Table ES2.

Livelihood Adaptation

The survey findings show households have responded to long-term trends through a process of *adaptation*, defined as a continuous process of changes to livelihoods, which either seek to enhance existing security and wealth or try to reduce vulnerability and poverty. Adaptation includes diversification (see below for definition), but is not synonymous with it because adaptation includes modifications to existing activities (e.g. intensification of crop production), as well as taking on new ones.

Adaptation generally involves some form of *asset-building strategy*. The report discusses five types of assets or capital that households draw on: human, social, financial, natural and physical. Rural people make long-term investments to develop assets that they will be able to use in the future to improve their livelihoods. For example, families invest in the education and training of their children, while adults seek to improve their skills (e.g. learning to drive a truck or to be a car mechanic) through informal learning processes.

The survey found that parents were also seeking to improve the living standards of their children in the future. This long-term (sometimes inter-generational) dimension of people's livelihoods is not well covered by household economic models, or by the literature on coping strategies, both of which tend to have a short-term focus.

Diversification and Rediversification

There is a lot of interest in livelihood diversification¹ among researchers and policy-makers. However, much of the literature overlooks the fact that households often had a diverse portfolio of activities and assets in the recent past, most of which utilised land-based common pool resources (CPRs). Our survey found that the decline in the quantity and quality of land-based CPRs has been accompanied by a reduction in activities that used to be associated with them, particularly the collection of various non timber forest products (NTFPs) and the grazing of animals. Thus, it would be more accurate to describe the more recent trends to diversification of activities as *rediversification*, or as the replacement of traditional types of non-farm activities with new ones.

Most of the diversification has been away from agriculture and into the non-farm sector. The non farm sector (NFS) can be usefully sub-divided into two categories: one that is stagnant, with poor returns; and one that is buoyant and dynamic, with high returns. Typical characteristics of the two categories are shown in Table ES3.

Table ES3 Duality within the Non-farm Sector	
Stagnant, poor returns	Dynamic, high returns
Casual labour	Businesses
Household manufacturing	Non-household manufacturing
Very small enterprises	Small and medium scale enterprises
Traditional technologies, products and services	Modern technologies, products and services

Urban Linkages - Positive or Negative?

A growing proportion of rural non-agricultural workers work in nearby towns. Better roads bring new sources of employment, most of which are in urban centres. These are accessed either by seasonal migration or by daily commuting. It is unusual for a whole household to relocate to towns, but when children reach adulthood they may take up permanent residence in an urban centre.

In principle, urban linkages may be *positive or negative*: urban industrial production may:

1. compete with rural industry (e.g. plastic shoes with leather ones); or
2. provide a source of sub-contracts for rural workers (e.g. for diamond polishing); or
3. provide employment (possibly at higher rates) for rural people who migrate or commute to urban areas for work.

Examples of all three of these effects were found in the literature and/or survey results. However, the project's findings (especially from Anantapur district) suggest that the net impact of the processes associated with urbanisation is positive. For example, for poor people living in villages near to Anantapur town, there was a greater diversity of income-earning opportunities, and they received higher wages. This also seems to be the view of villagers covered in the project survey, who perceive the development of transport infrastructure linking them to urban areas as almost entirely beneficial. In some areas, urban linkages appear to be a more important stimulus to NFS growth than agricultural linkages.

Explaining Changes in Livelihoods

In principle, there is a wide range of non-farm activities that households and their members can choose, and different households select different ones. It would be interesting and important to know what factors determine their choices. In particular, why do some enter the stagnant non-farm sector, while others enter the dynamic one? The report argues that the options available to people are a function of their access to the five types of capital mentioned earlier. For example, the quality of human capital is influenced by education; and high quality secondary, or even tertiary, education is a pre-requisite for certain well-remunerated types of work.

There is evidence that members of poorer farming households tend to diversify into casual unskilled wage labour (primarily in construction, agriculture and mining and quarrying). Wealthier households, on the other hand, tend to diversify into semi-skilled work, new enterprises of their own or salaried employment.

A major implication of this is that it is only the better-off or landed groups who have access to the more remunerative non-farm activities, and that they benefit more from the shift out of agriculture than poorer groups who are unable to enter the dynamic parts of the NFS. This suggests that diversification out of the agricultural sector may be increasing income disparities within rural India. Nevertheless, growth of the NFS appears to be benefiting most sections of rural society, even those involved in unskilled wage labour. All of the social groups interviewed in Anantapur believed that their standard of living has improved during the last 20-30 years.

¹ One definition of rural livelihood diversification is: "the process by which rural households construct an increasingly diverse portfolio of activities and assets in order to survive and to improve their standard of living" (Ellis, 2000).

There are several reasons why diversification has been taking place, including a mixture of 'push' and 'pull' factors. The latter include better access to, and availability of, off-farm work, particularly outside the village of residence and particularly in urban centres. For poorer households, the survey results and secondary sources show that 'push' factors are the main driving force behind diversification, particularly where it involves seasonal migration. Since the off-farm opportunities available to them tend not to be well remunerated, they spend less time away from the farm than people with access to semi-skilled or skilled work. In Udaipur, they also gave other reasons for preferring agriculture, namely:

- it is a more certain source of food for survival than off-farm work;
- casual wage labour is seen by some as a kind of bondage, whereas when working their farm they are their own boss;
- wage labour outside the village is full of hassles.

By contrast, land-holders with access to skilled labour or salaried work tend to make their choices slightly differently, primarily on the basis of one criterion - maximising the returns on their labour. Thus, they spend a higher proportion of their time away from their farms. Their off-farm work may also be more secure (less casual), and some are permanently employed, e.g. in factories.

Migration

Migration is a particular form of diversification. Most migration is seasonal, and seasonal labour migration is now an integral part of the livelihood strategy of a large proportion of rural households in semi-arid India. Migration can be advantageous in a number of ways, all of which were identified in the survey findings.

It can:

- provide access to new livelihood activities that are not available locally;
- provide access to better paid work of a similar kind to that which is available locally; or
- increase the amount of work of a given kind that is likely to be available over a certain period of time.

An important factor influencing the migration options available to people may be ease of access to (i.e. the speed and cost of reaching) locations where employment opportunities are available. Steady improvements in transport infrastructure and services have greatly reduced travel time (and hence probably transaction costs), thereby facilitating: (a) daily commuting to urban centres and (b) migration. For example, some people from Udaipur are now migrating to as far as Mumbai, whereas 20 years ago hardly any one would have done so.

Household Coping Strategies

A household coping strategy comprises a number of different components (mechanisms) that may be used in particular sequences or situations. Coping mechanisms fall broadly into the following five categories:

- Diversifying sources of income, including seasonal migration.
- Drawing upon common pool resources, such as village common lands and forests.
- Drawing upon social relationships (patronage, kinship, friendship) and informal credit networks.
- Drawing upon household stores (e.g. food, fuel) and adjusting current consumption patterns.
- Drawing upon liquid assets.

Most of the existing literature on coping strategies has three weaknesses. First, the examples given tend to be 'snapshots' of what a particular group did to cope with drought in a particular year, in other words, they lack a historical or temporal perspective. Second, they are nearly all pre-occupied with drought, there is very little information about how households cope with other types of shock. Third, they have not been related to macro-level trends. In this study we have sought to address these shortcomings.

CPR-related coping mechanisms	Drought year		
	1972	1987	1999/2000
Drawing on common resources	Forest products (gums, fruits, etc.) available	Forest products (gums, fruits, etc.) available	Forest products not available
Drawing on common resources	Wood, charcoal sold to contractors		Wood, charcoal not available
Drawing on common resources	Fodder available	Fodder available	Fodder not available
	Water crisis not severe: some irrigation from wells, ponds	Water crisis not severe: some irrigation from wells, ponds	Water crisis severe: irrigation generally not possible, even from tubewells
Animal husbandry as risk-spreading practice	Yes. More animals, so more animal products available. No fodder purchased.		AH less effective at spreading risk. Animals are less and weaker due to fodder scarcity
Drawing upon liquid assets: livestock especially goats	Sale of livestock,	Less livestock to sell	Less livestock to sell

This study looked at how households' coping strategies have changed over time, by comparing their responses to different droughts. We found that there have been major changes in coping mechanisms (in Udaipur district). Underlying some of these changes in coping mechanisms is a decline in households' access to natural capital, particularly water and land-based common pool resources. The CPR-related changes are summarised in Table ES4.

The contribution made by most coping mechanisms has declined, and in some cases has disappeared altogether. The coping mechanism of drawing on common pool resources is no longer practised in many areas (as illustrated by Sagatdi village case study in the table).

Diversifying sources of income is the coping mechanism that has grown the most in importance for a large proportion of rural households. It includes not only commuting or migrating for work, but also remittances from children who have settled in places, often urban, some distance from their parents' village. Such new sources of income have now become an integral part of their livelihood system.

The Robustness of Livelihoods to Drought

One important question is whether people's livelihoods are more or less robust to drought now than they used to be. People in survey villages in Udaipur were generally of the opinion that the 1999/2000 drought was the worst of the three in living memory, due to:

- the much lower water table, and hence little, if any, irrigation in the *rabi* season;
- the marked decline in availability of forage;
- the reduced availability of forest products; and
- the comparative lack of government relief work during the recent drought.

On the other hand, we have to take account of the fact that people have been diversifying into new activities, that tend to be less sensitive to drought. Furthermore, in many parts of the country state drought-relief and food security measures may be more effective now than they were 30 years ago. Thus, the answer to the question may vary, depending on the specifics of people's livelihood activities and on the extent to which the natural resource base in the vicinity of their village has been eroded.

Recommendations

The report makes a number of recommendations aimed at removing constraints on the livelihoods of the rural poor. Some of these recommendations are for further research, while others are for appropriate policies. Major topics where further research is recommended include:

- the impact and conditions of seasonal labour migration by men; and
- the threats and opportunities for poor farmers arising from globalisation.

□

INTRODUCTION

This report summarises and synthesizes the findings of macro-level desk studies undertaken by Gujarat Institute of Development Research (GIDR) and micro-level desk studies and survey work co-ordinated by the Society for the Promotion of Wastelands Development (SPWD)². The micro-level work focused on Udaipur district, Rajasthan, and Anantapur district, Andhra Pradesh. The two sets of work were designed to complement each other, contributing to a project on household livelihood and coping strategies in semi-arid India, managed by the Natural Resources Institute (NRI), University of Greenwich, United Kingdom (UK). The project has been funded by the UK Department for International Development's (DFID) Natural Resources Systems Programme³.

A1 Background and Objectives

This project sought "to provide a sounder understanding of: current livelihood and coping strategies of poor rural households in semi-arid areas of India; the factors constraining them; and the macro-level forces shaping their evolution and adaptation". Based on this improved understanding, "it will recommend effective options for strengthening livelihood and coping strategies" (project memorandum). To achieve this overall purpose, the project had four specific objectives:

- to synthesize information on macro-level trends and issues affecting semi-arid rural systems in different parts of India;
- to analyse household coping strategies identify key components;
- to develop a qualitative explanation of trends in household livelihood and coping strategies; and
- to identify constraints on livelihood options, particularly researchable ones.

More specifically, the project sought to:

- distinguish the livelihood strategies of different communities and/or social groups;
- identify which groups form the true poverty focus of the semi-arid zone;
- identify researchable constraints on the livelihood options open to those groups; and
- assess the effective demand for new livelihood options.

In addition, the research call indicated that the analysis of household strategies should cover all key household management decisions, including:

- allocation of family labour;
- management of natural resources, especially soil fertility;
- technical choices within crop, livestock or other enterprises;
- choices between enterprises, including subsistence vs commercial production and off-farm work;
- strategies to manage rainfall and other variable factors;
- savings, investment and borrowing decisions;
- management of household consumption; and
- community activities and other social action.

The study sought to investigate a number of key issues, including:

- How can we explain the portfolios of livelihood activities in which different households are involved?
- What are the coping strategies of different groups of households, and how have they changed over time?
- What are the main constraints on people's choices of livelihood and coping activities?
- Are households more or less vulnerable now than they were?

A2 Methodology

The project adopted a two-pronged approach, combining desk studies with survey work in selected villages. The study is a multi-tiered and nested one. Using secondary data, the desk studies have described and analysed trends at different levels - (1) regional (semi-arid India), (2) focus district, (3) block and (4) village; while the survey collected primary data from groups and individuals within selected villages.

² Other NGOs were involved in the survey work. In Udaipur District, there were four, each covering a different block. They were Astha (Kotra block), Prayas (Pratapgarh block, adjacent to Udaipur district in Chittorgarh district), Prayatna Samiti (Girwa) and Seva Mandir (Jhadol). In Anantapur district, the survey work was carried out by Mass Education and Organisation Society (MEOS). We would like to thank all of them for the major contribution they have made to this study.

³ This document is an output from a research project funded by the UK Department for International Development (DFID) for the benefit of developing countries. The views expressed are not necessarily those of DFID. The number of the research project is R7558.

A2.1 Macro-level desk studies

Semi-arid areas of India do not correspond with administrative areas of India, which made it difficult to review trends in the semi-arid regions as a whole. To get around this problem, GIDR divided 16 major states into drought-prone (DP) and non drought-prone (NDP), according to the proportion of districts within each state that were categorised by the government as DP (see Table A1). They also placed districts in these two categories, based on government definitions, for the purposes of comparison. This was because districts are not readily categorisable into semi-arid and non semi-arid either.

Drought - prone (DP) states		Non-drought prone (NDP) states	
1. Andhra Pradesh	(8/23)	1. Assam	(0/23)
2. Gujarat	(12/19)	2. Bihar	(6/42)
7. Haryana	(5/16)	3. Himachal Pradesh	(2/12)
3. Karnataka	(15/20)	4. Kerala	(0/14)
4. Maharashtra	(10/30)	5. Madhya Pradesh	(11/45)
5. Rajasthan	(17/27)	6. Orissa	(4/13)
6. Tamilnadu	(9/21)	7. Punjab	(0/12)
8. Uttar Pradesh	(15/63)	9. West Bengal	(3/16)

Note: Figures in the bracket indicate number of drought districts and total number of districts in the state.

GIDR also produced a second desk study, a review of the literature on household coping strategies in semi-arid India. In addition, NRI reviewed key references in the literature on: (a) coping strategies in general; and (b) livelihood trends and diversification in India, with particular reference to the non-farm sector (NFS) and explanatory models.

A2.2 Selection of districts and blocks

Districts

Two semi-arid districts, both with relatively high levels of poverty, were selected to represent different cultural and agro-ecological conditions. The districts were chosen from different states (Andhra Pradesh and Rajasthan), to allow for the possibility of differences in state policies influencing livelihood too. Udaipur district has a high proportion of tribals, whereas Anantapur district has few tribals and a higher proportion of scheduled castes (SCs). Mean annual rainfall is quite similar in the two districts, but the cropping systems are distinctly different.

Another factor influencing the selection of districts was the presence of DFID-supported TC projects in or near to the district. These are the Western India Rainfed Farming Projects (WIRFP), in the case of Udaipur; and the Andhra Pradesh Rural Livelihood Project (APRLP) in the case of Anantapur. The intention was to generate findings that would be directly relevant to the projects. Another reason for selecting Udaipur district was the fact that SPWD and its local NGO partners have been working there for several years, and had already developed a good understanding of livelihoods in certain parts of the district.

Blocks in Udaipur District

Four blocks were selected in Udaipur district, or adjacent to it, in which survey work would be undertaken. Two of them are blocks where SPWD is working with its partners, namely Girwa and Pratapgarh. The latter is in Chittaurgarh district, but is adjacent to Udaipur district. These two blocks were also chosen to illustrate the situations of villages near to a major urban centre (Girwa is near to Udaipur city) and those remote from such a centre (Pratapgarh). In Pratapgarh block there is a different type of marginal farmer to that found in Girwa, namely those who do not rely on wage labour. An important activity for these people is the collection of *tendu* leaves for making *beedis*.

Two more blocks were selected to cover significant phenomena in the district that are not strongly present in the first two blocks: these are seasonal migration for agricultural wage labour, and a shift from food crops to cash crops. The GIDR trends report had identified that both of these phenomena are also present more widely in semi-arid India, which was another reason for trying to cover them in Udaipur. Thus, Kotra block was added to cover the former, and Jhadol block to cover the latter.

Blocks in Anantapur district

In Andhra Pradesh, blocks have been replaced by *mandals* as administrative units. The basis on which the two *mandals* were selected was that one should be close to a major urban centre and one more distant. Anantapur *mandal*, which includes the town of Anantapur was the former, and Rayadurg was the latter.

Anantapur district	
Blocks	Villages
Anantapur	Manila
	Somaladoddi
Rayadurga	Mechiri
	Vadrahonnuru
Udaipur district	
Blocks	Villages
Girwa	Patukheda
	Sagatdi
Jhadol	Goran
	Malpur
Kotra	Hasreta
	Tulikakhet
Pratapgarh	Haripura
	Mhendi Kheda

A2.3 Survey methodology

Survey work was undertaken in two villages in each block, using semi-structured group discussions and case studies of individuals from each major group. Semi-structured, as opposed to structured, interviews were chosen because they are better suited to gaining insights into the reasons for livelihood practices, inter-relationships between them and the reasons for changes in them.

Groups

A group discussion was held with each of the major livelihood groups that had been identified in the block or village concerned. To apply this methodology it was necessary to know which households belong to which groups, so that people from those households could be invited to the relevant group meeting.

In the two SPWD blocks this information was to be obtained through some form of household census - based on a door-to-door survey, existing information about SHG members, and/or BPL lists. It was thought that in the other two blocks this method would require too much time and resources: the likely alternative there would be to ask a mixed group of villagers to identify major categories and to say which households belong in each.

Individuals

We also carried out semi-structured case studies of individuals, which were intended to put flesh on the general points and trends (skeletons) identified through the group discussions. It was originally planned to do two per livelihood group, but this had to be reduced to one because of time constraints.

Gender

Livelihood changes can affect men and women in different ways, and their attitudes towards them are also liable to be different. Thus, the above-mentioned process was applied to both men and women. They were interviewed separately, at both the group and individual (case study) levels, in order to ensure that women's views were obtained. In the individual case studies, a husband and wife were interviewed.

Content of Survey

The specific focus areas chosen were influenced by the findings of the two GiDR reports, and by gaps in the literature that had been identified. Two general weaknesses of reports and articles in the literature are that: (a) they tend to describe livelihood and coping strategies at a particular point in time, without much reference to how they have evolved over time; and (b) they tend not to relate micro-level findings to higher level factors that may be affected the micro-level. Thus, in this study we aimed to look at livelihoods and coping strategies in these wider contexts, and improve understanding of them as a result.

A2.4 Reports

Apart from this report (known as the 'synthesis report'), SPWD will be producing a report for each of the two districts, containing:

- An overview of the district, including agro-ecological information, a description of livelihood systems and trends.
- Profiles of each block⁴ in which survey work has been done.
- A summary of the survey findings for all blocks.
- Discussion of the implications of the findings for policy and practice, and preliminary identification of any promising livelihood options.

A3 Structure of the Report

Chapters B, C and D describe macro-level trends of various kinds, drawing on the desk-based research undertaken by GiDR. They also describe corresponding trends in the project's two focus districts, Anantapur and Udaipur. Some of the information about the focus districts was provided by GiDR, and some by SPWD staff in the respective districts. The final section in each of these chapters seeks to explain why the trends described have been taking place. Chapter B describes some general trends, for example regarding literacy and infrastructure. Chapters C and D then proceed to describe trends affecting productive activities, i.e. agriculture and the rural non-farm sector respectively.

The remaining chapters have a more micro-level focus. Chapter E describes and explains livelihood systems. It discusses some concepts associated with livelihoods, and describes DFID's sustainable livelihoods framework. It then describes some of the main livelihood systems and groups found in rural semi-arid India, with particular reference to the two focus districts. Finally, section E5 describes how people adapt their livelihood systems in response to long-term trends, and section E6 seeks to explain why livelihoods have changed in the ways that they have. In some ways, sections E6 and D5 are covering similar ground, but they do so from micro- and macro-level perspectives respectively.

Chapter F is concerned with short-term changes (coping strategies) in response to shocks, such as drought. Section F1 discusses, in general terms, different types of changes and different responses to change, including coping strategies. Sections F2 and F3 then look at household coping strategies in the two focus districts. Finally, section F4 examines how people's coping strategies have changed over time, in line with long-term trends and changes in their livelihood systems as a whole.

⁴ In Udaipur district, the block profiles were produced by the NGOs that carried out the survey work in the block concerned.

So far, the discussion has focused primarily on households, as this was the primary focus of the project. Chapter G looks within the household at gender relations and at gender differences in relation to livelihood activities and assets. Section G2 is concerned with agricultural activities, while G3 and G4 focus on the non-farm sector. Sections G6 and G7 examine the effects on women of long-term changes (trends) and short-term changes (shocks) respectively.

Chapter H discusses the nature of poverty in conceptual terms. It begins (H1) with the conventional concept of the poverty line, defined on the basis of calorific intake, and looks at trends and patterns in poverty (H2), as indicated by this narrow conception of poverty. Section H3 then looks at broader and more complex definitions of poverty, particularly the dimension of vulnerability, and also temporal and gender aspects of poverty. Then in H4 the preceding general and conceptual discussion is related to the situations and the main groups found in the focus districts, with particular reference to vulnerability.

Finally, Chapter I summarises the main constraints affecting livelihood activities in semi-arid India. It then describes opportunities for improving people's livelihoods and for easing constraints; and identifies a number of researchable constraints, i.e. constraints that could be eased through an improved understanding of their nature, and/or through research into interventions intended to address them.

□

GENERAL TRENDS

B1 National Trends

B1.1 An overview

General trends (e.g. population growth, urbanisation, literacy) at the national-level are only briefly discussed here⁵. In the broadest terms, the national data points to less reliance on agriculture as a livelihood in DP areas and a greater tendency towards migration (rural-rural and rural-urban migration). This finding is principally based on:

- (c) lower population densities but higher rates of urbanisation in states where atleast one third of the districts are DP; and
- (d) lower employment shares in agriculture in DP states.

It appears that this diversification has been due to a mixture of "push" and "pull" factors⁶, and has had long-term benefits. The drought-prone states have lower poverty rates and higher per capita net state domestic product (NSDP). Perversely, there is now a lower incidence of rural poverty in the DP states than in the NDP states, but higher urban poverty (though this difference is less marked than the rural poverty differential). However, DP districts have lower literacy rates than NDP districts.

Possible explanations of the better performance of the DP states in respect of rural poverty are that:

- the benefits of lower population densities and larger land holdings now outweigh the agro-ecological advantages of the more densely populated NDP states;
- rural communities in DP states enjoy better access (determined by the better rural services available in higher income states) to larger urban markets than rural communities in NDP states;
- migrants from DP areas send money back to families in DP rural areas; and
- NDP states, where agriculture offers a reliable if not particularly lucrative livelihood, and forests help provide an income supplement, have retained their poor rural populations much longer⁷.

B1.2 Land use and landholdings

Land Use

Table B1 shows the land use pattern in DP and NDP states. The first point that emerges is that there has not been any major change in the land use pattern both in the DP and NDP states. The DP states have about 50 percent area under cultivation and 9 to 10 percent under current and other fallow. In NDP states, the cultivated area is slightly less at about 48 per cent and with five to six per cent of fallow.

Common Pool Resources

Both types of states are losing area under grazing and pasture land: the decrease from 5.1 per cent to 3.9 per cent of total reported area for DP states means that they have lost almost 25 per cent. NDP states have a considerably higher area under forests; but excluding forests, the DP states have more area under common lands overall than the NDP states. The area has been quite small (as a percentage of total reported area), however, throughout the period 1970/71-1993/94.

Category	Percentage to total reported area								
	1970-71			1980-81			1993-94		
	DP States	NDP States	All India	DP States	NDP States	All India	DP States	NDP States	All India
Forest	13.4	25.1	21.6	14.1	25.0	22.2	14.4	24.9	22.4
Not available for cultivation	15.1	12.6	14.9	13.5	12.3	13.1	13.8	12.85	13.5
Pastures & grazing land	5.1	4.1	4.4	4.6	3.7	4.0	3.9	3.8	3.7
Land under tree crops	0.7	2.2	1.4	0.7	1.4	1.2	0.7	1.6	1.2
Culturable waste	7.1	3.8	5.3	7.5	3.4	5.4	6.7	2.8	4.7
Fallow	3.8	2.0	2.8	3.8	2.3	3.1	4.1	2.3	3.2
Current fallow	4.7	3.0	3.6	6.6	3.4	4.6	6.2	3.4	4.7
Net sown area	50.1	47.2	46.0	49.2	48.4	46.6	50.2	48.4	46.6

Source: Statistical Abstract Volumes, Central Statistical Organisation, Govt.

⁵ Further details are available in a GIDR report by Professor Sudarshan Iyengar, entitled "Development Trends in Drought-prone Areas of India: State and District-level Analysis". Hereafter, the reference used for this report is Iyengar, 2001.

⁶ The factors driving diversification are discussed in sections D5 and E6.

⁷ In DP areas, severe but erratic droughts can lead to an uneven exodus. Moreover, once large numbers of DP community members have migrated (seasonally or more permanently), it is easier for others to follow. There are large numbers of poor in NDP areas but less incidence of crisis migration arising from a particularly severe drought.

The forest area has increased slightly in DP states, presumably as a result of afforestation initiatives such as the social forestry projects of the 1980s and the JFM programmes of the 1990s. However, such initiatives, particularly social forestry projects, may have been associated with some restrictions on grazing and on access to forest products.

There have been a number of more micro-level studies of trends in common pool resources CPRs, of which the most comprehensive was Jodha's (1986). His analysis of twenty-one semi-arid districts in seven states reveals that over the previous three decades there had been a decline in the total area of CPR ranging from 26 to 58 percent in some regions. Besides the decline in the total area there had also been a decline in the productivity manifesting itself in shortening periods of assured supplies of fuel, food and fodder (Jodha, 1985).

Pasha (1992) in his study of three villages in Karnataka observed that CPRs had declined by about 33 percent over the previous 20 years. In the arid region of Rajasthan there was a 7-26 percent decline in CPR for grazing. One of the consequences of the decline in the grazing space was an increase in density of animals per unit of common grazing land, from 39 animal units per 100 hectares in 1951-52 to 105 during 1977-78 (Jodha, 1985).

In a survey of 15 villages in Gujarat, Iyengar and Shukla (1999) observed the reduction in the size of the CPR land and how its condition has deteriorated. These trends have seriously affected the livestock communities in the Kutch and Saurashtra regions who have a high proportion of cattle, goat and sheep population, and whose dependence on common pool resources is substantial (Iyengar, 1989).

Private Landholdings

The population increase has been higher in drought regions, and this is reflected in the pressure on farmland. Average size of operational holding has consistently fallen over time. Average land-holding size is falling particularly rapidly in DP areas (though holdings are almost twice as large as those in NDP areas). Table B2 contains data on land holding.

Reduction in average size of land holding is not accompanied by more equitable distribution of land. In fact, in most states whether DP or NDP the concentration ratio computed by Ginni coefficient shows an increase (Iyengar, 2001). In DP states average Ginni value was 0.534 in 1970-71 and it increased to 0.617. In NDP states it rose from 0.451 to 0.525. Rise in Ginni values imply that small holders were losing out to large holders.

	1970-71	1980-81	1990-91
Drought states	3.3	3.2	2.6
Non Drought states	1.7	1.6	1.5
All India	2.3	2.0	1.7

Source: Basic Statistics Relating to States of India, Centre for Monitoring of Indian Economy, Mumbai, September 1994.

B1.3 Availability and use of water

There is no systematic collection of data on this subject in India. Nevertheless, numerous studies have documented a rapid increase in the volume of groundwater abstracted, and a decrease in watertables in various parts of the country, particularly in semi-arid and arid regions. There has also been a trend of reduced area of local surface water storage systems, accompanied by a general shift from surface water for irrigation to groundwater.

B2 General Trends in Anantapur District⁸

Anantapur is one of eight drought-prone districts in Andhra Pradesh, with an average rainfall of 544 mm. It is a relatively sparsely populated district in the state, as well as being one of the poorest. Nevertheless, Anantapur has achieved 100 percent rural electrification.

B2.1 The human factor: demography and education

The density of population is 166 per square Km., while the same at state level is 241. According to 1991 census, the district has 3.18 million people. Of which 1.64 million are males and 1.55 million are females. The sex ratio is 947 (972 in the state). The district has most of demographic features of under developed region, such as: low urbanization, higher work participation rate, higher population growth, low literacy rates, adverse condition of women, etc. The district has 63 mandals, 12 towns, and 956 villages (only 932 are inhabited villages). Nevertheless, literacy rates have increased sharply during the last two decades (see Table B3), and other indicators also suggest improvements.

Profile	1985	1993
CMIE index of level of economic development	65	92
Area and population		
Number of occupied houses (000)	467	617
Number of households (000)	471	n.a.
Area ('000 sq. km.)	19	19
Population (Lakhs)	25	32
Growth of population (1971-91)	2.4	2.2
Density (persons per sq. km.)	137	166
Urbanisation (%)	21	24
Literacy (%)	29	42
SC population (%)	14	n.a.
ST population (%)	3	n.a.
Labour force (%)	43	46
(a) Agriculture (i+ii)	76	76
(i) Cultivators	40	n.a.
(ii) Agricultural labourers	36	n.a.
(b) Non-agriculture (iii +iv)	24	24
(iii) Household industries	4	3
(iv) Others	20	21
(v) Services (part of iv)	—	15.4

⁸ This section draws primarily on the SPWD report on Anantapur District.

B2.2 Structure of economy and occupations

Despite being drought-prone and under-developed, Anantapur appears to have been making good progress. The index value indicating level of development suggests improvement over time, as can be seen from Table B3. Between 1971 and 1991, population growth slowed down, although density has increased. The extent of urbanisation was higher in 1991. In early 1990s thus Anantapur seems to have consolidated its economic strength.

Table B3 shows the sectoral pattern of employment in the district. Proportion of workers to total population has registered an increase, but the occupational structure has not changed. 76 per cent of the workers are engaged in primary sector, i.e., agriculture and allied activities. This is by far the major sector, particularly for women, accounting for about 75 percent of all workers. The services sector is the second most important.

Type of infrastructure	Unit	1985	1990s	Reference year for previous column
Bank branches per 100,000 persons	No.	6.2	6.44	1994-95
Per capita bank deposits	Rs.	380	1923.67	1994-95
Per capita bank credit	Rs.	258	1188.26	1994-95
Per capita bank credit to agriculture	Rs.	473.33	1994-95	

Source: Data from SPWD Anantapur Report and lyengar, 2001.

B2.3 Infrastructure

The banking infrastructure has strengthened, with more bank credit available to industries also. Per capita bank deposits have grown dramatically. They rose from Rs 380 in 1985 to Rs 1924 in 1994/5. This has been accompanied by a slightly slower growth in per capita credit.

B2.4 Land use and landholdings

More than 50 percent of the geographical area is put under cultivation (net sown area - NSA), but it fluctuates widely every year due to rainfall and other related factors. As a result fallow lands also fluctuate every year. Except forests and barren lands, most of the common lands have been brought under cultivation (see Table B5). Advent of improved varieties of Groundnut encouraged the extensive cultivation and widespread encroachments and assignment of common lands in the district. Only about 5 percent NSA is put under multiple crops. Groundnut became predominant crop.

Category	Area for triennium ending				
	1961-62	1967-68	1977-78	1986-87	1991-92
Forest	10.09	10.09	10.10	10.30	10.30
Barren and uncultivable	9.62	8.90	10.00	9.91	9.10
Land put to non-agricultural use	5.96	6.89	7.86	8.26	8.10
Cultivable waste	8.20	7.83	5.84	4.50	3.70
Permanent pastures and grazing	0.58	1.20	1.36	1.20	1.20
Land under miscellaneous trees	0.93	1.21	1.22	1.10	0.60
Total fallow lands	11.79	16.18	18.24	22.60	16.70
Net sown area	52.83	47.70	45.31	42.13	50.31
Geographical area*	100.00 (1913)	100.00 (1913)	100.00 (1913)	100.00 (1913)	100.00 (1913)

Sources: Adapted from Subramanyam et al. (1993)

* Figures in parentheses indicate geographical area in 1000 hectares

Landholdings

More than half (56.1 percent) of landholdings were less than two ha. in area in 1991. The average holding size is lower for SCs and STs: SC (1.59 hectares) is lowest, followed by ST (2.05 hectares) and Others (2.96 hectares).

B2.5 Water use and availability

In all four surveyed villages, it was observed that the ground water level has fallen drastically, including in Somaladoddi village, where canal irrigation is prevalent. Well irrigation has been replacing the traditional irrigation sources, like tanks and streams. In some areas even the canal

irrigation is also becoming defunct. Another traditional source, 'open wells', is also becoming defunct due to depletion of groundwater. For example, in our survey the villagers of Vadrahonnuru said that all open wells dried up 15 years back. In another village, Mechiri, only two out of 100 open wells have water. The only source of irrigation available now is borewells. Given their huge investment requirements, only the better-off sections can afford this source of water.

Size Class	Total cultivated area in hectares (ha)		Area irrigated in hectares (ha)	
	1971	1981	1971	1981
Marginal farmers 0 - 1 ha.	22,360	35,120	8,430 (37.7)	7,481 (21.3)
Small farmers 1 - 2 ha.	65,360	93,280	8,628 (13.2)	9,235 (9.9)
Medium farmers 2 - 4 ha.	129,000	155,600	13,158 (10.2)	16,804 (10.8)
Big farmers 4 - 10 ha.	245,960	255,520	24,350 (9.9)	26,830 (10.5)
Very big farmers 10 +	402,480	260,480	35,016 (8.7)	25,527 (9.8)
All classes	867,131	801,981	91,553 (10.4)	87,858 (10.8)

Sources: Calculated from the data given in Subrahmanyam, (et al), 1993.
Figures in parentheses are percentages of irrigated area

The data in Table B6, though old, illustrates the trends clearly. While small and marginal farmers experienced a decline in the proportion of irrigated area, the marginal farmers experienced a steep decline in the absolute irrigated area also. All other classes experienced an increase in the proportion of irrigated area and also absolute area, except very big farmers.

Loss of irrigation leads to loss of cultivated area. Normally, soils under irrigation conditions in Anantapur are not suitable for taking up of dry crops like groundnut. As a result, the farmers leave the land fallow, when irrigation is not available. For this reason, marginal farmers have highest proportions of area under current fallow vis-à-vis other size classes (Subrahmanyam, et al., 1993). The small and marginal farmers of Maneela village of Anantapur *mandal* reported that about one-third area under borewell irrigation is left fallow in the year 2000 due to shortage of groundwater.

The farmers of Anantapur *mandal* reported that the cultivation of orchards is not picking up due to falling groundwater table and pest problems.

B3 General Trends in Udaipur District ⁹

Udaipur district is situated in the Aravalli hills in south Rajasthan. It has a mean annual rainfall of 624 mms, and normally experiences droughts every three years or so. At the end of the 1990s, it was badly affected by three successive years of drought. About 35 percent of the population are tribals, many of whom are involved each year in seasonal migration to the adjacent state of Gujarat. In the mid 1980s, only about 47 percent of all villages were reportedly electrified: data is not available for 1993.

Centre for Monitoring the Indian Economy's (CMIE) development index value for Udaipur is not very encouraging. Udaipur was way behind Anantapur in 1985, and in 1993 the position had deteriorated further. The CMIE development index is biased in favour of secondary and tertiary sectors, so this implies that Udaipur district's development has been particularly poor with respect to these sectors.

B3.1 The human factor: demography and education

The district experienced a very high population growth between 1971 and 1981 - 30.5 percent - but it was significantly lower (22.6 percent) during the following decade i.e., 1981-91. Urbanisation has increased slowly but steadily during the last 40 years; the percentage of people living in urban areas rose from 11 to 17 percent between 1961 and 1991. Literacy was still low in 1991, but rising sharply (see Table B7).

Virtually all of the tribals live in rural areas: the percentage in 1991 was 97 percent, slightly less than the 99 percent in 1961. Most SCs also live in rural areas, but the percentage fell from 89 percent in 1961 to 78 percent in 1991. This decline could be due to: (a) migration of SCs from rural to urban areas; (b) in-migration of SCs to urban areas from outside the district; or (c) a faster natural growth of SCs in urban areas.

⁹ Most of the information in this section is drawn from the SPWD report on Udaipur district

Profile	1985	1993
CMIE index of level of economic development	57	53
Area and Population		
Number of occupied houses (000)	250	562
Number of households (000)	257	n.a.
Area ('000 sq. km.)	17	17
Population (Lakhs)	24	29
Growth of population (1971-91)	3.0	2.0
Density (persons per sq. km.)	136	167
Urbanisation (%)	15	17
Literacy (%)	22	34
SC population (%)	8	n.a.
ST population (%)	34	n.a.
Labour Force (%)	30	43
(a) Agriculture (I+ii)	71	71
(i) Cultivators	65	n.a.
(ii) Agricultural labourers	6	n.a.
(b) Non-agriculture (iii +iv)	29	29
(iii) Household industries	2	2
(iv) Others	27	27

B3.2 Structure of economy and occupations

As in the case of Anantapur, one finds no change in occupation structure, which is surprising. In 1981 and 1991, 71 percent of the workers were in agriculture and allied sectors and 29 percent were in secondary and tertiary sectors (Iyengar, 2001).

B3.3 Banking infrastructure

Banking infrastructure has expanded rapidly in the district. As in Anantapur, there have been sharp increases in per capita bank deposits and advances (see Table B8).

Profile	1985	1993
CMIE index of level of economic development	57	53
Per capita bank credit to small industries (Rs)	31	100
Per capita bank credit to all industries (Rs)	116	391
Number of bank offices per lakh population	5.3	7.1
Per capita bank deposits (Rs)	445	1885
Per capita bank advances (Rs)	265	1008

B3.4 Land use and landholdings

Land Use

The land use pattern (percentage of total area) in the district over the years is shown below in Table B9.

The forests of the district belong to northern tropical dry deciduous forest. These forest areas are in the hilly tracts of Girva, Bheem, Dhariyawad, Kherwada, Jhadol, Kotra, Salumbar and Gogunda tehsil. Earlier, the major forest products of the district used to be timber, coal and firewood, but now timber production has come to a halt. NTFPs are now the major produce from forests, chief among them being tendu leaves, tendu fruits, aonla, honey, custard apple, areetha, grasses, etc.

Type	1971-72	1981-82	1991-92	1995-96
Forest	15.07 [†]	18.36	25.95 [^]	26.28
Non-agri lands	40.65	36.71	35.98	35.58
Lands without title	21.8	21.75	15.52	15.73
Wastelands	3.96	4.50	5.83	6.64
Net cropped area	18.45	18.28	16.72	15.76
Total	100	100	100	100

This is the percentage of net cropped area. However, the figures seem to be inaccurate.

The increase in forest cover percentage may be attributed to creation of a separate district, Rajsamand by cutting some parts of Udaipur.

The following conclusions can be drawn from the above data :

- The increase in forest area in 1976-77 may be attributed to resettlement. The increase seems to be due to addition of non-agricultural land in forest land.
- The explanation for increase in non-agricultural land, wasteland and land without title, however small, is not available. In normal course, the area under these two categories should decrease.
- The fluctuation in net cropped area can be attributed to rainfall variations and opening (or closing) of canals in various years.

Landholdings

Detailed information about trends in the size of landholdings is given in tables in the district profile (SPWD, 2001b). They show a general increase in the numbers and proportions of holdings that are less than two ha. and less than four ha. in area, and a decrease in holdings that are larger than this. Further information is given in Table B10.

1970-71	1980-81	1990-91
67	72	79

B3.5 Water use and availability

People in several of the Udaipur survey villages said that the water table had fallen substantially during the previous two-three decades. The water table now takes longer to recover after a drought than it did 30 years ago, and there are less sources of drinking water for livestock in the dry season.

B4 Discussion

B4.1 Reasons for the decline in common pool pastures and grazing areas

Prasad (1997) attributes the reduction of CPR to privatization of those lands by the farmers, as most of it has been brought under cultivation. As much privatization has been illegal, the official figures tend to overestimate the CPR area. There has been: legal land privatization; illegal encroachment or privatization; government distribution of CPRs to individuals under various schemes to benefit the poor; and auctioning of parts of CPRs by the government to private contractors for commercial exploitation (Jodha, 1985; Iyengar, 1989). Within a decade of land reforms (in 1960s) in Rajasthan, in the arid region as a whole, 3.4 million hectares of CPR were transferred to private ownership for the purpose of arable farming. In addition, the decline in CPR area and quality has been attributed partly to population growth and to physical submersion of land under large irrigation projects.

In Udaipur district, 73 percent of the land (forests, village pastures etc.) is officially in the custody of the government, but in practice a large proportion of this land has been encroached.

B4.2 Reasons for the decline in the water table

In Udaipur district, a combination of long-term trends and the current drought are having major impacts. Rajsamand lake has dried up for the first time in 400 years. This is primarily due to the mining industry, which is using up a lot of water, cutting the water seams which supply the underground aquifers, and blocking the flow of streams due to clogging with slurry. There is pressure building to close these mines.

During the drought in the late 80s, a plan was made to bring water to Udaipur from Jaisamand lake, but now Jaisamand is also drying up. There are plans to get water from Mansi Vakkal, but these are being opposed by the local population. The supply of water to industry and urban areas is progressively using up the rural water sources. Hindustan Zinc, for instance, has dug deep borewells to meet its water supply requirements. Some areas of Udaipur city are currently being supplied by tankers, which are drawing water from wells that were hitherto devoted to agriculture.

TRENDS IN AGRICULTURE

C1 National/Regional Trends in Agriculture

There are some clear differences between agricultural systems in DP areas and NDP areas. There is a smaller area share devoted to forest and tree crops in DP areas, and a higher percentage of area is sown. DP states devote a smaller share of area to cereals and a higher share to oilseeds. Coarse grains are much more important in DP states than NDP states. A smaller percentage of the cropped area is irrigated in DP states. Cattle are more important in NDP areas and sheep markedly more important in DP areas. Although agricultural production strategies are less intensive in the DP areas, there is nonetheless a clear trend towards intensification and greater use of purchased inputs. These differences and trends are elaborated on below.

C1.0 Contribution of agricultural sector to GDP

The state level trends reflect an interesting phenomenon in the context of the economic growth in the Indian Economy: agriculture is not the engine of growth any more. Out of first four states (first in terms of per capita NSDP), three namely Maharashtra, Gujarat and Haryana are drought states. Haryana has overcome its natural disadvantage by expanding the canal irrigation substantially. Maharashtra and Gujarat have achieved growth through secondary and tertiary sector expansion. In most areas one finds that DP states are better placed. Even the poverty reduction is higher in DP states. Central government's per capita assistance for planned expenditure is higher for NDP states, but per capita plan expenditure, which included the state expenditure as well, is higher in DP states. Since agriculture in DP states has not shown such an impressive increase, the livelihood of the poor in these regions may be more dependent on the non-farm occupations.

Employment in agriculture, which accounted for almost two-thirds of total employment in India, grew at less than one percent p.a. between 1977-8 and 1987/8 (Fisher et al). Growth in labour productivity in Indian agriculture (including both crops and livestock) has been consistently low since 1970. It has been lowest of all (0.25 percent p.a.) in low-potential rainfed areas, which roughly correspond to semi-arid and arid regions (Fan and Hazell, 1999).

C1.1 Crop production

High-yielding Varieties

During the last 30 years the widespread adoption of high-yielding varieties (HYVs) of crops has been a major engine of growth in agricultural production and factor productivity for India as a whole. HYVs are most widely used in irrigated areas, but their shares as a percentage of total cropped area have increased in all three of the main types of agricultural region. The percentage share is lowest, however, in low-potential rainfed agriculture, as can be seen from Table C1.

Type of agriculture	1970	1995
Irrigated	26	60
High-potential rainfed	7	50
Low-potential rainfed	10	40

Source: Fan and Hazell, 1999

Fertiliser application has also increased markedly since 1970. However, it is still considerably lower in rainfed areas than irrigated areas: in low potential rainfed regions it is about half the rate in irrigated regions (see Table C2).

Type of agriculture	1970	1995
Irrigated	19	90
High-potential rainfed	3	38
Low-potential rainfed	7	46

Source: Fan and Hazell, 1999

Productivity per hectare more or less doubled during the 1980s, while agricultural credit/ha. roughly quadrupled (see Table C3).

	Drought states		Non drought states		All India	
	1978-79	1988-89	1978-79	1988-89	1978-79	1988-89
Agricultural credit per hectare of cultivable land (Rs)	290	1426	276	1088	282	1236
Productivity per hectare (value in Rs.)	1501	3183	2283	4262	1941	3790
Productivity credit ratio	5.2	2.2	8.3	3.9	6.0	3.4
Food grains availability (Kg)	194.4	178.4	200.0	227.3	197.6	205.9

Source: Iyengar, 2001, Based on Profile of Districts, Centre for Monitoring Indian Economy (CMIE), Mumbai, 1985 and 1993

Potassium and phosphate fertiliser prices increased substantially when they were decontrolled in 1992. For example, the DAP selling price increased from Rs.4680 to Rs. 7500-8000 between 1991 and 1992 (SPWD report on Anantapur district). Since then, however, prices have been fairly stable.

Percentage Area under Major Crops

Let us now take a look at the cropping pattern in drought and non drought states. We have considered three main types of crops for the purpose, namely cereals, pulses and oilseeds. Together they form about 90 percent of the area under crops. In 1970-71, drought states had a better variation in pattern with 70 percent area under cereals, 16 percent under pulses and 14 percent under oilseeds. (Table C4). In non drought states the corresponding figures were 75, 16 and 9 percent. Over about 28 years, the share of cereals in drought states went down to 59 percent whereas, in case of non drought states it increased to 79. In drought states both pulses and oilseeds gained, the latter significantly. In non drought states, both pulses and oilseeds lost almost equally. Change occurred more sharply between 1981 and 1991.

Year	Cereals			Pulses			Oil Seeds		
	D	ND	AI	D	ND	AI	D	ND	AI
1970-71	70	75	72	16	16	16	14	9	12
1980-81	68	76	73	17	15	16	15	9	11
1990-91	61	78	69	18	15	16	21	7	15
1997-98	59	79	68	18	14	15	23	7	17

Source: Iyengar, 2001, derived from Basic Statistics Relating to States of India, Centre for Monitoring of Indian Economy, Mumbai, September 1994.

Oilseeds

The dramatic transformation of the Indian oilseeds economy from a 'net importer' in the 1980s to a 'self-sufficient' and even 'net exporter' status during the early 1990s has been popularly termed the "yellow revolution". From a mere 11 million tonnes during 1986-87, the country attained an all-time record oilseeds production of 25 million tonnes during 1996-97, just in the span of a decade (Hegde and Kiresur, 1999). However, this trend has been affected in recent years by the government's policy of market liberalisation, which has opened the door to cheap imports of edible oil (see section C3.3 and Box 3.1). Between 1993 and 1997 there was only a marginal increase in vegetable oil prices in the domestic market. As a result, oilseeds production nearly stagnated; and in some regions a shift from oilseeds took place.

Since 1950-51, the oilseeds area, production and productivity have increased nearly 2.5 times, five times and twice respectively. During the last decade soyabean registered the highest compound annual growth rate of production; it was followed by castor, sunflower and rapeseed-mustard. Groundnut, rapeseed-mustard and soyabean possess a major share of oilseeds in India, both in terms of area (74 percent) and production (84 percent). As far as yield is concerned, castor tops the list (1,192 kg/ha), followed by groundnut (1,155 kg/ha), rapeseed-mustard (1,013 kg/ha) and soyabean (995 kg/ha).

The annual vegetable oilseeds are mostly grown under moisture and nutrient-deficit conditions, i.e. in semi-arid regions. The area increases came where the oilseed crops were superior options to traditional crops in crop combinations. Farmers in water-starved regions of north Gujarat and Rajasthan chose rapeseed over wheat to get better returns from the available water (Hegde and Kiresur, 1999).

Pulses

More than 20 percent of the area under pulses is rainfed. During the last four decades, the total area under pulses has been virtually stagnant, and total production has been fairly constant, at 12-14 million tonnes. The area increased in most predominantly semi-arid states (but in Rajasthan it has been stable), while decreasing in Punjab, Haryana, Bihar, West Bengal and Uttar Pradesh.

Pulses	Area	Production (m. tns)	Productivity (kg/ha.)
Chickpea	7.22	6.01	832
Pigeon pea	3.82	2.88	753
Field pea	0.73	0.72	947
Mung bean	3.08	1.31	425
Uard bean	3.15	1.49	473
Lentil	1.34	0.88	660
Lathyrus	0.85	0.49	576

Source: Hegde and Kiresur, 1999

Cereals

Traditionally, the staple diet in most rural regions consisted of the local coarse grains, notably millets, sorghums and/or maize. These were usually marketed only after household need was taken care of. However, data from successive rounds of the National Sample Survey show that, during the last few decades, there has been a steady decline in average per capita consumption of coarse grains, and a shift to wheat (e.g. in Maharashtra) or rice (e.g. in Andhra Pradesh). The data on coarse cereal (Table C6) show that area has gone down both in drought and non drought states, a little more sharply in ND states.

Per capita consumption of sorghum in rural India declined from 23.2 kgs in 1961 to 11.4 kgs in 1989, a reduction of 51 percent (Marsland, 1998). In urban areas the decline has been more marked: from 14.4 kgs in 1961 to 5.0 kgs in 1989, a 65 percent reduction (Kelly et al, 1984, unpublished - cited in Marsland, 1998). Reductions in coarse grain consumption have taken place in all income groups in both rural and urban areas. Nevertheless, sorghum remained the most important cereal crop in rural Maharashtra in 1993/94, and was also important in rural Karnataka, where per capita consumption figures were far greater for sorghum than they were for wheat (Marsland, 1998).

Year	Drought	Non-drought	All India
1970-71	78	42	58
1980-81	73	38	53
1990-91	76	33	50
1997-98	68	30	45

Source: Iyengar, 2001, derived from Basic Statistics Relating to States of India, Centre for Monitoring of Indian Economy, Mumbai; September 1994.

Loss in area can be made up partly if the yield per unit of land increases. During last 28 years most crops have experienced increase in yield practically in all states. Interestingly, food grains have gained most (Iyengar, 2001). Compound Annual Growth Rate (CAGR) in the yield of food grains was 2.37 percent in drought states and 2.31 in ND states. Pulses fared badly in ND states. This is understandable because pulses are grown largely under rainfed conditions.

C1.2 Livestock production

Contribution of the Livestock Sector to the Economy

More than 70 percent of rural families in India own livestock. The livestock sector in India has been growing, and the share of livestock production in total agriculture rose from 18 percent in 1980-81 to 30 percent in the early 1990s (World Bank, 1999). While the contribution of agriculture as a whole to GDP has declined, that of livestock production has increased, from 5.7 percent in 1980-81 to 6.1 Percent in 1995-96 (Birthal et al., 1999). The highest growth has been in poultry, followed by meat and milk. Only the wool and hair sub-sector and draught power have declined in value.

Cattle	Buffalo	Sheep	Goat	Poultry
204.5	83.5	50.8	115.3	307.1

Trends in Livestock Populations

In the livestock sector three population trends are apparent between 1972 and 1992 (see Table C8). One is that there has been a steady growth in: (a) the buffalo population, particularly in drought-prone areas; and (b) the goat population, particularly in NDP states. A second is that there has been a steady decline in cattle as a percentage of the total population. Third, the sheep proportion has been fairly stable.

Livestock	Percentage of total livestock								
	1972			1982			1992		
	DP	NDP	All India	DP	NDP	All India	DP	NDP	All India
Cattle	41.9	58.4	50.5	38.4	52.4	45.9	35.7	49.7	43.4
Buffaloes	16.4	16.4	16.3	18.0	16.4	16.6	19.5	15.8	17.9
Sheep	18.9	4.2	11.3	18.8	4.5	11.6	18.9	3.9	10.8
Goats	20.5	18.1	19.1	22.4	23.5	22.7	23.6	25.5	24.5
Others	2.3	2.8	2.8	2.3	3.2	3.2	2.4	5.0	3.4

Source: Iyengar, 2001: Statistical Abstract, Central Statistical Organization, Department of Statistics, Government of India.

Both in DP and NDP states the proportion of cattle has gone down, but in NDP states the decline between 1972 and 1992 was sharper than in DP states. This is somewhat intriguing. Introduction of agro-mechanical technology would replace bullock, the traditional draft power. But one would have expected such replacement to take place more rapidly in DP states. However, to gain a better understanding of what has been happening it would be necessary to obtain disaggregated data for cows and bullocks.

Between 1966 and 1987, tractors have increased phenomenally in both type of states. In NDP states the rise is much sharper. Agro-mechanical technology has thus made in-roads in Indian agriculture in the post 1966 period, a period that coincides with the Green Revolution in some states. Fall in cattle proportion to total livestock is partly explained. Rise in water pumping devices such as diesel engines and electric motors reflect shift in the source of irrigation.

	1971-72		1989-90		1994-95	
	Cow	Buffalo	Cow	Buffalo	Cow	Buffalo
DP states	47.9	228.4	110.5	297.3	159.2	434.8
CARG in DP states (%)	-	-	-	-	5.3	2.8
NDP states	34.1	238.4	93.2	391.3	114.1	424.3
CARG in NDP states (%)	-	-	-	-	5.4	2.5

Source: Iyengar, 2001, derived from Statistical Abstract, Central Statistical Organization, Department of Statistics, Government of India; various volumes.

Milk Production

Milk accounts for more than 75 percent of the contribution of livestock products to GDP, and is higher than any single crop. Milk yields have risen substantially in DP and NDP states. The annual compound rate of growth of cow milk yield is almost same in both the regions - 5.3 and 5.4 percent (Table C9). Buffalo milk yield has increased faster in DP states at 2.8 percent per annum against 2.5 percent per annum in case of NDP states. Development of dairy industry and milk market has established animal husbandry as an independent and commercially viable activity in the country. Integrated Rural Development Programme (IRDP), a family focussed anti-poverty programme, had distribution of milch animals with subsidy and bank loan as one of the main schemes.

Economics of Milk Production

The estimated cost of milk production per litre is lowest in crossbred cows (Rs. 5.4), followed by buffalo (Rs. 7.69) and then indigenous cows (Rs. 7.96). However, buffalo milk fetches a better price since its fat content is higher (Shukla and Brahmankar, 1999).

C2 Agricultural Trends in the Focus Districts and States

C.2.1 Crop production in Andhra Pradesh and Anantapur

Land use pattern and agriculture sector activities show very interesting trends. Table C10 presents the details. It may be seen that area under forest and net sown area have increased impressively. Gross irrigated area has fallen. However, use of modern input and credit has gone up significantly and so also the output. As observed in earlier sections, production of food grain per capita has registered decline.

Agriculture has remained relatively backward in Anantapur district. Yields of most of the crops grown in the district are low vis-à-vis the state average. Application of chemical fertilizer is well below the state average. There is evidence of widespread adulteration of inputs, particularly pesticides and seeds (see Table C11).

Though the agricultural sector in Anantapur is not as developed as in Andhra Pradesh as a whole, it has been commercialised, in that more than three-quarters of land is put under commercial crops. In fact, a single crop - groundnut - is predominant in the district. The area under groundnut has increased from 19 percent in 1961 - 62 to 72 percent in 1993 - 94. This growth occurred at the cost of coarse cereals - *jowar*, *bajra* and *ragi*, pulses (horsegram), other oilseeds (castor and sesamum) and cotton. The changes were very dramatic in the late 1970's and early 1980's. The crops like mulberry, vegetables, flowers, sunflower and fruits (orchards) are gaining ground in recent years. Paddy, mulberry, Ragi and Cotton are important crops under irrigation. Other crops taken under irrigation are groundnut (mostly as second crop), orchards, and vegetables. groundnut was highly profitable during the 1980s and early 1990s, but has been less profitable since then, and there were major losses in 1999 (for further details see C3.3).

Animal draft power is predominant in agriculture. Only 16 percent of gross cropped area have irrigation facility. Within agriculture the share of private (well) irrigation has been increasing and that of public (tanks and canals) decreasing in recent years. The latter is also fluctuating widely. As a result a few powerful sections are cornering irrigation.

Profile	1985	1993
CMIE Index of level of Economic Development	65	92
Annual normal rainfall	540	-
Area under forest (%)	10	15
Net sown area (%)	50	61
Gross irrigated area (%)	19	14
Average operational holding (hectares)	4.1	2.9
Consumption of chemical fertiliser	13	58
(i) per hectare		
(ii) per capita	5	n.a.
Bank credit for agriculture		
(i) per hectare	196	481
(ii) per capita	79	82
Value of output of major crops (five year averages):		
(i) per hectare	474	1484
(ii) per capita	174	254
Production of food grains per capita	107	103

Input	Good	Normal	Adulterated	No response
Seed	28	41	29	1
Fertilisers	49	41	8	2
Pesticide	14	24	62	0

Source: SPWD, ciling survey of 92 households organised by Chowdary et al. (undated)

C2.2 Livestock production in Andhra Pradesh and Anantapur

In AP as a whole, the cattle and goat populations are on decline, and the sheep population has stabilised. Among ruminants, only the buffalo population is growing. The most rapid growth, however, has been in poultry. This is linked to rapid growth in commercial poultry production.

Livestock type	1961	1972	1983	1993
Cattle	12.34	12.51	13.22	10.95
Buffaloes	6.95	7.06	8.70	9.13
Sheep	8.36	8.34	7.52	7.79
Goat	4.25	4.38	5.46	4.33
Pigs	0.59	0.69	0.79	0.65
Poultry	162.48	190.47	323.91	498.84

The sharp fall in the goat population during the last decade, and the relatively steady sheep population, are distinctive features of livestock demography in AP that are not found in other states. According to one study, sheep production is preferred to goat production by most people (Vishwaraj, 1997), which is not the case for most neighbouring states. The state government has taken a number of measures to improve sheep production and discourage goat production.

In Anantapur, livestock populations have undergone significant fluctuations both in composition and inter-temporally. The livestock declined significantly in 1977, perhaps, due to drought; and again in 1987. In 1982 the livestock reached a peak. One of the reasons could be launching of IRDP in early 1980's. Under this programme, soft loans and subsidies were given to millions of the household to purchase plough and milch

animals. It is widely known that many unscrupulous transactions took place during that period. Some of the beneficiary household might have reported as owning livestock. Numbers of most types of ruminants were at or close to their highest ever levels in 1993: the exception is goats, which have recorded a significant decline, particularly during the last 10 years (Table C13). The state government's 'anti-goat' stance may have contributed to this decline.

Category	1966	1972	1977	1983	1987	1993
Cattle - male	317,054	322,452	318,571	313,566	277,872	369,089
Cattle-female	223,985	199,322	198,153	217,844	162,807	260,727
Buffaloes	217,716	211,530	216,471	258,300	226,614	267,386
Sheep	837,771	889,144	583,557	776,621	561,774	879,496
Goat	353,981	390,073	263,987	499,583	379,880	315,099

Sources: Data for 1966 to 1987 from Subrahmanyam (1993) and for 1993 Chief Planning Officer - Anantapur.

C2.3 Crop production in Rajasthan and Udaipur

Net sown area is very low, but it has experienced substantial increase, from 21 per cent of the reporting area to 38 per cent. Inputs in agriculture including bank credit shows increase, but the value of output does not show any significant corresponding rise. There is a marginal increase of 8.5 per cent (Table C13). Once again even in Udaipur district the per capita food grain production has fallen significantly.

Profile	1985	1993
CMIE index of level of economic development	57	53
Annual normal rainfall	630	n.a.
Area under forest (%)	18	41
Net sown area (%)	21	38
Gross irrigated area (%)	27	27
Average operational holding (hectares)	2.1	1.8
Consumption of chemical fertiliser		
(i) per hectare	7	25
(ii) per capita	2	n.a.
Bank credit for agriculture		
(i) per hectare	105	481
(ii) per capita	24	82
Value of output of major crops five year averages (I) per hectare	1367	1484
(ii) per capita	214	254
Production of food grains per capita	173	103

Food Grains

The area under food grains, as a percentage of gross cropped area, was fairly constant from 1971-72 to 1995-96. Maize is one of the key food crops accounting for 54 percent of the net cropped area in 1971-72 which increased to 70 percent in 1995-96. The area under maize production has increased by about 15 percent. (We have to discount for formation of Rajsamand district in 1991, which reduced the area of Udaipur district). This increase is partly accounted for by the shift from rice to maize and partly by the introduction of newly-cultivated fields.

Maize productivity shows distinct variation from year to year, which is partly due to annual variations in the total quantum of rainfall. It is also linked to the timeliness of the rainfall, which has declined (i.e. there has been a tendency recently for the monsoon to start later than used to be the case). There has been no major breakthrough in maize yield, and the stagnation in maize overall has lessened its importance vis a vis wheat. However the reason for its continued importance is its importance as a source of forage for the animals.

Pulses

There was a slight increase in the area under pulses, as a percentage of gross cropped area, and a substantial increase in productivity, from about 0.5 mt/ha. in the 1970s and 1980s to 0.8 mt/ha. in the 1990s. The area under gram, as a percentage of double-cropped area, declined from a high of 27 percent in 1971-72 to a low of 10 percent in 1986/87, but recovered to 22 percent by 1995-96. Productivity more than doubled during this period, from 0.64 to 1.34 mt/ha.

Oilseeds

The area under oilseeds has been fairly constant, but productivity has more than doubled, from 0.3 to 0.72 mt/ha. The productivity of mustard has more than quadrupled, from 0.31 to 1.44 mt/ha.; and the planted area, as a percentage of cropped area, has shown an even more dramatic increase, from one to eight percent. In contrast, groundnut productivity has halved, from 0.43 mt/ha in 1971-72 to 0.2 in 1995-96; and the planted area has also experienced a major decline. This is in marked contrast to trends in Anantapur.

Cash Crops

In Jhadol block ginger and chillies are taken. The area under cash crops, as a percentage of gross cropped area, has steadily declined from 5.95 percent in 1971-72 to 1.56 percent in 1995-96: so has their productivity, which peaked at 17.2 mt/ha. in 1981-82 and then crashed to around 2 mt/ha. since then. The agricultural statistics appear to define cash crops very narrowly, excluding some crops that are major sources of cash. The prime cash crop in the district is Mustard, while in Pratapgarh block soyabean is being cultivated. Soyabean is also the cash crop in nearby Dhariawad taluka of Udaipur district.

Agriculture is now increasingly dependent on purchased inputs like HYV, fertilizer (urea, DAP), use of diesel or electricity for the pumpset. With increasing prices and usage, this is increasing the cost of production. It also has implications for the structure of production, viz the need to generate cash to sustain production. Lending and credit is tied to the cash crops which are sold to the local moneylender/trader. There has also been an increase in short term credit by the credit societies, which is linked to the supply of inputs like fertilizer and seeds.

Landholdings

These have steadily declined in size, as we saw in B3.4. Some consolidation takes place as drought and other calamities force families to part with their land. They however prefer to give it to their brother or nearest relative, or keep it in the village, rather than selling it to an outsider. Land is also mortgaged to get loans. A lot of land cultivated by the farmer is therefore actually controlled by the money lender, who commands its produce.

Employment in Agriculture

More men, and still more women, were in the agricultural wage labour occupation in 1991 than in 1981. On the whole, the percentage of the working population in agriculture has declined slightly, but the percentage in the agricultural wage labour category has risen significantly. Women dominate in the latter category, whereas men are in the majority in the former.

C2.4 Livestock production in Rajasthan and Udaipur

In Rajasthan the cattle and goat populations are the highest of the different types of ruminants, and there are also large populations of buffaloes and sheep. From time to time severe droughts have a significant impact on livestock populations. This can be observed in Table C15, which shows that the numbers of cattle, sheep and goats in Rajasthan declined markedly between 1983 and 1988: this was due to a major drought in the mid-eighties.

Livestock category	1951	1961	1972	1983	1988	1992	1997
Cattle	10.8	13.1	12.5	13.5	11.0	11.6	16.7
Buffaloes	3.0	4.0	4.6	6.0	6.3	7.8	10.9
Sheep	5.4	7.4	8.6	13.4	9.9	12.5	14.3
Goats	5.6	8.1	12.2	15.4	12.6	15.3	16.9

Sources: Sagar and Ahuja, 1993; livestock censuses.

In Rajasthan :

- numbers of all categories of livestock have grown;
- the growth in the cattle population has been relatively small (55 percent);
- the buffalo population has grown rapidly (363 percent);
- the sheep population has grown rapidly (265 percent); and
- the goat population has grown rapidly (302 percent).

Trends in livestock populations in Udaipur district are shown in Table C16. The trends are very different from those observed at the state level. At the state level the populations of all types of ruminants were highest in the most recent census (1997), whereas in Udaipur district they all peaked in 1983 and have not returned to those levels since then.

In the case of cattle and sheep their numbers in 1997 were at their lowest level of the last 40 years, lower even than in 1988 when they had been hit by the severe drought. Goat and buffalo numbers have increased since 1988, but the former seem to have reached a plateau. Possible explanations for these trends will be discussed later.

¹⁰ Other types of livestock found in Rajasthan, such as camels and poultry, are relatively unimportant at the state level: their combined total in 1997 was 1.2 million. However, they may be important in particular districts or blocks.

Livestock category	Thousands					
	1961	1972	1983	1988	1992	1997
Cattle	1272.5	1302.5	1380.8	748.2	904.1	410.0
Buffaloes	443.2	462.6	528.5	302.0	409.1	457.1
Sheep	364.3	468.4	661.7	246.2	259.9	244.0
Goats	692.1	1198.4	1340.3	691.4	870.9	850.8

In tribal areas, like Kotra and Pratapgarh, local poultry is also predominant. The practise of modern poultry farming is not very widespread, due to competition from nearby Anand in Gujarat, and Ajmer district; and also the difficulties in maintaining the health of such birds. However, Ranawat poultry farm in Udaipur does source some of its requirement from villages near to Udaipur.

C3 Discussion and Explanation of Trends in Crop Production

C3.1 Reasons for changes in crop production nationally

Oilseeds

The main contributors to this transformation have included (Hedge and Kiresur, 1999):

- the oilseeds production technology;
- expansion in cultivated area;
- the price support policy; and
- the institutional support, particularly the formation of the Technology Mission on Oilseeds in 1986.

Pulses

The decrease in area in some states is at least partly due to increased irrigation facilities there, resulting in a shift from pulses to cereals, notably wheat and paddy, or even to vegetable crops.

Cereals

It appears that several factors have been operating simultaneously to produce the pattern of changes in demand for sorghum as food. The strength of any particular factor in determining consumption varies both according to the particular population group in question at a particular time and with population groups over time. These factors include: income; relative prices and the availability of competing staples; the role of the public distribution system (PDS); urban and rural consumer tastes; drudgery in food preparation, and access to processing technology; varietal issues; perceptions of nutritional value; and the strength of 'cultural' factors (Marstrand, 1998). In Udaipur district, a village study concluded that a change in taste preferences was the main reason for the steady decline in sorghum production (Seva Mandir, 2000a)

C3.2 Reasons for changes in crop production in Anantapur district

The decline in the production of coarse cereals like *jowar* (sorghum) and *ragi* (millet) can largely be attributed to the greater profitability of groundnut; and this, in turn, was linked to the introduction of new, higher yielding varieties. More recently, its profitability has been reduced. The reasons for the changing profitability of groundnut production are discussed further in the Box C1.

BOX C1

The Changing Profitability of Groundnut Production

The farmers of Anantapur used to cultivate mostly food crops in the past. But now almost the entire dry area has been devoted to groundnut crop, which has given good profits in the 1980s. Growing cost of cultivation coupled with stagnation/ decline in output prices reduced profitability of groundnut cultivation in the 1990s. Increase in cost of cultivation of groundnut is the result of two factors, viz. increase in the use of purchased inputs and increase in their prices in the 1990s. In the past, the cost of groundnut contains only own inputs, i.e., land, labour, and draft power and seeds. The share of purchased inputs used to be negligible. But over the last two decades the cost of purchased inputs has increased drastically, now it is equal to about 50 percent of the value of the output.

The price trends of agriculture inputs and output (groundnut) exhibited contrasting trends during 1980s and 1990s. While the prices of inputs grew relatively slow pace in the 1980s, they have accelerated in the 1990s. The power tariff for agriculture has tripled during 1990's, increasing from Rs.0.14 per KWH in 1992 to Rs.0.50 in 2000. The daily agriculture wages in the state have doubled in the 1990s. The nominal daily wage has increased from Rs.19.60 for men in 1991 to Rs.43.50 in 1999 and the same for women increased from Rs.14.20 in 1991 to Rs.32.20 in 1999 (Table - 5.4). The prices of different fertilisers have increased by one and half times to more than two times during 1990s.

In contrast the groundnut prices, which increased sharply in the 1980s, slowed down significantly in the 1990s and stagnated or declined slightly since 1997. The nominal prices have increased by mere 30 percent during 10 years in the 1990s. The farmers are getting lower prices: in the project survey, the villagers of Vadrachonnuru village said that the groundnut prices have slumped by Rs.200-300 per quintal four years back and stabilised at that level (see Vadrachonnuru Village Profile). The main reason for the slump in the groundnut price is opening of Indian market for cheap imports of palm oil from Malaysia and other countries. In value terms the import of palmolene has gone by 35 times between 1993-94 and 1999-2000. The value of imports increased from \$53 million in 1993-94 to over \$1,844 million in 1999-2000. Further, more number of edible oils were placed in OLG and the import duty on edible oils has been reduced from 65 percent in mid 1990s to 15 percent by the end of 1990s (government of AP, 2000).

Source: SPWD Anantapur Report

C3.3 Reasons for changes in crop production in Udaipur district

It is a little surprising that maize yields have not increased as a result of increased fertiliser application and the use of HYVs. This may be explained by the fact that there is an increasing dependence on composites, which are slightly lower yielding than the long duration variety. Composites are being introduced as an adjustment to the shorter rainfall period available, and also to make the land available for the rabi crop.

The increase in wheat production area in Udaipur is due, inter alia, to the increase in irrigation infrastructure during the last few decades. Previously, wheat was grown, but only in small pockets of land that had good water-retention (Seva Mandir, 2000a).

Sugarcane production is on the decline because of its high water requirement and the use of a large amount of fuel to make jaggery.

Increased Productivity of Crops In Udaipur District

In Udaipur district, there have been major increases in the use of HYVs during the last 40 years, as can be seen from Table C17. However, there have been some major deviations from this general trend in certain years. This may have been a major factor in the improved productivity of most crops. Increased fertiliser use may have been another factor, with substantial increases in the use of nitrogen and phosphorus, but a decline in the use of potassium.

Year	Wheat	Maize	Sorghum	Barley	Gram
1971-72	13408	3674	652		
1976-77	49220	4273	40		
1981-82	29260	6299	3188	100	
1986-87	44150	49449	6051	-	
1991-92	70000	150000	15000	23000	19100
1995-96	44000	31400	200	3300	13100

C4 Discussion and Explanation of Livestock Trends

C.4.1 Reasons for changes in livestock populations nationally

The average size of land-holdings is steadily declining in most parts of India, and the proportion of small and marginal land-holdings is increasing: these trends are expected to continue. Many small and marginal farmers are unable to maintain a pair of bullocks, sometimes not even one. Among poorer people, native cows are kept primarily as a source of bullocks, and only secondarily as a source of milk. The reduction in farm size, and the declining areas of village common lands (Jodha, 1991), are limiting the number of cows that people can maintain. In addition, people's dependence on bullocks is declining due to the mechanisation of agriculture: there have been major increases in the use of pump sets and tractors, increased reliance on the modern transport system, rather than the bullock cart. It has consequently become more expensive to maintain a bullock for the whole year and some people who have not switched to tractors have resorted to purchasing the bullock when it is ready for ploughing: some share one bullock each.

The Demand for Livestock Products

The prices of goat and sheep meat have been increasing (but price data are not collected on a systematic basis), as has the demand for meat. Assuming that the incomes continue to rise (in urban or rural households), the high income elasticity of demand for livestock products should ensure that the markets for meat and milk remain buoyant.

Goats and Meat Production

The national increase in goat population appears to be related to two factors. It is partly a response to the degradation of common lands, which has reduced the amount of forage they produce that is suitable for large ruminants. Goats, on the other hand, prefer to browse on the leaves of bushes and trees, and hence are affected differently by degradation. Second, it is also partly a response to increased demand for meat, and the development of marketing infrastructure linking rural areas to major urban centres, where much of the meat is consumed: for example, Rajasthan exports large numbers of goats to Ahmedabad, Bombay, and Delhi (Rathore, 1993).

Buffaloes and Milk Production

There is considerable regional variation in the type of dairy animals owned, with buffaloes predominating in the north and west of India, and cows in the south and east. At the national level about 59 percent of milk is produced by buffaloes, 21 percent by indigenous cows and 20 percent by crossbred cows (Shukla and Brahmankar, 1999). Indian consumers typically prefer high-fat milk, so milk quality is judged by its fat content. Buffalo milk typically has seven percent fat, so it commands a premium over cow's milk (World Bank, 1999). In retail channels milk is classified as full-fat milk (six percent), standard milk (four and a half percent), toned milk (three percent), double-toned milk (one and a half percent fat) and skimmed milk (0.5 percent fat). About 45 percent of milk produced is consumed as fluid milk, and about 35 percent is converted into butter or *ghee*, the rest is converted into cheeses, milk powder etc.

It is interesting that the increase in buffalo's percentage of the livestock population in DP states has been higher than in NDP states. Buffalo is a stallfed animal, so a good agriculture base, lot of green fodder and feed are required to support it. One might expect DP areas, with relatively more area under common land, to have a higher proportion of grazing animals such as cattle, goats and sheep. However, in south Rajasthan there has been a reduction in the availability of common lands for grazing. There is evidence that this has encouraged a shift towards stall-feeding of large ruminants, which has been accompanied by a reduction in unproductive cattle and an increase in buffaloes.

There is evidence that various factors, including the need for a good supply of forage, including green forage, have limited the increases in ownership to those people whose farms are relatively large. A national study, which covered 2868 households belonging to 239 Dairy Cooperative Societies, found that the majority of society members were small farmers, and that only about 15 percent of members were from lower social strata and the landless (Shukla and Brahmankar, 1999). The three major constraints identified by members were: health care facilities, breeding facilities, and availability of feed and fodder at low cost; and the latter was considered the most serious constraint.

Buffalo-keeping is largely confined to wealthier farmers (Vaidyanathan, 1988). Milk production can generate employment and income for smallholders and landless, but they need support. The IRDP provides funding for purchase of animals, but the poor need access to feed resources as well as livestock services (ibid.).

C.4.2 Reasons for changes in livestock populations in Anantapur District

Growing markets for dairy products and meat and governmental promotional measures might be some of the reasons for the observed changes in livestock sector.

The government generally does not provide services to goat-keepers, and the Forest Department discriminates against goat-keepers who graze their animals in forests.

C.4.3 Reasons for changes in livestock populations in Udaipur district

Bullock

The stagnation in the bullock population is due to several factors. The use of pump sets, decline of milling, use of tractors, shift to commodity purchases and the increased reliance on the modern transport system have all contributed to a reduced dependence on bullocks. The use of tractor power has increased from 1 percent to 10 percent in the last 20 years. Given these changes, for many people it has become financially unattractive to maintain a bullock for the whole year. They have therefore resorted to purchasing the bullock when it is ready for ploughing, and some keep one bullock each and share them. Some can no longer afford to keep any bullocks. This has in turn reduced the need to maintain cows, whose primary purpose is to produce bullocks.

It has however been observed that numbers of ploughs have not reduced, but rather increased. This is because a person uses his own plough, even if he borrows a bullock. Ploughs have however reduced in droughts. It appears therefore to be a disposable item that is procured again when times are better.

Buffalo

The numbers have been on the increase among better-off farmers for the following reasons :

- In the interiors, surplus milk marketing was done through *mava* production and ghee (clarified butter) making, which is more profitable with buffalo milk. Of late *mava* (milk residue after simmering for hours) production has declined because it is an energy-intensive process and fuel costs have increased.
- With the introduction of the co-operative dairy route, milk prices are now determined on the basis of fat content. The price of cow milk on this basis is very low¹¹.
- Where assured water supply is there, people have begun to produce lucerne grass and keep buffaloes. With a limited amount of purchased cattlefeed and grass, for two to three months, they can maintain a larger number of milch animals than would be supportable by the land they own. In this way the land constraint is eased to some extent.
- Milk production gives cash every 10 days or so when payment is made by the dairy.

Buffalo numbers increased the most in villages near the urban centres, where a dairy co-operative was formed. In some such villages, the sale of milk to the dairy has become the main source of income for better-off farmers, such as members of the *Dangi* community. To conserve fodder, buffaloes are purchased shortly before they become milk producing. The onus of maintaining dry but productive animals, is shifted to the fodder rich areas. The unproductive animals are given second rate treatment, ie they are fed less, sent to graze, etc. Milch animals as a result also produce much more dung than the other animals.

Goat

The recent decline in goat numbers in Udaipur district runs counter to the trend at the state level. However, Rajasthan is quite heterogeneous in terms of agro-ecological zones and livestock production systems, ranging from arid to semi-arid and sub-humid; and from pastoral to agro-pastoral. In addition, the construction of the Indira Gandhi Canal in northern Rajasthan may have had a significant effect on forage availability, and hence on livestock numbers, in that part of the state.

The goat, like the buffalo, has the advantage of mitigating the pressure of limited land holdings, since it can graze on common lands. In Udaipur district, the joint forest management and watershed development programmes have fenced off large areas of common land during the last 15 years, placing grazing restrictions on them. This may account for much of the decline in the sheep, goat and cattle populations since their peaks in 1988, and explain why they did not recover fully after the 1987/88 drought. As herd sizes have decreased, and common grazing areas have become less accessible, the returns to labour from herding goats have declined. As a result, in some places young adults have switched from goat-herding to wage labour. □

¹¹ However when 40 litres of cow milk is available in a village, the cow milk price is determined by fat and SNF content. This makes cow milk more viable to produce, but it still requires a large number of people to opt for cows in one go.

TRENDS IN THE RURAL NON-FARM SECTOR

D1 Classifications and Definitions¹²

The nine occupational categories used by the Census of India are shown in Table B5, and are listed again in Table D1. Unfortunately, there is no consensus as to which of these categories should be included within the rural non-farm sector (RNFS). The most inclusive approach is to include all activities in categories III to IX, while another approach is to include IV to IX (e.g. Fisher et al., 1997). In this report we tend to use the latter definition, bearing in mind that processing and storage of livestock, forest and tree products all fall within this definition.

There are various definitions of the RNFS, including the following:

"The RNFS comprises all non-agricultural activities - mining and quarrying, household and non-household manufacturing, processing, repairs, construction, trade, transport and other services - in villages and rural towns of upto 50,000 population, undertaken by enterprises varying in size from household 'own-account enterprises' all the way to factories" (ibid.).

Words such as 'employment' and 'jobs' can be misleading: less than 10 percent of rural workers are employed regularly, and there is much underemployment among the vast majority of those who are self-employed or work as casual labourers (ibid.). The RNFS provides work to 40-50 million rural workers, or as much as a quarter of all rural employment; while income from the sector contributes 25-35 percent of the total income of rural households (ibid.).

Types of Non-farm Rural Activity

The sector is very diverse, ranging from mining through manufacturing to services.

Some enterprises are at the household-level, and some beyond. Some require skilled labour, while others do not. RNFS sub-sectors include:

- food processing, ranging from grains and pulses to spices, milk and poultry;
- other primary processing, such as mining, bidi-rolling and sericulture/silk-processing;
- traditional manufacturing (including handloom products, wood products and pottery);
- modern manufacturing e.g. powerlooms, metal products and small engineering, and construction; and
- services, such as retail trade, restaurants, mechanised transport and communications.

D2 Patterns and Trends at the National/Regional Level

The structure of the economy and of occupations has been briefly described already in Chapter B, and that information is not repeated here. Broadly speaking, only a third of RNFS jobs are in manufacturing, while 60 percent are in services. The remainder are in construction, mining and food processing. The most important activities are manufacturing outside the household, trading and public services, each of which generates about a fifth of RNFS employment (ibid.). Household manufacturing is the only part of the RNFS in which rural employment has been declining, undermining further the perception that traditional cottage industries are the mainstay of the RNFS in India (ibid.). The distribution of rural main workers by occupational category is shown in Table D1.

Employment in RNFS grew at five percent p.a. between 1977-8 and 1987/8 (Fisher et al).

It is also useful to place RNFS sub-sectors in another set of categories (see Table D2), namely:

- high-share, those which already generate a high share of employment in the RNFS;

¹² This section and the following one draw heavily on the book by Fisher et al., 1997.

	Category	Total rural main workers (RMWs)	As % of total RMWs	As % of RMWs in RNFS
I	Cultivators	107 568 463	48.4	-
II	Agricultural labourers	70 338 340	31.6	-
III	Activities allied to agriculture	4 940 998	2.2	-
IV	Mining and quarrying	1 039 269	0.5	2.6
Va	In household industry	4 810 074	2.2	12.2
Vb	In non-household industry	7 903 477	3.6	20.0
VI	Construction	2 318 397	1.0	5.9
VII	Trade and commerce	7 301 392	3.3	18.5
VIII	Transport, storage & communications	2 747 204	1.2	7.0
IX	Other services	13 321 965	6.0	33.8
I-IX	Total RMWs	222 289 579	100.0	-
IV-IX	Total RNFS workers	39 441 778	17.7	100.0

Source: Fisher et al., 1997

- high-growth, those in which RNFS employment is growing at a rapid pace; and
- emergent, those which are only just emerging as part of the RNFS, and thus do not feature prominently in past data.

Variations between States

Fisher *et al* divide eight states into two broad groups:

- those in which the RNFS is more developed, i.e. Punjab, Tamil Nadu and Gujarat; and
- those in which the RNFS is less developed, viz., Assam, Orissa, Andhra Pradesh, Rajasthan and Uttar Pradesh.

In the first set, Gujarat has undergone a significant transformation of its rural economy, through the extensive and rapid growth of rural manufacturing. Tamil Nadu also has a large rural manufacturing sector, but it is not growing as fast as that of Gujarat. In Gujarat the secondary sector generates almost half of all employment in the rural non-farm sector, and rural jobs in manufacturing outside the household have been growing at an annual rate of 5.7 percent (Fisher *et al*, 1997). The proportion of agricultural labourers in rural employment hardly rose between 1981 and 1991; Gujarat enjoys low rates of unemployment, and many women are entering the labour force.

High-share	High-growth	Emergent
<ul style="list-style-type: none"> • Mining and quarrying • Plantation products (Assam) • Processing of grain, paddy, sugar and fish • <i>Bidi</i>-rolling • Cotton textiles • Textile products • Wood, cane and bamboo products • Leather (Rajasthan) • Pottery • Matches (Tamil Nadu) • Metal products • Repairs • Construction • Land transport • Retail trade • Restaurants and hotels • Educational services • Health services 	<ul style="list-style-type: none"> • Mining and quarrying • Processing of fibres • Powerlooms • Silk textiles • Textile products • Carpets (UP) • Wooden furniture and fixtures • Leather (UP) • Ceramics • Diamonds (Gujarat) • Metal products • Repairs • Construction • Land transport • Retail trade • Restaurants and hotels • Business and communication services • Rural tourism 	<ul style="list-style-type: none"> • Poultry processing • Prawn processing • Sericulture and silk • Floriculture and phytochemicals • Spice processing • Oilseed processing • Fruit and vegetable • Ceramics • Stoneware • Cementware • Plastic products • Gem-cutting • Business and communication services • Rural tourism

Source: Fisher *et al*, 1997.

The second set of states, which includes those containing this study's focus districts, shows signs of significant rural distress. In Andhra Pradesh agricultural workers make up almost half of the agricultural workforce. In Rajasthan, growth in RNF employment is more dependent on labour in mining and construction. Rural employment in manufacturing in Rajasthan, has been declining (*ibid*). The reliance of these states "on their primary economies suggests that the processing of primary products is one of the most promising avenues to develop their non-farm sectors" (*ibid*).

Categorising the rural labourforce into three groups - cultivators, agricultural labourers and the non-farm sector - reveals some interesting changes in rural employment over time. The proportion of cultivators in the rural workforce is declining: the sector that compensates for this varies from one state to another.

As can be seen from Table D3, the proportion of cultivators in Rajasthan is declining more slowly than in Andhra Pradesh, Gujarat or India as a whole; but the growth in the proportion of agricultural labourers in Rajasthan is still higher than in Gujarat and than the national average. In Gujarat the proportion of cultivators has declined more rapidly than in Rajasthan, but the proportion of agricultural labourers has hardly increased. This is because (as is suggested by the data in column 3) Rajasthan has failed to expand its non-farm sector, whereas in Gujarat there has been substantial expansion of the RNFS, particularly in manufacturing.

State	% point change in proportion of cultivators to RMWs	New jobs in RNFS as % of jobs lost in cultivation	Change in proportion of agricultural labourers to RMWs (%)
Andhra Pradesh	-6.0	3	5.8
Rajasthan	-2.1	-51	3.2
Gujarat	-4.7	82	0.8
India	-3.4	33	2.3

Source: adapted from Fisher et al., 1997: based on Census data.

D3 Trends in Focus Districts and States: Anantapur and Andhra Pradesh

Industry in Anantapur

The industry sector comprises of large/medium, small and tiny scale units. There are 24 large/medium units in the district with an estimated aggregate investment of some Rs.666.20 million and employment to 7,900 persons. These units are mainly textile based units engaged in cotton yarn spinning and the manufacture of cotton and silk fabrics. Chemical-based units, primarily edible oil processing units and mechanical engineering based units such as forging and casting are also common. There are also a few agro-based and mineral-based units.

It is understood that a majority of the large and medium units in the district are promoted by entrepreneurs from the neighbouring Karnataka state and the technical and skilled manpower employed by these units is also attracted from elsewhere. However, the unskilled employees comprise mainly of locals.

The composition of small scale industry (SSI) units points to the predominance of agro-based units, followed by general engineering, textile, mineral and forest-based units in that order. The share of service-based units is also significant. The entrepreneurs and labour engaged in the SSI sector are mainly locals. The size of the units is usually very small and the extent of market limited.

The important manufacture items in 12 towns are groundnut oil and other products, silk yarn and *saris*, matches, *bidis* and handloom cloth. The important commodities exported from these towns are groundnut seeds and products, silk *saris*, yarn, tamarind, lime fruit and handloom cloth. Imported items imported into these towns are coconuts, silk yarn, rice (number one item in five towns), electric motors and jaggery.

Silk, wool and cotton weaving is very important household industry in the district. Stone quarries and other stone cutting activities provide employment to a large number of people. These two activities are very important in terms of employment, next to agriculture and livestock.

Profile	1985	1993
CMIE index of level of economic development	65	92
Workers employed in mining and quarrying (per lakh persons)	25	n.a.
Average daily employment in factories (per lakh persons)	254	n.a.
Employment in household industries (per lakh persons)	1577	n.a.

Source: Iyengar, 2001.

D4 Trends in Focus Districts and States: Udaipur and Rajasthan

D4.1 Mining and quarrying

Udaipur district holds bountiful mineral resources. The important metallic minerals include ores of lead, zinc, copper, silver, and cadmium. The other minerals harnessed for industrial purposes are soapstone, rock phosphate, calcite, asbestos, barytes, emerald, limestone and marble. Not surprisingly, employment in mining and quarrying is impressive in Udaipur, as can be seen in Table D5.

Profile	1985	1993
CMIE index of level of economic development	57	53
Workers employed in mining and quarrying (per lakh persons)	231	n.a.
Average daily employment in factories (per lakh persons)	447	n.a.
Employment in household industries (per lakh persons)	750	n.a.

Source: Iyengar, 2001.

Lead, Zinc and Copper

The lead-zinc deposits of Zawar contain over 40 million tons of ore in selected blocks. The deposits are worked by Hindustan Zinc Ltd. About 40,000 tons of zinc concentrate and 14,000 tons of lead concentrate with significant quantities of silver and cadmium as by-products are produced by HZL.

Soapstone and Phyllite

These constitute the district's third most important mineral resource. There are 200 soapstone and prophyllite mines in the district. Udaipur produces about 45 percent of the total soapstone production in India¹³.

Work in mining and marble-working is the main activity of many men in Tulikakhet, one of the survey villages in Kotra block. They work in the adjacent district of Rajsamand. Kotra block is one of the most backward blocks in Udaipur, and men from this block are a cheap source of labour for the mining companies, who send their own vehicles to Kotra to collect them. The men are enthusiastic about working in this sector, which they see as a better activity than rainfed agriculture, and would like mining work to be available in their own block.

D4.2 NTFP collection

With the decrease in the quantity and quality of forests in many parts of India, the contribution of NTFPs to rural livelihoods and incomes declined. In Udaipur's Girwa block, for example, collection of forage and fuelwood used to be significant income-generating activities, but in some villages, these activities have now completely stopped (Prayatna Samiti survey report). The same also applies to the collection of seasonal fruits, gum and honey. This process can be described as the opposite of diversification.

Nevertheless, certain NTFPs remain important in particular areas, and some of the more remote Udaipur villages are still involved in collection of NTFPs for sale. These include *tendu* leaves, which are used in the making of *bidis* (country cigarettes). For a month in the summer, forest units are leased out by the forest department to private contracting parties, who set up stipulated (scheduled) collection centres in villages where local people (mainly tribals) bring the plucked *tendu* leaves, tied up in small bundles (PRAYAS, Pratapgarh block profile). They are paid at piece rate.

D4.3 Rediversification of enterprises in Udaipur

Diversification to work outside the village is a relatively recent phenomenon in most villages in Udaipur. This is illustrated below by the survey findings from Girwa block. Of all the blocks in which survey work was done, this is the nearest to a city (Udaipur), and diversification into non-farm work is probably greatest here.

Sagatdi

The people of this village are involved in a variety of off-farm income-earning activities, not all of which are rural, including: construction work, sand mining, other labour works, and truck and tractor driving (see Table D6). Truck drivers and labour contractors hold strong positions in the village.

S.No.	Labour work	Nos.	Duration (Months)
1.	Outside Udaipur	15	10
2.	Drivers (tractor/truck)	6	10
3.	Assistants in trucks, etc.	12	10
4.	Sand and road construction	20	8-10
5.	Sand/road/construction	30-40	4-6

Source: Sagatdi group discussion.

The frequency and duration of migration for work have increased substantially during the last 15 years. Only *Rawat* tribals did wage labour 25-30 years ago, but other caste groups are now involved. In Sagatdi a pucca road to the village was constructed 30 years ago. The people see the road as beneficial, as it provides access to new jobs. The first year in which a village member travelled a long distance for wage labour was 25 years ago, when one person went to Ahmedabad. It was only around 10-15 years ago that long-distance migration to cities of Gujarat (Ahmedabad and Surat) and beyond (Bombay), became quite common in the village. Wage labour in Udaipur city also began 25 years ago, while work in sand-mining began 16-18 years ago. Truck and tractor driving started not more than seven - eight years ago.

Patukheda

Here 10-12 percent of the villagers migrate for work outside Patukheda. Most of these go for construction work, tractor driving, or to work as helpers in hotels or shops. Long-distance migration is quite a recent phenomenon: 25 years ago no one had seen Mumbai, but now 15-20 people go to distant cities (Mumbai, Kanpur, etc.) for work. There is even some international migration now: three people have gone to Kuwait to earn money. 15 people work in private firms and three people have government jobs.

¹³ This figure refers to the undivided Udaipur of pre-1981 time.

D5 Discussion and Explanation of Structural Trends in Rural India

D5.1 Models of structural changes in rural areas

Two principal models have been put forward that seek to describe and explain certain aspects of the structure of rural economies and their evolution over time. One is the rural growth linkages model, and the other is the residual sector (or distress) hypothesis.

The Rural Growth Linkages Model

According to the growth linkages model, agricultural growth, and hence growth in agricultural incomes, stimulates the growth of RNFS employment (Haggblade and Hazell, 1989; Hazell and Haggblade, 1993).

It is said to do so through:

- *expenditure* linkages, due to the rising expenditure of farm households on locally-produced non-farm goods and services (such as clothing, utensils and processed foods);
- *backward* linkages, through the purchase of farm inputs produced locally; and
- *forward* linkages, to locally based processing and marketing enterprises for farm outputs.

Studies of rural growth multipliers mainly concur that consumption linkages tend to dominate forward and backward linkages in explaining total linkage effects (Ellis, 2000, citing Hazell and Haggblade, 1993). For the rural growth linkages model to work, "the conditions required are that rising farm-led demand calls into being new rurally-located, labour-intensive, small factory production in the consumer, supply and output markets of the farm sector.... under this scenario, the artisanal RNFS will certainly decline, but only in the context of growth in new labour-intensive, non-farm activity that replaces it" (Ellis, 2000).

The Residual Sector Hypothesis

This hypothesis views non-agricultural activity as a residual sector - i.e. rural workers who are not absorbed fully in agriculture spill over into non-agricultural activities.

Both of these models have been the source of considerable debate among researchers, and some of the principal arguments and evidence are reviewed below.

D5.2 Applicability of the rural growth linkages model in semi-arid India

There are various types of evidence that suggest that, while the contribution of agricultural growth to the RNFS in India as a whole has been important, other factors have played a significant role too. The contribution of agriculture may have been less in semi-arid areas where rainfed agriculture predominates. In Part C, we saw that, while crop yields have generally increased (thanks to HYVs, increased inputs of fertilisers, etc.), there has also been a steady decrease in farm sizes. There is also evidence that various factors - notably decreasing farm size and the increasing capital intensity of agriculture - may have been creating an excess of labour in the agricultural sector, particularly during certain seasons. Some people have suggested that surplus labour in the sector, rather than the growth of agricultural incomes, may be a stimulus to growth in the RNFS.

Growth in the agricultural sector has been sluggish during the last 20-30 years. Labour productivity in Indian agriculture has been consistently low since 1970. It has been lowest of all (0.25 percent p.a.) in low-potential rainfed areas, which roughly correspond to semi-arid and arid regions (Fan and Hazell, 1999). A study of inter-temporal employment and output patterns in West Bengal concluded that diversification into non-farm activities was more likely to have occurred as a result of stagnation in agriculture, or post-green revolution shedding of labour by farmers who are substituting capital for labour, than from farm yield growth itself (Chandrasekhar, 1993).

Rural-rural Linkages

There is no guarantee that growth in agricultural incomes will stimulate non-farm enterprises in rural areas: linkages could be stronger with urban areas than with rural areas. Regarding expenditure linkages, one study, in north Arcot district of Tamil Nadu, found that the vast majority of industries supplying farmers with consumer and producer goods were based in urban areas (Harriss, 1987).

Forward linkages appear to have been weak. The processing of agricultural produce into food products, which is commonly assumed to be the primary source of rural non-farm employment, in fact accounts for only 4.1 percent of RNFS employment (Fisher et al., 1997). This suggests that:

- (a) processing may be taking place in urban areas; and/or
- (b) rural enterprises unrelated to agriculture are making major contributions to RNFS employment, stimulated by demand from outside rural areas.

Non-rural Sources of Demand

There are, in fact, some dynamic sub-sectors in the RNFS - such as textiles, leather, diamond and gem processing, chemicals and ceramics - that rely heavily (some almost exclusively) on urban and export demand, and not just on demand from rural households. Cottage enterprises producing products and services for village consumption are no longer the dominant part of the rural non-farm economy (ibid.). The mining

industry is another, demand for whose products is primarily located outside rural areas; and is an important source of work for many poor rural people in Udaipur district. It appears that these industries are not locating in rural areas because of links with the farm sector, but because of the presence there of cheap labour and other factors, such as location of raw materials or low land costs. Rural-urban linkages are discussed further in a later section.

D5.3 Applicability of the residual sector hypothesis

An alternative explanation for the growth of the RNFS is that it expands due to the lack of employment opportunities in agriculture, rather than because of it - that distress and impoverishment may be the driving forces behind it. Some of the principal arguments for and against the hypothesis will now be briefly summarised.

In support of the residual-sector hypothesis, it has been pointed out that there is a strong positive association between the person-day unemployment rates estimated by the NSS and the percentage of rural non-agricultural workers (Visaria and Basant, 1994). There is also evidence that participation in non-agricultural work varies inversely with the size of land-holding possessed by the households, which suggests that small and marginal farmers are forced to diversify (ibid).

However, the high share of casual labourers among non-agricultural workers, or the higher participation of landless households in non-agricultural activities may not necessarily be a result of distress: they may be engaged in economically viable activities (ibid). Furthermore, there is also a strong positive correlation between unemployment rate and the index of agricultural development and agricultural productivity per hectare; and it has been suggested that this casts doubt on the assumption that the above-mentioned correlation between unemployment rates and the percentage of non-agricultural workers is a distress phenomenon (ibid). However, some might argue that that this positive correlation can be explained in terms of growing capital-intensity of agriculture, and associated shedding of labour, as was suggested by Chandrasekhar for West Bengal (Chandrasekhar, 1993).

Table D7 Duality within the RNFS	
Stagnant, poor returns	Dynamic, high returns
Casual labour	Businesses
Household manufacturing	Non-household manufacturing
Very small enterprises	Small & medium scale enterprises
Traditional technologies, products and services	Modern technologies, products and services

D5.4 Variation within the RNFS

That the debate over the residual sector hypothesis has been inconclusive is not surprising. The highly diverse nature of the RNFS means that sector-level generalisations are liable to be unhelpful, and may mask different trends and processes within the sector. A certain degree of dis-aggregation is surely called for. There is evidence that the RNFS can be usefully sub-divided into (at least) two categories: one that is stagnant, with poor returns; and one that is buoyant and dynamic, with high returns (Fisher et al., 1997). Typical characteristics of the two categories are shown in Table D7. A more micro-level perspective on the heterogeneity of the RNFS can be found in sections E6.2 and E6.3.

D5.5 More on rural-urban linkages

India's high population density, by comparison with Africa and Latin America, means that a higher proportion of the rural population are located quite close to urban centres. Linkages with urban centres have been growing as a result of both urbanisation and improvements in transport infrastructure. A growing proportion of rural non-agricultural workers work in nearby towns, a pattern that subsumes the influence of both agricultural development and agricultural stagnation.

Urban linkages may be positive or negative: urban industrial production may compete with rural industry, or provide a source of important sub-contracts, particularly in rural areas within 25-30 miles of an urban nexus. Urban-rural linkages are also important in financial and skills transfers, and in providing markets for the outputs of rural small and medium enterprises (Gordon, 1999).

Negative Effects : Competition between Rural and Urban Enterprises

The rural sector must compete with the urban sector, with its advantages in agglomeration and transport costs, in the production of many goods. One group in Udaipur whose livelihood has been undermined by competition from urban-produced goods is the *Meghwals*, who make shoes from leather and wood. One pair of their shoes may cost Rs. 70, whereas a pair of plastic shoes costs about Rs. 30, so people in the villages have tended to switch to the latter. In one of the survey villages, out of 5 who engaged in this occupation, only one now does so and that too at a reduced level. This is partly due to the lack of availability of dye from the forest but mostly due to the competition from the cheaper shoes, with more fashionable designs, from outside (Seva Mandir survey report). However, not all rural enterprises are vulnerable to competition from urban ones. Clearly, when considering the relationship between rural and urban enterprises, it is desirable to distinguish between different categories of non-agricultural activities.

BOX D1**The Benefits of Urban Proximity in Anantapur District**

In choosing the two locations for the field study, the major criterion was distance from a major urban area. An attempt was made to keep other factors constant, so that we could study the impact of the city, which is closely associated with livelihood options in the non-farm sector. Accordingly, the two *mandals* selected were:

- (i) Anantapur *mandal*, which is closest to the only class-I town in the district, viz. Anantapur; and
- (ii) Rayadurga *mandal*, which is more than 100 KM away from Anantapur town.

Other conditions like soils, rainfall, etc have been kept similar: both *mandals* have similar topography and are situated in the central zone of the district. We found the following differences between the two *mandals*.

1. The villages in Anantapur *mandal* exhibited greater diversity and have better employment and income opportunities for the poor.
2. The daily wage rates are about 25 percent higher in the Anantapur *mandal* villages.
3. At places of migration the people of Anantapur are earning almost double those of Rayadurga.
4. There were famine conditions in Rayadurga in the late 1970s, when starvation, eating of famine food, and deaths due to hunger and diseases occurred. Livestock also perished due to starvation and diseases. By contrast, Anantapur villages have not experienced such famines during the last 40 years.

Source: SPWD Anantapur Report.

Positive Effects

Several Indian researchers have reported a significant positive relationship between the rate of urbanisation and the proportion of non-agricultural workers in rural areas at the cross-sectional level; and concluded from this that the net impact of the processes associated with urbanisation is positive (Visaria and Basant, 1994). This view is supported by the project's findings from Anantapur district, which are summarised in Box D1. This also seems to be the view of villagers covered in the project survey, who perceive the development of transport infrastructure linking them to urban areas as almost entirely beneficial. In some areas, urban linkages appear to be a more important stimulus to NFS growth than agricultural linkages.

Transport Infrastructure, Migration and Commuting

There is aggregate-level evidence that government expenditure on roads has "by far the largest impact on rural poverty" of any form of government expenditure (Fan et al., 1999). Investment in roads reduces rural poverty through:

- growth in agricultural productivity;
- increased non-agricultural employment opportunities; and
- higher wages.

The impact of these three factors on rural poverty reduction has been estimated to be, in percentage terms, 24, 45 and 31 respectively (ibid.). Better roads bring new sources of employment, most of which are in urban centres. These are accessed either by migration or by daily commuting.

Commuting in Gujarat and Udaipur

Basant (1991) estimated that more than 25 percent of the non-agricultural workers in 30 study villages of Gujarat commuted to towns for work. Similarly, the fieldwork in Udaipur district found that an increasing proportion of people living in villages near to the city is obtaining work there. This is indicated by the fact that the number of buses reaching the cities from the rural areas is on the increase. Sagatadi and Patukheda villages, of Girwa block, could only boast of one bus per day 20 years back. This has now increased to 10 during different times of the day. The same is the case with Jhadol block. The travel is for various reasons (to attend court cases, make purchases, sale of commodities like grass etc.) However, the main reason is to undertake wage labour, such as construction work, in the city.

D5.6 Other contributors to growth of NFS

Comparisons across states suggest that other factors, notably education (human capital) and infrastructure (physical capital), also contribute towards the growth of rural non-farm employment (Fisher et al., 1997). Human capital is discussed further in the next chapter. Roads are one major type of physical capital, and electricity generation, transmission and utilisation equipment is another.

Electricity can be important in powering more modern and efficient RNFS units, as well as reducing the drudgery and time required to carry out certain activities, particularly ones done by women (see chapter G). As we saw earlier (sections B2 and B3), Anantapur District has achieved a much higher level of electrification than Udaipur district. This may be one reason why it is more developed, particularly in the secondary and tertiary sectors.

DESCRIPTION AND EXPLANATION OF LIVELIHOOD SYSTEMS

During the last 15 years a livelihoods perspective has become more widely adopted within the development community. It has, for example, largely superseded the farming systems framework, partly because of the increasing recognition that even rural livelihoods often include significant non-farm activities. A widely quoted definition of livelihoods is that of Chambers and Conway (1992:7) who state that a livelihood:

"comprises the capabilities, assets (stores, resources, claims and access) and activities required for a means of living".

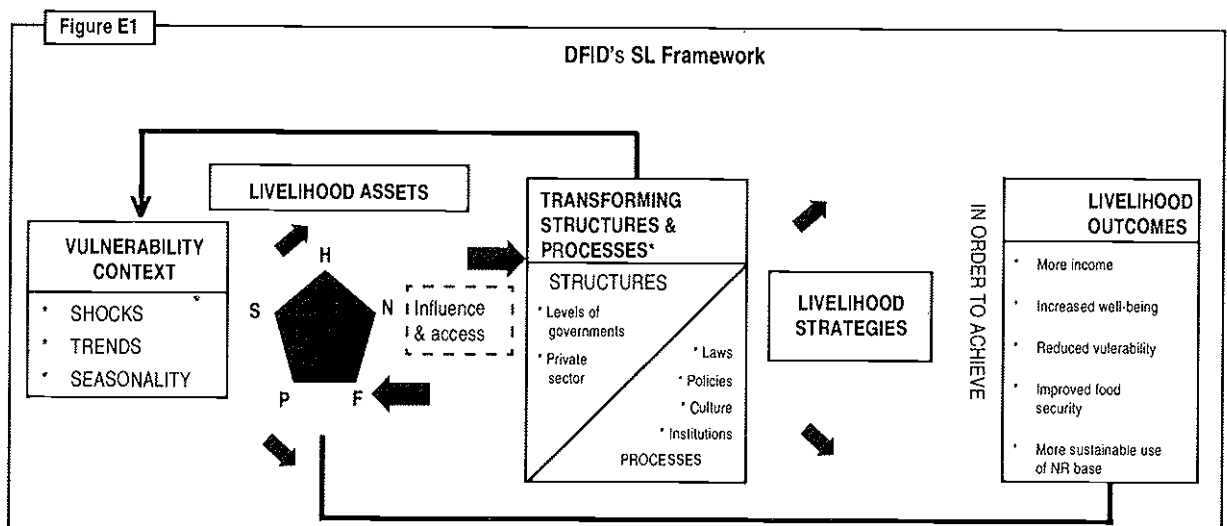
Ellis (2000) seeks to build on this definition by including reference to the access of individuals and households to different types of capital, opportunities and services. For Ellis, a livelihood:

"comprises the assets (natural, physical, human, financial and social capital), the activities, and the access to these (mediated by institutions and social relations) that together determine the living gained by the individual or household".

Several types of livelihood models have been put forward over the years (Sen (1981), Chambers (1988), Swift (1989), Kabeer (1991), Davies (1996), Carney (1998), and others such as Barratt and Reardon (2000)). Livelihoods models focus on the relationship between assets (also capitals, factors), activities (also strategies, production, exchange etc) and consumption outcomes (also entitlements, consumption bundles, well-being, utility, income) within a mediating environment.

E1 DFID's Sustainable Livelihoods Framework (SLF)

Several different versions of livelihoods frameworks have been developed (see Carney *et al.*, 2000 for descriptions). Here we will present the one described by DFID, which was the reference framework used by the researchers in this study.



Source: Carney *et al.*, 2000

E1.1 Assets

DFID's SLF places assets into the following five categories :

Human capital (H) : the skills, knowledge, ability to labour and good health important to the ability to pursue different livelihood strategies;

Physical capital (P) : the basic infrastructure (transport, shelter, water, energy and communications) and the production equipment and means that enable people to pursue livelihoods;

Social capital (S) : the social resources (networks, membership of groups, relationships of trust, access to wider institutions of society) upon which people draw in pursuit of livelihoods;

Financial capital (F) : the financial resources which are available to people (whether savings, supplies of credit or regular remittances or pensions) and which provide them with different livelihood options; and

Natural capital (N) : the natural resource stocks from which resource flows useful for livelihoods are derived (e.g. land, water, wildlife, biodiversity, environmental resources).

E1.2 Transforming structures and processes

'Transforming structures and processes' are now known as 'policy, institutions and processes'. It is the name alone, rather than what is 'included' in this area that has changed. They comprise mediating influences external to the household. They include factors that are influenced by the state, such as government policies and programmes, and laws and regulations. Social and cultural institutions and norms also

shape or limit the use of assets and the types of activities available. For example, Gujarat is a vegetarian state and this means that animal husbandry practices and objectives are oriented towards the production of dairy products rather than meat. Transforming structures and processes can usefully be classified as operating at different levels, such as macro (e.g. national government policy), meso (e.g. state policies and programmes) and micro (e.g. local land-use plans).

Market forces also exert a major influence on livelihoods through changes in relative prices and terms of trade. Government liberalisation policy may interact with market forces by removing market imperfections and barriers. For example, it may result in imports of cheap edible oils, and hence a reduction in the market price of oilseeds produced by farmers, as has happened in India.

E1.3 Livelihood strategies and activities

A household's assets, together with the policy and institutional environment, will shape the options open to it as far as its activities and strategy is concerned, as will its objectives (see below). The strategy comprises several activities, some of which are income-generating and some not: these activities transform the assets into outcomes.

E1.4 Livelihood outcomes and objectives

The following have been listed in DFID SLF literature in the Livelihood Outcomes box:

- More income
- Increased well-being
- Reduced vulnerability
- Improved food security
- More sustainable use of NR base.

A few distinctions need to be made in relation to the outcomes box. First, outcomes need to be distinguished from objectives. A household may have a particular outcome as its objective, but the actual outcome may differ from the objective. Second, it is also important to recognise that households may have both short-term and long-term objectives. Household coping strategies can be said to correspond with short-term objectives, whereas adaptive strategies may be related to long-term ones (see next chapter). Third, it is important to distinguish between the objectives, or criteria, of a development agency and the objectives of local people. Fourth, outcomes may have both positive and negative aspects, and these need to be clearly separated.

People's objectives are likely to vary somewhat, depending on their livelihood strategies and circumstances. However, there has been surprisingly little research in India into what people's objectives, or desired outcomes, actually are. In a review of the literature about 10 years ago, about five relevant studies were identified (Chambers et al, 1989). The reviewers postulated that for many people there is a hierarchy of three objectives or priorities, all of which can overlap and co-exist: but, as the lower ones are more and more met, so the higher ones become more significant. They are:

- *Survival*, based on stable subsistence
- *Security*, based on assets and rights
- *Self-respect*, based on independence and choice.

Name of head	Gonda Ji	Gotam Ji	Rupa Ji	Kalu Ji
Caste	Patel	Patel	Brahmin	Tribal (meena)
Landholding	10 bigha	19 bigha	6 bigha	4 bigha
Main activity	Agriculture	Agriculture	Agriculture	Agriculture
Wage labour	Never	Never	Very rare	Seasonal
Wealth status*	Medium	Wealthy	Medium	Medium/poor
Objectives	Better & comfortable life of son	More income	Better food and house for children	Survival
	Daughter to be happily married in well-off family	More implements (agricultural?), "as I have only a son"	Security against emergency needs	Security against emergency needs
	To have better house & more assets	Education and better life for son	Acquiring more land, ornaments & assets	Participating in social affairs (he's active in village panchayat)
		Social status	Helping children set-up a business	

* The basis for categorising the cases like this is primarily the information on landholding size, main activity and involvement in wage labour. In addition, the 'wealthy' case is considered one of the most prosperous families in the village. The one household involved in wage labour on a regular basis is not involved in labour migration for long periods.

The project survey obtained information about livelihood objectives in four of the individual case studies undertaken in Girwa block, Udaipur district. This is reproduced in Table E1, together with some information about the household. In most cases the husband and wife were interviewed together.

Only one of the respondents gave survival as an objective, but all three medium wealth ones mention *security* against emergency needs and/or acquiring more assets. The *self-respect* objective mentioned by Chambers *et al.* is less apparent, but Kaluji's interest in participating in social and political affairs is related to this. The survey results suggest that two more types of objective may need to be added to the three listed above. A fourth type of objective given by three respondents is *material improvements* in livelihoods, especially having a better house. A fifth type of objective, mentioned in three cases, is a *better life for the children*, in terms of house, food, education, business or happiness.

E2 Livelihoods in Semi-arid India

A livelihood system is based on a combination of assets, together with a portfolio of activities. No two livelihood systems will be exactly the same, but it is possible to categorise them on the basis of the dominant livelihood activity. Widely found types of livelihood system in semi-arid India include:

- medium/large farmers, primarily dependent on agriculture¹⁴;
- small/marginal farmers, who are primarily dependent on a combination of agriculture and wage-labour;
- livestock-specialists, for whom animal husbandry is the principal livelihood activity; and
- landless labourers, who are primarily dependent on wage labour, which may be agricultural or not.

Farmers grow a mixture of food crops and cash crops¹⁵, and there is widespread variation in the balance between the two. For example, farmers in Anantapur depend heavily on one cash crop, groundnut, whereas farmers in Udaipur have a more even balance between food crops and cash crops.

E2.1 Farm enterprises and management

Objectives are generally thought to include both profit maximisation and insurance against risk, the former constrained somewhat by the latter. Agricultural objectives are also likely to be influenced by the household's broader objectives, of the kind discussed in section E1.4. Farmers adopt a number of risk-spreading measures, two of which are mixed cropping and livestock husbandry. The project found, however, that these measures have been becoming less widespread in some areas (see Box E1).

Crop Production

The profitability of different crops is affected by: a range of agro-ecological factors (weather, soil quality and type, etc.); whether or not irrigation is available; costs of inputs; and the prices of agricultural products. Farm size and the household's access to non-farm natural capital (primarily CPRs) also affect options. For example, small and marginal farmers living in villages with little access to grazing areas will be forced to keep relatively few livestock. Other factors include the households skills, size and structure (human capital). Access to financial capital may also be important.

The decision to grow a particular crop on a particular fragment of land depends largely on its water requirement (Seva Mandir, 2000a). Crops that need more water - such as wheat, rice and lucerne - are grown on relatively fertile lands with good moisture retention characteristics.

BOX E1

Decline in Traditional Risk-spreading Measures in Semi-arid Regions

Mixed Cropping

In Udaipur district, some farmers practice mixed cropping of the maize with sorghum, to provide them with a hedge against unpredictable rains - sorghum can grow well even if there is low rainfall (Seva Mandir, 2000a). However, the practice of mixed cropping has been dying out in both focus districts.

Livestock

The keeping of livestock is a well-known hedge in semi-arid regions against crop failure. However, in many villages in Udaipur district it has become less effective than it was 30 years or so ago, when forage and drinking water were relatively abundant in CPRs (especially forests) even during drought years. The general shift from large ruminants to goats in many households is partly a reflection of the deterioration in the availability of forage and drinking water. During this year's *kharif* cropping season in Udaipur some bullocks in the study villages were too weak to do the ploughing, and had become a liability rather than a productive asset. With the poor monsoon this year, the livestock situation is likely to be even worse next year.

¹⁴ The word 'agriculture', as used here, includes both crop production and animal husbandry, with the former being more important than the latter.

¹⁵ Of course, some crops may be both consumed by the household and sold.

Animal Husbandry

Cultural factors (e.g. caste) and traditions play a role here. For example, the keeping of sheep is an enterprise that has traditionally been undertaken by only a few castes; and goat-keeping has a social stigma attached to it that discourages higher castes adopting it as an enterprise.

The practice of share-rearing has not been well-documented in the literature on livelihoods and animal husbandry, but was identified through both the literature review of coping strategies (Rani and Dodia, 2000), and the survey work in Jhadol block, Udaipur (Seva Mandir survey report). As was noted in the former, this system "is of considerable interest because livestock are crucial for the poor both as stock and as assets that can be sold in times of crisis or needs" (Rani and Dodia, 2000).

Apart from strengthening social bonds between the two families involved, both the sides gain from share-rearing, albeit on unequal terms. Some observers have seen the relationship as exploitative: but, as Beck points out, the poor are positive about share-rearing and would not enter into it if they did not see it as benefitting them (Beck, 1994). Fieldwork in Gujarat found that sharecropping of cattle enabled lower caste farm servants to pay off debts to their masters (Breman, 1979), and it has been identified as an important source of income for the poor in both Gujarat and Rajasthan (Jodha, 1986).

E2.2 Migration

Migration for work is an important component of the livelihoods of an increasingly large proportion of rural households in semi-arid India. There are four different types of migration that are commonly referred to in the literature: seasonal, circular, permanent (usually rural→urban) and international (Ellis, 2000). Seasonal migration is when temporary migration occurs, corresponding to one or more troughs in the local seasonal labour calendar, usually correlated with agricultural seasons. Circular migration refers to temporary migration that is not necessarily tied to agricultural seasons, in which the migrants routinely return to their principal place of residence (their 'home'). Permanent migration is when the family member (excluding newly married women) moves long-term to a different location, and establishes their home there. Such family members, who are often sons, commonly make remittances to the rural household from which they moved. International migration is when a family member moves temporarily or permanently abroad. In some Indian states migration to countries in the Arabian Gulf is not unusual.

The frequency of these four types of migration among households, or household members, with farms in Rajasthan and Gujarat appears to be (in descending order): seasonal; permanent; circular; and, in a few cases, international (examples of the latter are also given in Unni, 2000).

Another migration typology has been suggested (SPWD Anantapur Report), namely:

1. First – migration as a last resort to survive, which takes place when all options of livelihood within the village are exhausted.
2. Second – (seasonal) migration for additional work/ income, which takes place when the work in the village is over, normally after harvesting of all crops.
3. Third – migration for alternative work, characterised by better remuneration or better work environment or opportunity to use skills or acquire new skills.

All three of these types of migration may be found in the same area, the type depending on the circumstances of the households. There is evidence that households may switch over time from type 1 to type 2 to type 3 (ibid.). The reasons why different households have different patterns of migration are discussed in sections E6.4 and E6.5.

Seasonal migration is undertaken by a large proportion of households in various parts of semi-arid India. For example, one study found that 76 percent of the households¹⁶ in the tribal study village, in Gujarat's Panchmahals district, migrated seasonally (Uma et al, 1999). They migrate to urban areas, where they are involved in various non-farm activities like, construction work, truck loading and working in the factory. The percentage of male and female members migrating out was 63 and 37 percent respectively. The authors observe that during a drought period, there is excess migration, which results in excess supply of labour and depression of wages.

E3 Livelihoods in Anantapur District and Survey Villages

This section and the one on Udaipur district describe the principle activities found. The situation regarding natural capital (land-holding size, CPRs, crop production and livestock), physical capital (infrastructure) and human capital (literacy) has been discussed in previous chapters. The situation regarding financial capital was not discussed earlier, because it is difficult to discuss usefully at the macro level. Instead, it is considered here and in E4 in relation to the two focus districts.

E3.1 Introduction/overview

The principal activities identified in the four study villages are given in Table E2. Silk-weaving, quarrying and dairying are relatively new activities. It is noteworthy that the number of families involved in dairying is much higher in the villages in Anantapur *mandal*, and this is a reflection of their closer proximity to a major town, Anantapur (see section D5.5). Silk-weaving is also an activity in these two villages, particularly Manila.

¹⁶ In this categorisation of 'households', the authors have included two situations. First, where at least two members from the household migrate; and second, where the entire household migrates with their kith and kin. The latter is predominant.

Village	Mandal	Total families	S&M farmers	Landless labourers	Goat & sheep rearers	Quarry workers	Silk weavers	Dairy
Manila	Anantapur	434	226	85	30	100	75	218
Somaladoddi	Anantapur	395	246	80	30	nil	5	250
Mechiri	Rayadurga	421	259	6	23	nil	nil	15
Vadrahannur	Rayadurga	213	50	45	36	nil	nil	28
Total		1463	781	216	119	100	80	511

The same family may have two or more of these activities. For example, a farmer may own dairy animal and also a loom. However quarry work is somewhat exclusive from other two new occupations. None of the quarry workers own/ work on the loom and they have very little dairy activity. It can be inferred from the table that one half to two-thirds of households are involved in new occupations in the Anantapur *mandal* villages.

E3.2 Activities: farm enterprises

The major shift from coarse grain crops to groundnut was discussed earlier. Groundnut is now the single most important crop in the district.

Multiple Cropping on Irrigated Lands

With the advent of short duration crops, farmers are now taking up two or even three crops in their irrigated lands. For example, the farmers of Mechiri village reported that they had taken up three crops, viz. *jowar*, paddy and wheat/ paddy. These three crops provide employment throughout the year.

Emergent Crops

Orchards like oranges and grapes, which provide employment throughout the year have entered Anantapur *mandal*. Another crop - mulberry, which has greater employment potential (through out the year) - is gaining ground in most parts of the district under irrigation. The spread of borewells has strengthened these processes.

Dairying is another activity that has been spreading, particularly near towns.

E3.3 Activities: Self-employed non-farm enterprises

Weaving was one of the important household industries in Anantapur district for quite some time, but the cotton weaving has declined significantly in recent years due to, among other factors, decline in the cultivation of cotton in the district. However, the district has one of the important centres of silk saris in the country. Dharmavaram silk saris are number one brand in the state and one of the handful of famous brands in the country. Hundreds of traders in Dharmavaram import the silk yarn from places like Bangalore and also collect locally and export silk saris to Hyderabad, Bangalore and many other important cities/ places in the country. Thousands of households living in the villages around Dharmavaram purchase yarn from these traders, weave saris and sell them to the traders. Recently other small centres like Somandepalli village are developing like Dharmavaram.

Further development of transport and market links also helped some of families to start self-employment activities like making of readymade garments, setting up of tea stalls, service shops, etc.

E3.4 Activities: employed work

A number of big and medium industries are coming up in the district particularly in and around Tadipatri and Anantapur towns. These industries are providing employment to local people mostly in lower level jobs. Agriculture machinery like electric pump sets, tractors, threshers are providing employment in the rural areas. Construction activity, including road and railway works, is providing employment to a large number of people at least seasonally.

All four surveyed villages reported availability of opportunities in the non-farm sector. In Somaladoddi, the closest village to Anantapur town, 40 (nine percent of families) persons are employed in organised factories - bottling unit, iron factory and PVC pipe factory. In Maneela village of Anantapur *mandal*, out of total 447 families, more than 200 families are involved in dairying, 75 families in weaving and 80 - 100 families get daily employment in the stone crusher. In Vadrahannuru village of Rayadurga *mandal*, about 50 persons are employed in non-farm activities, and are commuting daily to Rayadurga town for employment. In Mechiri village of Rayadurga *mandal*, out of 421 families, members of about 75 families are engaged in non-farm activities. Of these, about half are involved in modern activities, such as: readymade garment-making, electric motor rewinding, canteens, provision shops, etc.

Regular Migration

Now, thanks to the advent of transport and communications, people are well-informed about what kind of work is available, where and when and how to reach the point of work. As a result, migration of different kinds became an integrated part of their livelihoods. Similarly people of all four surveyed villages reported as migrating seasonally every year in search of not just additional work but also for higher wages, even if some work is available in their native villages. In fact, about 200 labourers immigrate every year to one of the surveyed villages, Manila to work in stone crusher. Even from this village, 30 people migrate upto 60-70 kms. every year to work on more lucrative road construction activity.

E3.5 Financial capital: savings, credit and investment

In the past, people used to save and invest in livestock, land and gold and silver ornaments: they had no other options. Today, the poorer sections are not saving or investing in livestock so much, due to the decline in the availability of common grazing lands; nor in gold and silver, as these now tend to be beyond the reach of the poor.

At one time, the important source of credit to the poorer sections was large landowners. Though interest rates were low (less than one percent per month), such loans invariably led to some sort of attachment of labour. Attachment of labour takes two forms, *viz. formal attachment and informal attachment*. In the *formal attachment*, a member of the loanee family becomes a servant in the farmer's family. The farmer pays a fixed wage for a year and provides food and other necessities to the servant. In return the servant work for 14 to 16 hours a day for the master, doing all kinds of work. In the *informal attachment*, the loanee family members work in the fields of the farmer who gave them the loan. Under informal attachment, the farmer who gave the loan has first charge on the family's labour: if there is no work with the farmer then they may work for other farmers. Normally the farmer does not pay the peak time wage rate, but provides additional employment during the lean time.

This patron-client relationship has weakened drastically during the last few decades. The number of formally attached labourers has declined from over 100 to 21 in Manila village; and from about 80 to 5 in Somaladoddi village of Anantapur mandal. The breakdown of this practice appears to be benefiting the labour/ poorer families more than the large landowners.

The labour/ poorer families now have a number of employment opportunities, including ones outside the village, that provide them with cash. They also have a variety of informal sources of loans, such as: moneylender, commodity traders (e.g. butchers and groundnut traders), fertilizer and pesticide traders and financial companies. They may be able to access formal sources as well, such as banks, co-operatives and SHGs. However, the rates of interest have gone up in the informal market: currently they vary from two to five percent per month, and are as high as 10 percent in some cases. Even the SHGs charge about two percent per month. With the breakdown of the patron-client relationships, the farmers are also charging higher rate of interest. In addition, relatives and friend provide cash and kind assistance in the form of gifts and soft loans. These transactions tend to increase during moderate drought conditions and decline during severe drought/ famine conditions, as all the families are affected by droughts.

E4 Livelihoods in Udaipur District and Survey Villages

E4.1 Introduction/overview¹⁷

Several types of livelihoods are found in rural Udaipur. The principal ones are listed below in terms of their main activity/enterprise, but it should be borne in mind that all livelihood systems are likely to include other activities at certain times.

1. Small/Marginal Landholders and Unskilled Labourers

Own crop production does not meet the household's food grain requirement. Under rainfed conditions crops can only be grown during the kharif (monsoon) season, unless there are heavy rains in October (Prayas report). Livestock-rearing is hardly an option, due to lack of access to forage. Thus, one or more household members go for unskilled wage labour for three - six months a year, during the winter and summer seasons.

1(a) Agricultural labourers. Seasonal migrants who go to Gujarat to do agricultural labour often take their children with them, thus depriving them of formal education. Given the importance of education in accessing better paid work, this tends to lock the family into low-paid casual work.

1(b) Tendu leaf collectors. In Pratapgarh and Kotra blocks there is another type of marginal farmer, for whom the collection of tendu leaves for making beedis is an important activity.

1(c) Wage labourers in the non-farm sector. These include people working in mining, construction and sand extraction: some are seasonal migrants, while others are based in their villages year-round.

2. Small/Marginal Landholders and Skilled Labourers

Types of activity involving skilled labour include: truck-driving, motor mechanics, masonry and artisans. The additional cash income from working in these occupations means that capital accumulation is much higher than in the first livelihood system.

3. Medium to Large Landholders

For these people agriculture is the primary activity. They are able to meet the household's foodgrain needs, and to generate cash from the sale of agricultural produce. They may also look for wage labour opportunities, near to their village, for relatively short periods of time when agricultural labour demands are slack. This is the one group that invests significantly in agriculture and land improvement, irrigation, etc.

4. Households with Salaried Workers

For these workers households agriculture is a secondary livelihood activity. They have the highest level of capital accumulation, and spend money on better (*pukka*) housing, improved education of the children, etc. After the salaried worker has retired they often invest their savings in starting a small business, such as a flour mill or a taxi service, to ensure them a continuing steady source of income. They tend not to invest their income and savings in agriculture.

5. Livestock Specialists with a heavy dependence on sheep and/or goats.

¹⁷ This subsection draws heavily on the following reference (Seva Mandir, 2000a).

E4.2 Activities: farm enterprises

Agriculture in Udaipur is largely rainfed, so farmers prefer to grow crops that are drought-resistant. In a large proportion of the villages farmers cultivate crops primarily for home consumption. Food production is given priority over cash crop production.

Fragmentation

If a farmer's landholding is in the form of small scattered fragments, the cost of fencing and protection of the crop increases significantly. Farmers' time and energy is concentrated more on those fragments that are largest and are located nearest to the home.

Soil Fertility

A farmer prioritises the application of manure according to the nearness of an individual fragment to the house; hence crop yields from such fragments tend to be higher (Seva Mandir, 2000a). In Sagatdi, *san* and *gawar* were grown as green manure crops until about 30 years ago. This was done particularly before the *Rabi* crop, for better production of mustard, as it was used to repay debts. This practice has stopped now, as holdings have become smaller and people are no longer willing to spend so much time in the fields. (*Gawar* is still grown, but as a fodder crop and cash crop.)

Water Availability

When the rains are good almost all of the arable area is under cultivation during the *khariif* season: for example, 97 percent in Bichiwara village, Jhadol block (Seva Mandir, 2000). By contrast, in the *Rabi* season only 50 percent may be cultivated, or as little as two-three percent in a drought year (*ibid.*). According to various people interviewed during the survey (e.g. in Jhadol block), the capacity of their fields to retain moisture after the monsoon season had been declining. Consequently, they are now only able to grow a crop in the *rabi* season if there have been good rains in October, or if they have a well and hence can irrigate an area of land. Rice production has declined for this reason.

Current Cropping System

During *khariif* almost all the cultivable land is under cultivation, and this is generally considered to be the main cropping season. *Rabi* is the other major cropping season. The cropped area is smaller in *Rabi*, and depends on the topography, soils and irrigation infrastructure. In the third cropping season, *Jaid*, only a very small area is cultivated. Information about the crops grown in Bichiwada and Sagatdi is summarised in Table E3.

Cropping seasons			
Village	<i>Khariif</i> (monsoon)	<i>Rabi</i> (winter)	<i>Jaid/Jayad</i> (summer)
Bichiwada	Maize, sorghum, black gram, horsegram, rice	Wheat, barley, gram	
Sagatdi	Maize, <i>gawar</i> , <i>til</i>	Wheat, mustard	<i>Mung</i> bean, sugarcane, <i>Rijga</i>

Sources: Seva Mandir, 2000a; Prayatna Samiti survey report.

Changes in Cropping Systems

Cropping systems have been changing over time. In Girwa block, for example, major changes that took place between 1977-1997 included: cultivated area of maize increased by almost 30 percent, and of Mustard by 83 percent; while that of barley declined by 80 percent, and horsegram by 74 percent (Girwa block profile).

Sagatdi village illustrates some of these changes (see Table E4). Another major change in the village is that wheat has replaced barley as the main *rabi* season crop. Villagers trace this back to the introduction of an improved variety of wheat by the agricultural extension officer nearly 20 years ago. They said that before then many people would not recognise wheat. He provided seed to all farmers free of cost, and guided them throughout the season in how to grow it. The success of the crop encouraged farmers to continue growing it.

Cropping seasons			
Time period	<i>Khariif</i> (monsoon)	<i>Rabi</i> (winter)	<i>Jaid/Jayad</i> (summer)
1970s	<i>Jowar</i> , maize, <i>til</i>	Barley, mustard	<i>China</i> , <i>kangni</i>
1980s	Maize, <i>gawar</i> , <i>til</i>	Wheat, mustard, barley	<i>Mung</i> , <i>kangni</i>
1990s	Maize, <i>gawar</i> , kalat	Wheat, mustard, horsegram	<i>Mung</i> , maize
Current year	Maize, <i>gawar</i> , <i>til</i>	Wheat, mustard	Mung bean, sugarcane, <i>Rijga</i>

It is not just the crops that have changed in Sagatdi, but also the relative importance of the cropping seasons. The *rabi* season is now regarded by the farmers as three - four times more important than *khariif*. They gave various reasons for this, namely:

- wheat, mustard, and gram are all important crops;
- wheat and mustard give cash income ;
- wheat can be conserved for longer than maize ;
- maize productivity is not very high;
- the price of maize is low; and
- maize is no longer used much as a staple.

Animal Husbandry

Numbers of livestock units, and even more so livestock units per household, have been declining in recent decades, as is shown in Table E5.

Livestock category	1961		1971/72		1991/92	
	Total	Per cap.	Total	Per cap.	Total	Per cap.
Cattle	1273	0.87	1303	0.72	904	0.31
Buffaloes	443	0.30	463	0.26	409	0.14
Sheep	364	0.25	468	0.26	260	0.09
Goats	692	0.47	1198	0.66	871	0.30
Total livestock units ¹⁸	1864	1.27	1999	1.11	1471	0.51

Two major factors behind the decline in livestock units per capita are: (a) the decrease in farm sizes; and (b) the shrinkage in area of common lands and their degradation.

In Sagatdi, people said that the total number of animals owned had declined by about two-thirds in the last 25 years. The men attributed this partly to the growth in wage labour, which they said can be an easier or more effective way of earning income than keeping animals.

E4.3 Activities: self-employed non-farm enterprises

Most households in rural Udaipur own farmland and grow crops. However, agriculture is not able to provide entirely for the sustenance needs of the people, and most households have a food grain deficit that has to be made up from purchased grains. In addition, apart from the peak period of the rainy season, the agricultural and allied sector is not able to provide enough employment opportunities within the village.

Some income-generation and subsistence options have declined during the last 20-30 years. For example, in Sagatdi people used to collect fuelwood and forage from the forest and sell it, whereas this has now completely stopped. The same is true for other NTFPs, such as seasonal fruits, forage, gum and honey. The loss of these livelihood options has particularly affected women and the elderly, reducing their opportunities for income-generation.

Forest-based Activities remain important in some of the remoter regions of south Rajasthan. In both Kotra and Pratapgarh blocks, *Tendu* leaf activities have been supported by local NGOs, Astha and Prayas respectively, who have helped to enhance the price received by the tribals in its collection. Some efforts are underway to see whether this experience can be extended to other NTFPs as well.

Rajasthan's Joint Forest Management (JFM) programme has involved about 2700 villages in Udaipur district in protection of degraded forest areas, covering an area of 236,000 ha. Effective protection will result in increased NTFP production in the future.

E4.4 Activities: employed work

People who work away from their farms for some of the year can usefully be classified in terms of the type of work they do, i.e. as:

- unskilled labour;
- skilled labour; or
- salaried work.

Examples of each of these kinds of work are given below. The degree of skill involved in the work undertaken is positively correlated with the educational level of the worker, the mean daily income and the duration of time that the person is working away from their farm (see Table E8). The daily wage of people who have received primary education may be 2.5 times that of illiterates, and that of people who have received secondary education may be three times that of illiterates (see Table E7). Although people doing unskilled labour are relatively poorly paid, this does not necessarily mean that this kind of work is unattractive to them. Those for whom the value of self-employed agriculture has declined significantly may greatly welcome it, as in the following example.

¹⁸ Livestock units have been calculated by treating large ruminants as one unit, and small ruminants as 0.14 of a unit.

Unskilled Labour -Mining

Among the tribals in Kotra block's Tuilkakhet village, many work in mines in south Rajasthan. This group see working in the mines as their main livelihood activity, and would like to see mining introduced into their own block (Astha project report). All households in the village - which has very little irrigation and has been experiencing drought for the last two - three years --- are pessimistic about the future of agriculture.

Skilled Labour - Masonry

An example of skilled labour, a mason is given in Box E5.

Salaried Work

Some men from Sagatdi village, Girwa block work in a gas factory in Gujarat, spending 10.5 months per year away from home.

E4.5 Financial capital: savings, credit and investment

Savings, credit and investment practices vary, depending upon people's livelihood systems and general wealth status. Two examples are given below from Girwa block, one is tribals in Sagatdi village, and the other is Dangis (better-off farmers) in Patukheda. The two villages are near to each other, and the tribals sometimes borrow from the Dangis, but only as a last resort.

Tribals

In Sagatdi, sources of credit are:

- Friends and relatives
- Self -help group (for members only)
- Mahajan
- Patels (*dangis*) of neighbouring village

Friends and relatives are approached for smaller requirements. This is reckoned as a mutual help. Generally repayment period is fixed in such cases. Interest is charged only if the repayment period is very long. Interest rate in such case varies from 12 to 24 percent. About 20-25 years back grain was also borrowed in place of money. Nowadays, a self-help group (SHG) is also furnishing credit requirements of various degrees and for a range of purposes. Members of the SHG regard it as an important source of credit.

For bigger requirements, money is partly managed in the village and partly arranged from *mahajans* (moneylenders). If land or jewellery is not pawned, 10 percent of the total amount lent is kept by the moneylender. This is known as *kasrat* (for a sum of Rs. 1000, the borrower would get Rs. 900 only though interest would be charged on Rs. 1000). If jewellery is pawned, *kasrat* is not charged. If the amount is not paid in the time decided, interest is added to the principal amount. Interest rate in such cases is 24 percent.

BOX E3

Is Income from RNFS Invested in Agriculture?

A case study of one village in Udaipur concluded that households with one or more salaried workers tend not to invest their income in agriculture, because it is no longer a major source of income for them (Seva Mandir, 2000a). They spend money on construction of a *pukka*, cemented house, and on their children's education. When the salaried worker retires, he is likely to invest his savings in a small business, such as a flour mill or a taxi service.

Similarly, households with member(s) involved in unskilled wage labour tend not to invest much money into their farms, but for different reasons (ibid). In this case, they have more pressing needs particularly (i) the purchase of food grains; followed by (ii) consumer goods, such as soap, hair oil, cosmetics, salt and spices; and (iii) clothing material. During times of scarcity some households also purchase forage for their animals. In addition, wage labourers, especially daily 'migrants', often spend money on country liquor. Nevertheless, they sometimes invest some money on well repair work.

In case of land mortgage to *mahajans*, *kasrat* and interest are not charged. No investment is done by the mahajan in cultivation on such land but the crop is shared equally between the lender and the borrower. Other products such as crop-waste, grass, etc. are not shared by the mahajan. This practice is known as *Hama-dama*. In land mortgage cases, *mahajan* does not accept repayment before the time fixed. If money is repaid while the crop is standing, mahajan would share the crop all the same. If money is not repaid for long, mahajan can occupy the land.

The *Patels (dangis)* also lend money, on interest rates ranging from two - three percent per month. If land is mortgaged to the Patel, he himself cultivates on it. No share is given to the borrower in any of the products. Thus, the Patels are the tribals' last resort for borrowing.

Dangis in Patukheda

Changes in patterns of savings, credit and investment among better-off farmers are illustrated by the *dangis* of Patukheda in Table E6.

1980	2000
● Saving in form of jewellery	Money is invested in: ● Better housing ● Agriculture implements
● Animal purchase / land purchase were avenues of investment.	● Animal purchase ● AH implements ● Motorbikes ● Money is given on interest
● Extra amount deposited with <i>mahajans</i> (moneylender), who didn't give any interest on this. They would charge interest on borrowed money even if one had deposited money to ML	● Some still deposit with <i>mahajan</i> (10%)
● No concept of depositing in bank or post office.	● 30-40% have accounts in bank or post office

E5 Livelihood Adaptation in Response to Long-term Trends

Responses to long-term trends involve adaptation, which can be defined as the continuous process of "changes to livelihoods which either [seek to] enhance existing security and wealth or try to reduce vulnerability and poverty" (Davies and Hossain, 1997). Adaptation includes diversification. However, it is not synonymous with it, because adaptation also includes new ways of trying to sustain the existing income portfolio (Ellis, 2000). For example, a household that is predominantly dependent on agriculture may adapt to water scarcity by deepening its well, or switching to less water-intensive crops, as illustrated by Box E4.

BOX E4

Case Study of Agricultural Adaptation and intensification

Gonda Ji, aged 42, is married and lives in the village of Patukheda in Udaipur. He has five children - four daughters and a son - all of whom are married. The two younger daughters still live with Gonda Ji, whereas the two older daughters live with their in-laws. The son works in a restaurant in Jaipur, but his wife lives with Gonda Ji. The older two daughters are illiterate, whereas the younger two are literate (third and fifth standard).

The family depends mostly on agriculture. The landholding has not been divided for the last two generations as Gonda Ji has no brother. They have six *bigha* of irrigated land and four *bigha* of *Beed* (private wasteland used as pasture). Four *bigha* of the irrigated land was bought by Gonda Ji himself about 25 years ago. The money for land purchase was borrowed from a moneylender (pawned jewellery) and was later repaid through agriculture. In normal rainfall years, three crops are taken. Wheat and maize are the major ones, and in normal years 50 percent of the wheat is sold. A part of this is used to repay moneylenders.

Water Resource Development

Gonda Ji shares one well with other cousins. He was also able to dig a new well nearly 15 years ago, and installed an electric motor on it 11 years ago. Before this he had a wooden 'rahal' and later an iron one. About three years ago, he also constructed a *menzer* on the well.

Animal Husbandry

It is the second major source of income of the family. In common with district-level trends, their ownership of large ruminants has declined, except for buffalo. About 20 years ago the family owned 10 cows, two buffaloes, four bullocks and a calf. Presently it has one young cow (not producing milk), a calf, three buffaloes, three calves (of buffaloes) and a pair of bullocks. Earlier the family used to give milk on *mawa bhatti* and some amount was sold privately. *Ghee* was made at home. Buttermilk and milk were consumed by members. Since the dairy was started a few years ago, milk is kept in home twice a week for making *ghee* for home consumption and to get buttermilk which is essential part of diet.

Other Livelihood Options

Gonda Ji and Goribai (his wife) themselves have never gone for any kind of wage labour. In fact, they had to give some land in '*Sijara*' i.e. share cropping, as Gonda Ji has no brother to help. Their son is working in Jaipur and sends some money for his own family (wife and one year old son). Although someone will be needed to work on the farm in the future, the parents want their son to get good job, because it ensures a regular and assured flow of cash. In such case, the agricultural work can be taken care of by a servant or sharecropper.

Coping

The family has not faced any serious crisis, except for death of parents and the present drought. Gonda Ji borrowed Rs. 35,000 when his father died. Later he sold one *bigha rakad* (un-irrigated land) to one of his cousins for Rs. 85,000 - part of which was used for repayment and the rest invested in the well. Major expenditures were made in purchasing land, digging the well, and making jewellery for daughters and daughter-in-law. Most of the money was borrowed from moneylenders. Expenses were also made for settling social obligations (dispute with in-laws of daughter and son).

Source: Prayatna Samiti, Patukheda interviews.

A household's strategies for adaptation may not be successful, which is why the words 'seek to' have been added to the above definition. For example, investment in a son's education may not result in him getting the well-paid urban job, and hence providing a drought-proof flow of remittances, as the parents had intended. (See Box E7 for a case of investment in education resulting in indebtedness and a poorly paid job.) Thus, it is necessary to distinguish between positive and negative adaptation. Positive adaptation generally results in households having an enhanced capacity to resist shocks. Negative adaptation, on the other hand, results in the adoption of successively more vulnerable livelihood systems over time (Davies, 1996).

Positive adaptation generally involves some form of asset-building strategy. Contrary to a popular view of the 1960s and 1970s, there has been growing recognition during the last 15-20 years that rural households can "take a longer term view of livelihood security than merely taking advantage of currently available income-earning opportunities" (Ellis, 2000), provided they have secure rights to the assets they want to develop. Thus, rural people make long-term investments to develop assets that they will be able to use in the future to improve their livelihoods. They also, as we saw in section E1.4, seek to improve the living standards of their children in the future. This inter-temporal (sometimes inter-generational) dimension of people's livelihoods is not well covered by household economic models, or by the literature on coping strategies, both of which tend to have a short-term focus.

Households may seek to build or develop any of the five types of asset that form part of the sustainable livelihoods framework. Examples of each will be given below, starting with the most obvious one, human capital.

BOX E5

Diversification Into a Skilled Profession (Masonry) in the Non - farm Sector

Ishwar/Mav Ji is one of two brothers who are both married and live at their father's house, as part of a joint family. The family lives in Bichiwada village, where the father runs a provision shop and a flour mill. They recognised that their landholding was not enough to meet their "sustenance needs", so they "made conscious efforts towards finding other sources of income". Since 1996, he has been working as a mason.

He was able to enter this profession because he had relatives who taught him the skills, when he stayed and worked with them in Ahmedabad, Gujarat. His general education also proved useful, as it helped him "in taking measurements, in calculation of wage rate and payments". He visits Ahmedabad at certain times of the year, and if work is available he stays and shares a rented room with his relatives and acquaintances. They are in touch with a contractor, who arranges work for them, normally at a daily rate of Rs. 150. This is about three times the rate he would receive as an unskilled labourer in Udaipur district, so he and the family have benefitted considerably from him becoming a mason.

Construction work is greatly dependent upon the availability of water. Thus, the probability of him finding work as a mason in Ahmedabad is highest during the rainy season - but this is also the busiest time in the agricultural calendar in his village. During this period, the mason chooses to work in Ahmedabad, because the loss of his labour on the farm "is well compensated by the cash I bring home" from Ahmedabad. However, he leaves his wife at home so that she can do work on the farm.

Last year was a drought year, so he was only able to obtain work in Ahmedabad up to October, and subsequently he worked at home. In January-February 2000 he was able to get some work as a mason in a nearby village, for which he received Rs. 100 per day.

Source: Seva Mandir, 2000a.

E5.1 Human capital

(a) Development of Skills by Adults

The mason (see Box E5) is an example of someone who has increased his options by increasing his skills. The development of human capabilities by individuals has been observed in Udaipur district, where "there is an increasing crop of skilled workers", working as truck drivers, motor mechanics, masons and artisans (Seva Mandir, 2000). Some of these skilled workers have acquired additional skills while working in nearby mines or in other types of unskilled non-farm work (ibid.).

A second example of development of human capital comes from a village study in a semi-arid part of Gujarat's Saurashtra region (cited in GIDR Report 2). Shylendra et al (2000) found that 20 percent of the households in the village had diversified into various non-farm activities. The most prominent of these was being diamond polishing, which is a skilled activity. This diversification dates back to the mid-seventies, when a severe drought hit the village and the whole Saurashtra region of Gujarat. The farmers had made huge investments in tubewells in the village during this period. They had borrowed huge amounts of money for the investment, which was to be repaid.

To cope with the crisis, some of the male members of these households migrated to Surat, which is one of the major diamond polishing centres. These men learnt the trade and also brought this activity to the Saurashtra region. The remuneration from this activity was attractive, and this encouraged other men folk to diversify into this activity. The study also observed that 30 percent of the labour in the village migrated to small towns or cities and were employed in non-farm activities, the majority of them in diamond polishing. The study further reveals that about 18 percent of the rural households in the village permanently migrated-out to cities and towns and were involved in diamond polishing. Most of these households started migrating out permanently along with their kith and kin in the nineties. Prior to that only the male members would migrate seasonally on a short-term basis. This shows that one of the long-term coping mechanisms adopted by the households is that of acquiring skills, which helps them to adopt an alternative activity.

BOX E6**Diversification through Investment in Children's Education:
A Case of Positive Adaptation**

Rupa Ji is a *Brahmin*, aged about 50, who lives with his wife in Patukheda village. He has three sons and a daughter, all of whom, except for one son, are married. His three sons now live in the city of Nagpur. The eldest son went there about six years ago, and runs a small hotel; the second son runs a Pan (Betel) shop, while the youngest one works in a shop. Before the sons obtained work in Nagpur, the family was entirely dependent on agriculture and animal husbandry.

Due to low income, big family and frequent shocks, the family has been unable to acquire any significant asset or jewellery. The family has suffered a number of crises during the past 15-20 years, including: death of family members (first wife and parents); frequent death of animals; and the current drought. The three sons send money to their parents. In a normal rainfall year, this would be an extra income, but in the present situation it is being used for general household maintenance and is enabling Rupa Ji and his wife to cope more effectively with the drought.

Source: Project case study by Prayatna Samiti

(b) Education of Children

People often give priority to education of their children, particularly boys. Parents hope that the children will be able to acquire skilled and well-paid work, and that they will get a good return on their investment in due course. Box E6 gives an example of a household in which the parents are benefitting from their investment, while Box E7 contains a second, less successful, example.

BOX E7**A Diversification through Investment in Children's Education:
A Case of Negative Adaptation and Disillusionment**

Panna Lal is illiterate, but he always wanted his children to get properly educated. His elder son Kheji Lal was a brilliant student from the start. Panna Lal motivated him to go for higher education which resulted in to his son doing a postgraduate degree with history. This was a unique achievement not only in the family but the whole area. Panna Lal and his family started getting respect from the fellow villagers for this achievement. Then his son wanted to do some professional course for better job prospects.

Four years ago, Panna Lal borrowed Rs. 35000 for getting his son admitted to teacher training course. He had to mortgage some of his land for the loan. Later, to meet other expenses (like college fees, books and living expenses), he sold one *bigha* of land. His son completed the course successfully. Panna Lal had high hopes from him, but his son could not get any worthy job. His son is now teaching in a private school in Baghpura for mere Rs. 500 per month.

Panna Lal has not been able to repay the loan till now. He is very angry with the present educational system which provides high degrees but not the jobs. His relatives and villagers have also started mocking him for his bad condition and his decision to get his son educated. Panna Lal feels cheated. Now he says he will never borrow for education of his grandchildren because it is not worth it.

Source: Seva Mandir, 2000b. Project case study, Goran village.

E5.2 Social Capital

The formation of various village, or sub-village, groups and committees is one form of social capital development. Self-help Groups (SHGs), focusing on savings and credit functions, is one recent, but widespread, example of this. Another is the creation of committees to manage forests or pastures and make them more productive. Interestingly, in these examples, the building of social capital is linked to the building of other types of capital - financial and natural respectively.

The above examples of social capital development have usually depended on a catalytic input from development agencies. Examples of self-initiated social capital development seem to be far less common, but that may be because they are less visible to outsiders. One such example comes from Anantapur, where landless labourers have formed themselves into organised groups that negotiate payment on a piece-work basis with potential employers. Another comes from forest-dependent communities, particularly in eastern India, that have initiated community management of local forest without any formal partnership with the state or development agencies (Conroy et al., 1999).

E5.3 Natural Capital

The planting of fruit trees near to homesteads, and the nurturing of a wider range of trees on private land-holdings generally, are a prime example of the development of a natural asset. Trees growing along field boundaries, or in fields, may result in short-term financial losses, due to competition with annual crops, but farmers are often prepared to accept this as a small price for securing benefits of a much larger value in the future. The owner of the land sometimes has a specific purpose in mind for certain trees (e.g. to contribute to the daughter's dowry), but often they are used to meet unforeseen contingencies (Chambers et al., 1993).

E5.4 Financial Capital

Poor rural households in India do not usually have functioning bank accounts in which to keep savings, so liquid assets (such as jewellery, trees and smallstock) have been the main form of financial capital. That is now changing, however, with the introduction and spread of SHGs. Financial capital, whether it be in the form of liquid assets or bank savings, can either be converted into natural, human or physical capital, or can be used as working capital for a small enterprise, such as a tea shop or pan stall.

E6 Explaining Changes in Livelihoods

E6.1 Household economic models

Household economic models predict diversification as a function of on-farm returns to labour time compared to off-farm earning opportunities. Given its asset base and total amount of labour time, the household makes comparisons between the return to using more of that time on the farm or deploying it in off-farm or non-farm wage or other income-generating activities. Factors that increase the return to time spent on farm activities would tend to reduce the motivation to diversify. Conversely, a rise in off-farm or non-farm wage rates, or greater opportunities to undertake remunerative non-farm self-employment would increase the motivation to diversify (Ellis, 2000). An increasing proportion of rural households have been getting involved in non-farm work during the last 20-30 years, suggesting that push and/or pull factors must have been at work.

Push Factors

The national and district-level data in Part B show that there has been a steady decrease in farm sizes during the last two-three decades. Thus, to maintain a given level of production, households have to increase productivity and intensify the production system; and the data in Part C show that they have been doing this (e.g. increased use of HYVs, commercial fertilizers and pesticides). However, there have been other trends that have either reduced productivity or increased costs or both. These include: a reduction in the availability of animal dung for use as fertilizer (due to reduced number of livestock units per household and/or use of dung as a fuel); and falling groundwater levels, resulting in higher abstraction costs or a smaller planted area. The influence of push factors is illustrated by the mason from Udaipur (Box E5). As he put it: "The landholding of our family was not enough to meet our sustenance needs, therefore we made conscious efforts towards finding other sources of income" (Seva Mandir, 2000a).

Pull Factors

As discussed in section D5.5, improved transport infrastructure has facilitated access of rural people to a wider range of work opportunities, through daily commuting or seasonal migration. Thus, relatively well-paid non-farm work could be encouraging people to diversify. (This is discussed further in section E6.4.)

E6.2 Assets, constraints and the choice of enterprises

In reality, the factors determining choices are much more complex than the household economics models suggest. In particular, people's options are strongly affected by the size and nature of their assets, lack of which can be a major constraint. This helps to explain why different households are making different choices: why one remains focused on agriculture, while another diversifies into a skilled activity (e.g. masonry) and another diversifies into one or more forms of wage labour.

This brings us back to the heterogeneity of the NFS, which is crudely embodied in the concept of duality (distress v. development) that was referred to in Part D. There is evidence that different processes may be taking place in different places and at different times; and may even be taking place simultaneously in the same region. For example, micro-level evidence from a developed region of Gujarat suggests that distress and development factors operate simultaneously in the same region (Visaria and Basant, 1994). The data show that people with different sizes of land-holdings, and the landless, participated in non-agricultural work, but the type of work varied. Large landholders engage in trade and agro-processing, while the land-poor were involved in a range of non-agricultural activities, whose productivity varied (ibid). The influence of each type of capital on people's options will now be described in general terms.

Human Capital

Education is an important preparation, even precondition, for rural workers to enter certain, relatively skilled, RNFS activities. As a result, the educational attainment of workers in the RNFS tends to be higher than in the agricultural sector. Educational levels are also higher for manufacturing outside the household rather than within, suggesting that formal learning assists mobility into non-household industry, including for women. However, in low-skill activities (notable, agricultural labour, mining and construction) educational levels tend to be no higher than in agriculture (Fisher et al, 1997).

Educational status	No.	No. of migration days/year	Average wage per work day	Average annual from income off-farm work
Illiterate	6	137.5	29.9	4108
Received primary education	7	169.3	76.1	12880
Received secondary education	9	239.4	91.2	21833
All migrants	22	189.1	74.8	14150

Source: Seva Mandir 2000a.

Natural Capital

Decreases in farm size. Non-agricultural employment is particularly important for households with little land, and for the landless, who spend 20-50 percent of their working days on non-farm activities. The percentage of days spent on non-farm activities rises as the size of landholdings declines.

Water in Udaipur (and Anantapur) the water table has been falling, for two reasons. First, the levels of abstraction are higher, particularly for irrigation. Second, the level of recharge is lower, because forest and vegetation cover have decreased, resulting in a reduction in infiltration and increased runoff. This has major implications for crop production and animal husbandry. Those with relatively good agricultural land may respond by investing in a borewell: while SMFs with marginal land may decide that the likely returns do not justify the investment, or may not be able to raise the capital to make the investment.

Financial Capital

Options may also be limited by lack of access to financial capital that is required for certain adaptation or diversification options, such as: constructing a borewell, or establishing a flour-milling business.

Social Capital

Social contacts (be it relatives, friends or acquaintances) tend to be important to diversification in various ways, including: learning new skills; and finding out about, and gaining access to work opportunities.

Physical Capital

Both privately owned (e.g. well, vehicle) and publicly owned (roads, electricity distribution system) capital can have an important influence on the options available.

In summary, the options available to people are a function of their access to various types of capital. A major implication of this is that it is only the better-off or landed groups who have access to the more remunerative non-farm activities, and that they benefit more from the shift out of agriculture than poorer groups who are unable to enter the dynamic parts of the NFS. There is evidence that diversification out of the agricultural sector is also increasing income disparities within rural India, as it is the wealthier households that profit most from increased non-farm incomes (Fisher et al., 1997). Nevertheless, growth of the RNFS is benefiting most sections of rural society, even those involved in unskilled wage labour (ibid).

E6.3 Models of participation in India's non-farm sector

Unni (2000) has developed formal (econometric) models which, taking account of various constraints (such as those described above), seek to explain household and individual diversification into the NFS in India.

Household Participation

The household model seeks to explain why some rural households, and not others, become primarily involved in (i.e. derive most of their income from) the non-farm sector. Applying the model to empirical data from villages in Gujarat, Unni concludes that:

- access to agricultural land or a large landholding deters entry into the non-farm sector;
- households in the later stage of their life cycle are more likely to undertake self-employment in the non-farm sector (perhaps through acquiring the necessary physical or financial capital); and
- education enhances earnings.

She also notes that upper caste households are more likely to undertake self-employment in the non-farm sector, as well as earn higher incomes from it.

Individual Participation

Even within households that derive most of their income from their farms, one or more individual members may be involved in non-farm work on a long-term or short-term basis. Thus, Unni developed a separate model to explain individual participation in the NFS, which embodies the idea of duality within the NFS as was discussed in Chapter D. According to the model, entry into NFS activities is influenced by factors operating at different levels (Unni, 2000). The *first* level is whether or not someone enters the NFS at all. This is determined by: the person's level of education; a lack of, or low value land; and a 'circle of contacts' in the NFS. The *second* level refers to those factors that determine whether or not individuals enter high-income secure jobs (self-employed or salaried). Individuals are more likely to do so if: they are well-educated and possess skills that are in demand; come from a relatively large village (perhaps associated with infrastructure and larger market); have access to financial capital; and belong to a higher caste. Those who do not have these assets are only able to enter low income, low productivity residual activities in the NFS.

E6.4 The influence of different remuneration levels on labour allocation

Differences in returns to labour not only influence whether people diversify into non-farm work, but also the duration of non-farm work per year. People with salaried employment allocate the most time to off-farm work, while those involved in the least remunerative work, unskilled labour, allocate the least time. Land-holders with access to skilled labour or salaried work tend to make choices slightly differently from those who can only do unskilled labour. It appears that the former tend to make their choices primarily on the basis of one criterion - maximising the returns on their labour.

Classification of migrants	Days of migrant work per year	Average daily income
Unskilled labour	157	47
Skilled labour	180	79
Salaried workers	360	133

Source: Seva Mandir, 2000a

This is illustrated by the mason in Udaipur (Box E5). The probability of him finding work as a mason in Ahmedabad is highest during the rainy season, but this is also the busiest time in the agricultural calendar. Nevertheless, during this period, the mason chooses to work in Ahmedabad, because the loss of his labour on the farm "is well compensated by the cash I bring home" from Ahmedabad. However, his wife stays at the farm to do agricultural work.

By contrast, people in Udaipur whose off-farm options are limited to unskilled labour choose to work on the farm during times of peak agricultural activity, notably the rainy season; and they spend less time working away from the farm. This can be explained at least in part by the fact that the difference between returns to off-farm work and own-farm work is less for them than for skilled labourers and salaried workers with service jobs. There is also some indirect evidence of this phenomenon from the Anantapur survey, which found that people in Anantapur *mandal*, where NFS options are better than those of Rayadurga *mandal*, sometimes leave their land fallow while they pursue these options, whereas people of Rayadurga *mandal* do not leave land fallow.

For unskilled workers, the duration of days spent on off-farm work is also influenced by the size of the harvest. In a good year they will spend far less time doing off-farm work than they do in a bad year (e.g. year of drought or abnormal rain pattern), as is illustrated by individual case studies from Jhadol block, Udaipur. It appears that priority is given to working on the farm; and that off-farm work is undertaken primarily to acquire the additional cash needed to make up any deficit in food grains and to purchase other essential items.

People in Sagatdi village, Udaipur invoked the concept of certainty/security in explaining why they give priority to working on their farms during the *kharif* or *rabi* crop production seasons. They said that producing crops, including food grains, themselves was a relatively certain way of getting food, whereas off-farm work is less certain and never guaranteed.

E6.5 Migration

Migration is a particular form of adaptation. An important factor influencing the migration options available to people may be ease of access to (i.e. the speed and cost of reaching) locations where employment opportunities are available. Steady improvements in transport infrastructure and services have greatly reduced travel time (and hence probably transaction costs), thereby facilitating: (a) daily commuting to urban centres and (b) migration. Migration can be advantageous in a number of ways. It can:

1. provide access to new livelihood activities that are not available locally;
2. provide access to better paid work of a similar kind to that which is available locally; or
3. increase the amount of work of a given kind that is likely to be available over a certain period of time.

In addition to easy or low cost access geographically, another important consideration is whether the person has friendly and informative contacts in the place where the work opportunities exist. The mason referred to in Box E5 has acquaintances and relatives in Ahmedabad, Gujarat, which is about 250 kms away. They are able to inform him about the availability of work, through a contractor they know, and he can live with them while he works there. The normal daily wage there is Rs. 150, whereas locally it is about Rs. 100 when it is available. Thus, in his case the advantages of migration are 2 and 3 of those listed above.

The literature on migration explains migration decisions in terms of (a) individual choices and (b) inter-temporal family contracts (Ellis, 2000). The former interpretation focuses on income differentials between urban and rural areas, adjusted for job search probabilities, as the prime determinant of migration. The latter interpretation emphasises risk-spreading and imperfections in rural capital markets as reasons to migrate (Ellis, 2000). It is assumed that there is an understanding between the migrants and other household members (particularly the parents) that they will maintain a flow of remittances to their families. Remittance income is particularly useful to households in semi-arid areas if it is not correlated with either seasonal cycles or risk factors (notably drought) in agriculture¹⁹. An example of this is given in Box E6, where the sons' remittances were helping the parents to cope with the drought.

E6.6 Push versus pull factors in migration in Udaipur district: a summary of the evidence

Like the literature on the RNFS, the migration literature discusses both 'pull' and 'push' factors in explaining why migration occurs. However, in practice when households and individuals make their choices they probably consider numerous factors. The example of the mason illustrates how both 'push' and 'pull' factors can come into play. There was initially a 'push' to find a new off-farm enterprise; then once he had acquired masonry skills there was the 'pull' of higher wages, and perhaps more work, in the city of Ahmedabad.

Nevertheless, information collected by this study strongly suggests that for poorer groups 'push' factors are more important than 'pull' factors in inducing migration; whereas for better off groups pull factors become more important.

¹⁹ In the case of masonry this may not apply. Construction work is greatly dependent on water, and in semi-arid regions work may be more difficult to find if the rains are poor (Seva Mandir, 2000a). In years when the rains are good, work is available in Ahmedabad from July to March.

Men's Priority	Reason	Women's Priority	Reason
(1) Agriculture (and animal husbandry as allied occupation)	Can work on one's own volition. Animals needed for manure for agriculture	(1) Agriculture	Ensures food for survival.
(2) Wage labour (outside village)	Ensures cash earnings, but full of hassles	(2) Animal husbandry (separate from agriculture)	Draught power, manure that is basis of agriculture and supplementary cash income and food (milk products)
(3) Forest-based work and income (has potential to evolve as a good source for livelihood)	Very limited -mostly for self-consumption, less cash income, mainly in kind (timber, fodder etc.)	(3) Casual wage labour	Supplementary income. Useful only if labour near home.
(4) Forests	Supplementary		resources for animals (fodder) and household (timber/fuel)

Source: Prayas Survey Report.

Deterrent Factors

Apart from 'push' and 'pull' factors, there may also be 'deterrent' factors that are taken into account. The latter may include: transaction costs (e.g. bus fare, opportunity cost of travel and search); being separated from one's family, for an individual migrant; reduced access to education for children (if the whole household migrates); extra burden for women with children (see Chapter G); and increased risk of abuse of women, if they migrate. In addition, some people may perceive casual wage labour, particularly when seasonal migration is involved, as a kind of bondage (Prayas survey finding).

Casual, Unskilled Labour

Among poorer, less well educated and socially disadvantaged (SCs and STs) farming households, self-employed agriculture is generally strongly preferred over casual labour. This is illustrated by Table E9 for tribals in Mhendi Kheda village, Pratapgarh. (Similar rankings were also given by men and women in Haripur village, Pratapgarh.) The Prayas report notes that "only those who do not have enough land for agriculture activity will go for casual wage labour".

It goes on to say:

"Even when agriculture may be contributing significantly less (in economic terms) as compared to wage labour, the tribal community in Pratapgarh prefer agriculture as an occupation, which is more adaptable to their independent and free spirit" (Prayas project report). Women view agriculture as providing food security (variety too) in a way that casual labour cannot. However, attitudes are changing, and some young men prefer to live and toil in the city (ibid).

In summary, the reasons given by people on Pratapgarh and Girwa blocks for preferring agriculture were:

- it is a more certain source of food for survival than off-farm work;
- casual wage labour is seen by some as a kind of bondage, whereas when working their farm they are their own boss; and
- wage labour outside the village is full of hassles.

Despite their preference for agriculture the proportion of these people migrating for work has been increasing quite rapidly during the last two-three decades - why? In Udaipur district there is *prima facie* evidence that agriculture is becoming less profitable (see Table C14). On a per hectare basis, bank credit for agriculture more than quadrupled between 1985 and 1993, whereas the value of outputs of the major crops (five year averages) only rose by 8.5 percent.

The off-farm opportunities available to these poorer groups tend to be limited to casual, unskilled labour, which is generally not well remunerated. As a result, they spend less time away from the farm than better educated people (see Table E7), or people with access to skilled work (Table E8), who are better paid. Men from the poorer groups stay on the farm during the kharif season to undertake their agricultural responsibilities with the women. If there is a good crop the duration of their seasonal migration will generally be shorter (Jhadol report, Seva Mandir).

The male tribals of Tulikakhet village in Kotra block, Udaipur are pessimistic about the future of agriculture. Less than 15 percent of their arable land is irrigated, and the land is hilly and uneven. They earn Rs 50-60 daily in mining and marble work, and nearly 80 percent of them spend more than six months a year doing this work. Nevertheless, even they stay in their village to do agricultural work in the *kharif* season, and to a lesser extent *rabi*.

When making the choice between agricultural work on their own farm and off-farm work, it is only people with access to better paid and/or salaried work who give preference to the off-farm work - e.g. masons (as illustrated in Box E5).

In Anantapur district, the situation may have been different - at least until recently. However, we do not have the same depth of information to analyse it. On the basis of comparable data to Udaipur, the profitability of agriculture appears to have increased between 1985 and 1993 (Table C10), which would be consistent with survey data. Given the crisis in groundnut production, we could expect more recent data to present a different picture.

RESPONDING TO SHOCKS: HOUSEHOLD COPING STRATEGIES

F1 Coping and Adaptation in General

F1.1 Types of change

Households are continually facing changes, and it is useful to distinguish between different types of change. One important distinction is between changes that are short-term in nature (for example, seasonal changes) and those that are long-term (e.g. soil erosion); another is between changes that are predictable and those that are not. Sudden changes are commonly referred to as 'shocks', whereas more long-term and gradual changes are referred to as 'trends'. Shocks test the ability of the livelihood to cope, whereas trends test the ability of the livelihood to adapt. Adaptation was discussed in chapter F, so this chapter focuses on coping strategies.

Predictability

Long-term changes tend to be relatively predictable by their very nature, once the trend has been underway for some time; whereas short-term changes, or events, may be either predictable (as in the case of seasonal changes) or difficult to predict (e.g. a car crash). The predictability of a change is important, in that the more predictable it is, the more time households have to plan and prepare for it. There is a spectrum of predictability, and the two examples given above fall towards opposite ends of the spectrum. Marriage is an event that is highly predictable, given that the household usually has a major influence on its timing; whereas death is an event that tends to be relatively unpredictable, unless it is as a result of a terminal but slow-acting illness.

Drought in semi-arid regions, the main type of short-term change considered in the literature on coping strategies, usually falls somewhere towards the middle of the predictability spectrum. This is because: (a) it occurs quite frequently - for example, every three-four years; and (b) when the rains fail, there is a time lag before the full impact of this is experienced, which may give rural people (and governments) a few months to respond. Extreme droughts are slightly different in that rural people may not be able to predict which decade they will occur in, let alone which year. On the other hand, extreme droughts in India tend to be associated with successive years of drought. Thus, as soon as the rains fail for the second (or third) time, the dire consequences of not responding become predictable.

F1.2 Short-term change and vulnerability

The concept of vulnerability has received considerable attention (Chambers, 1989; Davies, 1996), and has been incorporated into the Sustainable Livelihoods Framework through the 'Vulnerability Context' (see Figure E2). It has been defined as a high degree of exposure to risk and shocks, linked to proneness to food insecurity. Chambers suggests that "vulnerability has two sides: an external side of risks, shocks, and stress which an individual or household is subjected to, and an internal side which is defenceless, meaning a lack of a means to cope without damaging loss" (Chambers, 1989). The precise nature of the 'damaging loss' will depend on how the household responds to the shock. The most vulnerable households are those that are "both highly prone to adverse external events and lacking in the assets or social support systems that could carry them through periods of adversity" (Ellis, 2000).

Sensitivity and Resilience

The internal side of vulnerability has dimensions of sensitivity and resilience. These concepts were originally used in the literature on natural resource management (Bayliss-Smith 1991; Blaikie and Brookfield 1987), but have recently been applied to the analysis of livelihoods and adaptation. Sensitivity is the intensity with which the external shock is felt, or the magnitude of the system's response to it. Resilience is the ability of the ecological or livelihood system to bounce back from stress or shocks or to adapt to change.

Livelihood systems that are sensitive and lack resilience will be more affected by the shock, and will take longer to recover from it. Conversely, the most robust livelihood systems are those that have high resilience and low sensitivity. Diversity of assets and activities improves resilience, provided that the shock or stress does not have a negative effects on all of them: when it does the shock is described as co-variate. For example, if the shock were a drought, and the household depended entirely on crop production, then it would be highly sensitive to the shock; whereas another household, with the additional activities of bamboo-weaving and seasonal work in the transport sector, would be less sensitive to drought.

Common Major Events and Shocks in Rural Areas

If we consider other types of shocks apart from drought, vulnerability may not be directly related to food insecurity, and may be related instead to long-term negative effects on people's livelihoods, such as loss of productive assets or increased indebtedness. There are several common types of events and shocks in semi-arid rural India. These include: death of a family member; serious illness of a family member; death or incapacitation of a productive animal (e.g. bullock); and pest and disease outbreaks on crops. Another important dimension of shocks is their magnitude, which can often be measured in monetary terms: e.g. the cost of paying for a funeral, or of purchasing food to replace a failed food crop. Some examples of the costs of different shocks in Udaipur district are given later.

F1.3 Responses to short-term changes and events

Responses to Frequent and Predictable Short-term Changes.

People develop ways of accommodating common predictable changes (adverse or otherwise), such as drought and seasonal changes²⁰. Mixed cropping and livestock husbandry are two ways in which people in semi-arid regions have sought to accommodate the threat of drought

²⁰ Seasonality is sometimes perceived as a negative phenomenon in development literature (e.g. DFID material about the SLF), but if rural people's livelihoods are well-adapted to it, they themselves may not perceive it as negative.

in their normal livelihood systems. A third is what Jodha (1978) has referred to as asset depletion and replenishment cycles, in which assets are depleted during drought years and then replenished during the years when the rains are good. Such assets include: stocks of food grains; and liquid assets, such as goats, chickens and jewellery. The concept of a cycle assumes, or implies, that the asset depletion process is regular and reversible. It corresponds with the steady-state line in Figure H3.

Coping Strategies

Asset depletion has been one key component of the coping strategies of many rural households. Coping strategies have been defined in various ways. Some definitions focus on food insecurity: for example, Davies defined them as a short-term response to an immediate and inhabitable decline in access to food (Davies, 1996). Ellis defines coping strategies more broadly, as the sequence in which the methods used by households to survive, when confronted with unanticipated livelihood failure, are deployed (Ellis, 2000). The sequence in which assets are disposed of tends to be related to their importance in enabling the household's normal livelihood strategy to be resumed: i.e., productive assets (e.g. land or a bullock, for a farmer) that would be difficult to re-acquire are retained for as long as possible, and only disposed of as a last resort.

The broader definition given by Ellis is more appropriate to this study, given that it is not only concerned with drought as a shock. However, his use of the word 'unanticipated' is a little problematic, as there is a certain degree of predictability about droughts as was discussed earlier. There is a general consensus, however, that coping strategies address short-term shocks rather than long-term trends.

F1.4 Types of coping mechanisms

Most of the existing literature on coping strategies has several weaknesses. One is that the examples given are 'snapshots' of what a particular group did to cope with drought in a particular year: in other words, they lack a historical or temporal perspective. A second is that they are nearly all pre-occupied with drought: there is very little information about how households cope with other types of shock. A third is that most studies focus on short-term changes and short-term responses to those changes: relatively little work has been published on how households respond over many years to long-term changes. We have sought to address all of these weaknesses, or gaps, in this study. The first two are covered in this chapter, and the third, long-term adaptation, was discussed in the previous chapter.

Coping mechanisms, or methods, fall broadly into the following five categories (Agarwal, 1999):

1. Diversifying sources of income, including seasonal migration.
2. Drawing upon communal resources, such as village common lands and forests.
3. Drawing upon social relationships (patronage, kinship, friendship) and informal credit networks.
4. Drawing upon household stores (of food, fuel, etc), and adjusting current consumption patterns.
5. Drawing upon liquid assets.

The above-mentioned coping mechanisms can be related to the five types of capital identified in DFID's Sustainable Livelihoods Framework (see Box F1).

BOX F1

The Relationship between Coping Strategies and Livelihood Assets

Natural Capital

The second coping mechanism, drawing upon communal resources, involves the use of natural capital.

Financial Capital

DFID identifies two main sources of financial capital: available stocks and regular inflows of money. Available stocks include liquid assets such as livestock and jewellery, as well as cash and bank deposits. The fifth coping mechanism involves the sale of livestock, jewellery and other liquid assets.

Social Capital

The third coping mechanism listed above involves the utilisation of social capital. The DFID guidance sheet on Social Capital notes that it can be important as a 'resource of last resort for the poor and vulnerable'; and can provide a buffer that helps them cope with shocks, such as death in the family, and can also act as an informal safety net during periods of insecurity. This coping mechanism may draw on patron-client relationships, kinship and friendship. Social capital is often used as a means of obtaining credit, at which point the distinction between social and financial capital becomes blurred.

The first coping mechanism is related to at least three types of capital:

- * human capital (having the necessary skills to do the income-generating activity);
- * social capital (having the necessary contacts with potential employers or recruiters); and/or
- * physical capital (e.g. daily migration for wage labour in the nearest city may only be feasible where there is good transport infrastructure).

Regarding the fourth mechanism, household stocks of edible goods are clearly an asset of some kind, and perhaps are most appropriately classified as natural capital.

Responses to Infrequent and Large Magnitude Events

The more costly events - particularly death and serious illnesses, given their relative unpredictability - normally have to be financed by loans from money lenders, as their costs exceed the value of disposable assets and the lending capacity of relatives. These loans can be a heavy burden on the household for years to come. An example is given in the following box. However, this sum is exceptionally high - see Table F4 for more typical figures.

BOX F1

Death in the Family Results in Long-term indebtedness

Dal Chand's father died 19 years ago. His family took a loan of Rs. 40,000 from the moneylender, at a high rate of interest, to cover the costs of organising the death rites. His family says they have paid more than they have borrowed, but there is still a balance of Rs. 15,000 to pay.

Source: Project individual case study by Seva Mandir

F1.5 Coping and the state

The Indian union and state governments have implemented two main types of scheme to help people cope with drought. One is the distribution of foodgrains and other key consumables, principally through the Public Distribution Scheme (PDS); and the other is drought-relief employment schemes. These state schemes have played a major role in the reduction, if not complete elimination, of mortality associated with famines. This aspect of India's experience stands out when compared with the experiences of other countries.

Public Distribution Scheme

The public distribution system strives to ensure household food security through the distribution of essential foods in disadvantaged areas. Items available from PDS shops, at subsidised prices, include food grains and kerosene.

Employment Schemes

India's experience with rural employment schemes has been another critical factor differentiating it from other countries that frequently suffer the drastic consequences of famines. The schemes tend to vary across states, but they all aim at providing employment to the rural poor who are willing to do unskilled manual work on a piece-rate basis. Self-selection is usually built in, as no choice of work is offered, the wage rate is usually below the agricultural wage rate and workers may have to travel long distances to participate. The projects chosen are usually labour-intensive and create productive assets. The Indian authorities, encouraged by the presence of democratic institutions, have had the political will to commit the necessary resources to support these schemes, especially during times of severe food security crises associated with a rapid loss of food entitlements.

F2 Household Coping Strategies in Anantapur District

F2.1 Introduction

Historical Context

A brief historical account on famines found perhaps in Gazetteer suggests that famines and droughts have been recorded since 14th century. Until the British occupied the territories, the district was also ravaged by passing invaders and neighbouring states. Between 1803 and 1885 famines and scarcity occurred during many years. 1803, 1823, 1832, 1838, 1853, 1854, 1865 and 1876-78 were particularly famine years and there were other 22 years that witnessed scarcity. Famine relief work and cash doles were started for saving lives of affected people. The trend continues even in 100 years that followed.

It was only in the 1970s that the situation seemingly improved with ground water exploitation. However, it was limited to some parts of the district. The state's strategy to cope with the drought and famine has been to provide relief work and cash doles. The Gazetteer does not record any traditional systems of coping with drought and famines.

F2.2 Coping with drought

Drawing upon CPRs

In Anantapur district, CPRs, in the past used to play a very important role in the livelihood strategies of rural communities, not only in stress times but also in normal times. Almost all poor households used to keep livestock, and completely depended on common pool resources for fodder and water. For example, in Mechiri village of Rayadurga mandal, more than 50 percent of wage labourers used to keep livestock in the past; but now only one-two percent wage employees are keeping one or two goats or sheep, mostly stall feeding due to encroachment of common lands. Some poor people used to irrigate their lands from streams, which used to flow for longer periods. But now the streams are drying up immediately after rains. As a result these people lost this source of irrigation also.

The villagers of Rayadurga mandal reported that during stress periods, some families used to collect firewood, sell it in the nearby towns and sustain themselves on that income. A few households used to collect wild leaves, roots, and fruits for consumption during severe droughts/famine periods. In all four villages the contribution of common resources had declined drastically, particularly in Rayadurga mandal.

Drawing upon Social Relationships and Informal Credit Networks

The patron-client relationship between farmers and wage labour (see E3.5), and caste affiliations, used to help the poor to cope with stress periods. However the patron - client relationship has to a large extent broken down. The poorer sections appear to be more benefited from their freedom: now they have a number of options for employment and credit. Mortgage of their labour appears not to be a preferred option. The 20 attached labourers of Manila village said that their indebtedness to their masters is the only reason for them to work as attached labour or servants. They seem to be very unhappy with their working conditions and requested the project's study team to help them to gain their freedom.

Relatives and friends provide cash and kind assistance in the form of gifts and soft loans. These transactions tend to increase during moderate drought conditions and decline during severe drought or famine conditions as all the families are affected by droughts.

Now government and NGOs have become important players in helping the poor to overcome the hardships of droughts. The new institutions like SHGs and agriculture labour unions, supported by the NGOs, have become effective in getting official minimum wages, particularly from government departments and official contractors.

Drawing upon Household Stores and Adjusting Current Consumption Patterns

It is known fact that during famine times, people switch to famine food and fodder. Famine food includes eating of dead animals, wild weeds, roots, leaves, etc. It was reported in Chitradurga district of Karnataka, that in some extreme cases people consume a stone like substance (talc or soapstone) found underneath the soil by mixing with *ragi* or *jowar* flour and cooked. This kind of food, according to the local people, fill the stomachs and delays hunger. (Karanth, G. K, 1991). Such practices were prevalent about 40 years ago in some parts of Anantapur district.²¹

In our survey, people of Rayadurga *mandal* reported that in the past, people who could not migrate used to resort to famine food, i.e. eating of wild leaves, weeds, dead animals, etc. Starvation was quite common in the past in Rayadurga villages during famines. These food practices used to result in a number of health problems during drought/ famine periods. Further it was revealed when food was in short supply, they used to ration it in the following order - children, old people and adults.

In the villages of Anantapur *mandal*, no severe shortage of food was experienced during last 40 years, especially during last 20 years. The villagers never experienced total crop failure during the study period. During stress periods, people of Anantapur usually reduce expenditure on social and cultural functions like marriages, festivals, etc. (Prasad, N. Purendra & P. Venkata Rao, 1997).

Drawing upon Liquid Assets

In the past people used to save or invest in livestock, gold and silver ornaments and land. They had no other options. Today the poorer sections are not saving or investing in livestock to the same extent, due to the decline of common grazing lands; nor in land and gold and silver, as they have become beyond the reach of the poor. Now accounts with banks or SHGs are a new means of saving that is gradually spreading.

In the past sale of livestock, land, houses and gold or silver ornaments was one of the coping mechanisms of the poor. Yet another was mortgage of their land, houses and labour to the big farmers. Today the poor do not have these options, as they own relatively little land, gold or silver and livestock. Today the poor appear to be coping the stress conditions without any sale of assets due to government assistance and availability of number of credit sources.²² The only reserve that they are tapping during stress periods is drawing on their cash savings in banks or SHGs/ co-operatives, etc.

Diversifying Sources of Income

In the past, the two principal diversification options were mixed cropping and rearing of livestock. The former of these has now largely disappeared, while the latter is less important than it used to be for most people. These have been replaced by a few new diversification options, particularly in Anantapur *mandal*, including: (a) regular migration, (b) multiple cropping and surpluses from groundnut crop, (c) dairy, (d) weaving, (e) employment in the non-farm sectors and (f) others (charcoal-making and prostitution).

Migration was not a normal diversification option in the past. The main reasons were lack of proper transport and communication facilities, and lack of proper knowledge about local geography. Nevertheless, migration was the principal source of sustenance during droughts or famine periods to most of the families. People of Rayadurga villages used to migrate in groups (10 - 15 members) to different locations - even to far off places like Davanagiri, Kundaramukhi, etc. In the past, usually more than one person from a family used to migrate, so that one person could bring back some grain or cash for the members who were left in the village or family. Some families used to sell all their livestock before migration, while others used to take away their livestock with them. For some families shortage of fodder and water for their livestock was the main reason for migration. Those migrations were need-based (not regular activities). Often the duration of migration used to be long - more than six months and even upto two years.

Migration has now become a normal activity of the livelihoods of a large proportion of the households, particularly the landless labour households. This was discussed in section E3.4.

²¹ Personal communication of Khasimpeera, MEOS from his personal experience.

²² The civil society/ NGOs are also playing an important role in mitigating the hardships of the people during the stress periods.

F2.3 Coping and the state

PDS

Now no one is starving even during acute famines thank to the well-functioning fair price shops of PDS. All the four surveyed villages have fair price shops, which supply, among other things, about 20 Kgs. of rice per month per family of below poverty line (BPL) at very subsidized rate. The government of AP supplies rice to the BPL families at the reduced rate of Rs.5.50 per kg, rather than the government of India's issue price of Rs.5.90 per kg to BPL families. It supplies about 11.31 million families, three times more than the officially recognized number of BPL families (3.78 million) in the state.

Before April 2000, the government of India used to supply only 10 kgs of grains per family per month, whereas the government of AP used to supply 20 kgs. per family per month to BPL families. For this scheme the government of Andhra Pradesh has been providing huge funds every year. On average, the government allocated about 0.9 percent Gross State Domestic Production (GSDP) for rice subsidy during 1990s. The requirement for rice scheme in 2000-2001 is estimated to be Rs.10.3 billion (government of AP, 2000). Unlike many other government schemes, rice, in this scheme, is reaching the real poorer sections. One of the reasons could be the low quality of rice. Further, the government, these days, is supplying additional quantities of food grains at subsidised prices during drought periods.

Other Forms of State Support

Apart from the PDS, the other measures are inadequate and tardy and subjected to leakage. For example, in 1999 crop compensation was distributed to 399,000 farmers. Of the Rs.450 million sanctioned, only Rs.360 million has been released and just Rs.280 million distributed. This is not a very large amount compared to the losses of Rs.5.5 billion in groundnut alone in 1999 (Menon, Parvathi, 2000).

F3 Household Coping Strategies in Udaipur District

F3.1 Introduction

General Preferences in Coping Mechanisms

Dangi farmers in Patukheda were asked to rank their coping mechanisms in order of preference. The result was as follows:

- Mutual help (in monetary terms as well as exchange of goods, bullock, etc.).
- Borrowing money from rich people of village.
- Loan from moneylender in Bambora.
- Pawning jewellery.
- Mortgaging land.
- Children sent out for jobs (10-15 years).
- Selling of animals²³.
- Selling of land.

They pointed out that borrowing money has several potential negative consequences, namely:

- Interest is high, hence principal amount remains same for years.
- Children held in debt trap.
- No choice in selling crops. Farmers gets lesser price than the market value.
- One has to buy poor quality goods from same moneylender.
- One can lose jewellery or land.
- Another debt for repaying old ones.
- Less expenditure on food, clothing, medicines, household expenses.

F3.2 Changes in coping strategies over time

There have been major droughts in the district in 1972, 1987 and 1999-2000. In order to find out whether coping strategies have changed, and how, the survey topics included a comparison of the situations and the coping mechanisms used during the current drought and one or both of the previous ones.

Changes in people's asset bases and in the vulnerability context in recent decades have led to changes of emphasis in the coping mechanisms that they use, and in their vulnerability to drought. The main changes in coping mechanisms in Udaipur district are summarised in Table F1. One

²³ The *Dangis* tend to keep large ruminants rather than small stock.

thing that is striking from the table is that there is only one coping mechanism that has clearly increased in importance during this period of time, namely the increase in people's dependency on non-farm sources of income, particularly wage labour. These sources include:

- Locally available wage labour, including commuting to urban centres.
- Seasonal labour migration, mainly to urban centres.
- Remittances from children who have settled in places, often urban, some distance from their parents' village.

The contribution made by most of the other coping mechanisms has declined, and in some cases has disappeared altogether. Underlying some of these changes in coping mechanisms is a decline in households' natural capital, particularly water²⁴ and land-based common pool resources. In particular:

- Forest products are no longer available for collection and sale, due to degradation and contraction of forests and subsequent restrictions on access.
- Availability of fodder has decreased, due to the decline in quality and quantity of CPRs and reductions in farm size.
- Numbers of livestock per household have decreased, hence people have less liquid assets to dispose of.
- In Udaipur, the water table has declined drastically over the years, and in the current drought this greatly reduced cultivation of the *rabi* (winter) crop.

Village-level Perspective - Sagatdi

For most of the people the present drought is the most critical drought in memory. The severity of 1972's drought was much less than the present one because the ground water level was not as low as it is now. Moreover, fodder was available in the forest. The drought of 1987 was even less critical.

Summary

Overall, the changes in the drought situation, and people's responses, can be summarised as follows:

- The water table has declined drastically over the years, and in the current drought this had a severe effect on the cultivation of the *rabi* crop.
- Mutual self help systems have declined.
- Purchases of fodder have increased, partly due to decline in quality and quantity of CPRs.
- Forest products are no longer available for collection and sale.
- Some villages even have to purchase water.
- Middle-wealth farmers have deepened their wells, and some have even borrowed to do so.
- Borrowing from the SHG has been resorted to. The money lenders are refusing to give loans without mortgaging the land.

Development of Social Capital to Manage Drought

One Udaipur NGO, Prayatna Samiti, has been supporting villagers to take collective action to cope with drought, in the following ways. First, through the mechanism of the SHGs, collective purchases of grain were arranged from the neighbouring district of Banswara. Purchasing directly from farmers meant that they were able to purchase grain for Rs 7.00 as against the price of Rs 8.00 in the market. Second, truck drivers have the practice of dividing one truck load into three smaller truck loads. One truck load costs Rs 12,000, whereas the smaller loads are sold for Rs 5,000 - Rs 6000. Some farmers were encouraged to go for joint purchases of the larger truck load. These actions required purchasing power, though collective action meant that the total amount spent could be reduced. Collective action was also facilitated by the work of Prayatana Samiti and functional SHGs with well defined and trusted leadership that could take the responsibility for collective purchases (albeit with the help of someone from Prayatna Samiti since it was a new activity).

F3.3 Coping with other types of event

While conducting the individual case studies, as part of the survey work, we asked people what types of contingencies they face, apart from drought. Marriage, death and illness were commonly mentioned. In some cases, the individuals were asked to estimate the costs associated with these events: the information given by four men is summarised in the Table F2.

Marriage is the most costly event, followed by death and then illness. Death of a large ruminant is another such event, and replacing one may cost a few thousand rupees.

By comparison, during a drought year, Gambir Singh estimates that the household needs to spend an extra Rs. 10,000 (Rs. 7000 on grains and Rs. 3000 on forage for their animals); and Jog Ji estimates Rs. 9000 (Rs 7000 and Rs. 2000 respectively). Thus, for them, the costs of a drought are similar to the costs incurred in association with the death of a family member.

²⁴ The water table has declined in many regions of semi-arid India. In Anantapur and other parts of south India, tanks used to be an important source of water for irrigation, but tanks have also declined in availability and use.

Coping mechanisms (direction of change)	Drought year		
	1972	1987	1999/2000
Drawing on common resources (decline)	Forest products (gums, fruits, etc.) available	Forest products (gums, fruits, etc.) available	Forest products not available
Drawing on common resources (decline)	Wood, charcoal sold to contractors	Wood, charcoal not available	
Drawing on common resources (decline)	Fodder available	Fodder available	Fodder not available
			More disease in animals
Drawing on social relationships (decline)	Mutual help strong in sharing water, implements, bullock	Mutual help strong in sharing water, implements, bullock	Mutual help less
Drawing on informal credit networks: moneylender (more difficult -decline?)	Moneylender used to lend money easily	Moneylender used to lend money easily	Loans from moneylender conditional on mortgaging jewellery or land, or high interest rate
Government relief work (decline)	Govt. relief work was more.	Govt. relief work was more.	Less drought relief work.
Government distribution of grains (changes unclear)	<i>Jowar</i> (sorghum) distributed by government		Double foodgrain to BPL families through PDS
Diversifying sources of income, including seasonal migration (increase)			More dependency on wage labour than in previous droughts
	Water crisis not severe: some irrigation from wells, ponds	Water crisis not severe: some irrigation from wells, ponds	Water crisis severe: irrigation generally not possible, even from tubewells
Drawing upon household stores: grains (decline)	Yes	Yes	No. Food grain crisis, partly due to lack of irrigation
Adjusting consumption patterns (little change)	Yes	Yes	Yes
Drawing on informal credit networks			Borrowing money from SHG and money lenders for arranging food grain
Animal husbandry as risk-spreading practice (decline)	Yes. More animals, so more animal products available. No fodder purchased.		AH less effective at spreading risk. Animals are less and weaker due to fodder scarcity
Drawing upon liquid assets: livestock (decline)	Sale of livestock, especially goats	Less livestock to sell	Less livestock to sell
Drawing upon other liquid assets (changes unclear)			Non- consumable agric. products sold to arrange foodgrain.

Individual (social group)	Type of event			
	Drought	Marriage	Death	Illness
Gambir Singh (Rajput)	10000	25000	15000	500-2000
Jog Ji (Tribal)	9000	20000	10000	100-2000
Kama Ji (Tribal)	-	20-25000	2500	100-500
Kalu (Tribal)	-	30000	2500	200-2000

For the individuals in Table F2, the costs of a drought (based on the cost of purchasing food grains and forage) are similar to the costs incurred in association with the death of a family member. However, in some cases the costs associated with death are considerably higher and can result in a high level of indebtedness (see Box F2), as can the cost of marriage. In considering the vulnerability of households, therefore, it is important to consider the whole range of major shocks, and the issue of indebtedness; rather than focus exclusively on drought and food security, as many previous studies have done.

F3.4 Coping and the state

Government-sponsored drought-relief work played an important role in assisting people to cope with both the 1972 and 1987 droughts. However, in most of the survey villages there was a perception that the drought-relief work provided during the current drought was inadequate.

Table F3 shows that most people of Tulikakhet and Hasreta villages, who are predominantly tribals, were aware of the government declaration regarding the provision of famine relief work nearby. However, most of them prefer to find work themselves outside the district, rather than wait for the proposed government relief work and rely upon it being provided in time. They seem to be rather sceptical about this. It is interesting that they seem confident of finding work themselves, and demonstrates a healthy degree of independence from the state support scheme.

Sl.No.	Details	Tulikakhet		Hasreta	
		Yes	No	Yes	No
1.	People knew about govt. declaration of famine relief work	38	4	48	12
2.	People always prefer to leave their village and get job outside the district	35	7	38	22
3.	Arrangements are being made by the people themselves during famine period	35	7	42	17
4.	People do not rely upon govt. relief measure being taken in time	35	7	45	15

F4 The Impact of Long-term Changes on Coping Strategies

This section draws together and summarises the findings from the project survey in the two focus districts, with regard to how and why households' coping strategies have changed over time.

F4.1 Changes in natural capital, particularly CPRs

Long-term trends in natural capital, and people's access to it, are having major impacts on people's livelihood systems and coping strategies, and will continue to do so. The decline in farm size has already been noted and discussed, as has the decline in the quantity and quality of land-based CPRs. The decline in the latter has been accompanied by a reduction in activities that used to be associated with land-based CPRs, particularly the collection of various NTFPs and the grazing of animals. This constitutes a kind of reverse diversification process. Thus, the coping mechanism of drawing on CPRs is no longer practised in many areas.

Forests Products and Income Generation

The project survey found that a variety of forest products used to be collected for sale by poorer people, particularly during drought years. This coping mechanism has now disappeared in many villages, such as Sagatdi.

Water Availability

In Anantapur the supply of irrigation water from tanks has declined markedly, while in Udaipur the water level in the wells has been steadily going down over the last 30 years. In Sagatdi, during the last 20 years the water level in wells has fallen from 30-32 feet to 50-60 feet; while

during 1999-2000 most of the wells in Bichiwara had dried up by the end of January 2000. As a result, there has been a general lack of irrigation, which has prevented people growing crops during the rabi season. This represents a loss of income and/or food that would have helped them cope with the drought.

There has also been a reduction in the availability of drinking water for livestock, particularly during the dry season.

Forage Resources

During the last 30 years there has been a major reduction in the amount of forage that is available locally from CPRs. As a result of this, and drinking water scarcity, animal husbandry is a less effective mechanism for spreading risk than it used to be.

General Observations on Animal Husbandry

In Udaipur a structural change has taken place during the last 20-30 years. Previously, people depended on the natural resources of the region to preserve their animals, if necessary shifting them to better endowed areas. Now, forage, and sometimes even water, are purchased from the market by some households. However, limitations on purchasing power mean that it is primarily the wealthier households who do so.

F4.2 Changes in other assets and coping strategies

Drawing upon Liquid Assets

The number of goats per household has declined somewhat. This is partly because of the reduced availability of forage, and partly because of constraints on family labour available for herding: adults (and sometimes teenagers) are going for wage labour, while children are increasingly being sent to school. Jewellery is still an important liquid asset for many households, but people in Anantapur are less able to afford gold and silver jewellery.

The holding of functional bank accounts is becoming quite widespread among farmers who are moderately well-off, but remains rare among the poor. SHGs have come into existence in many villages, and are beginning to make a significant contribution to savings and credit services in some cases.

Drawing upon Household Stores and Adjusting Consumption Patterns

Household stores of food grains used to be part of people's coping strategies, but nowadays most SMFs do not produce surplus food grains in a non-drought year so this coping mechanism has also greatly declined. Adjusting consumption patterns is still widely practised.

Drawing upon Social Relationships and Informal Credit Networks

Mutual self-help has declined. In Anantapur, the traditional patron-client relationship of farm servants being attached to wealthy landowners has also declined. Dependence on money-lenders for credit continues. However, the criteria for obtaining loans from them have become more stringent (at least in Udaipur): previously the personal credibility of the applicant was enough, but now moneylenders tend to make the mortgaging of land or jewellery a condition of any loan. Traders are another important source of credit. With farmers' increased dependence on external inputs for crop production, the supplier of crop inputs have become an increasingly important source of credit, particularly in Anantapur.

Diversifying Sources of Income

This coping mechanism is the one that has grown the most in importance for a large proportion of rural households. For many it is now an integral part of their livelihood system. It includes:

- Locally available wage labour, including commuting to urban centres.
- Seasonal migration, mainly to urban centres.
- Remittances from children who have settled in places, often urban, some distance from their parents' village.

F4.3 The robustness of livelihoods to drought

One important question is whether people's livelihoods are more or less robust to drought now than they used to be. People in the survey villages (e.g. Haripura and Sagatdi) in Udaipur were generally of the opinion that the 1999-2000 drought is the worst of the three in living memory, due to:

- the much lower water table, and hence little, if any, irrigation in the *rabi* season;
- the marked decline in availability of forage;
- the reduced availability of forest products; and
- the comparative lack of government relief work during the current drought.

On the other hand, we have to allow for the fact that people have been diversifying into new activities, particularly non-farm ones, which also tend to be less sensitive to drought. Furthermore, state drought-relief and food security measures may be more effective now than they were 30 years ago.

BOX F3**Sensitivity to Drought : The Case of Bichiwara Village**

The authors of a study of the farming systems of this village conclude that the people living here are less sensitive to drought than they used to be, because of the employment and food grains provided by the state in drought years; and also because of the availability of mining as a source of wage labour that is unaffected by drought. They recognise, however, that some factors were more favourable in the past: people had a surplus of food grains; the moisture regime was better; and the forests used to play the role of "shock absorbers", by providing tubers, fruits and gums.

Source: Seva Mandir, 2000a

BOX F4**Co-Variate Risk of Different Activities during a Drought**

It is important to note that some non-farm activities are affected by drought: i.e. there is a certain degree of co-variate risk. This is compounded by the long-term decline in the water table that was discussed earlier, which tends to increase sensitivity to drought. For example, in Udaipur district, the drought has reduced the amount of work available in the sand extraction business, by reducing the amount of sand being washed down into the river. From a total of 100 trucks per day plying through Bambora town, this has reduced to 50. There is pressure on the existing available sites for sand extraction. The demand to localise the use of labour at these sites is already surfacing. Construction work is also affected by drought, as was noted in the discussion about masonry, and by the long-term trend of reduced water availability. Tourism is being affected too, as the lakes dry up.

Thus, the answer to the question will probably vary, depending on the specifics of people's livelihood activities and on the extent to which the natural resource base in the vicinity of their village has been eroded. The case of Bichiwara village is given in Box F3 as an example. The relationship between vulnerability to shocks and a household's portfolio of activities is discussed further in Chapter H.

GENDER AND LIVELIHOOD STRATEGIES

The research project on which this report is based was required to focus primarily on the household-level, so that has been the main emphasis in the report. It is widely recognised, however, that the household is not a homogeneous unit, and that intra-household differences and relationships can be important. In this chapter, therefore, we look at the status, activities, roles and responsibilities of men vis-à-vis women, and how these have changed over time.

G1 Gender Differences in Literacy, Education and Health

G1.1 Literacy

As we saw in Part B, female literacy has been steadily rising in drought-prone states, from 27.5 percent in 1981 to 35.4 percent in 1991. Nevertheless, illiterate women are still in a minority and female literacy rates lag behind male literacy rates. This is illustrated by the data for Anantapur (see Table G1), where the literacy rate among men is double that of women.

	Anantapur mandal	Rayadurga mandal	Anantapur district
Male	60	65	55.9
Female	40	35	27.6

Source: SPWD Anantapur Report.

In rural areas literacy rates tend to be generally lower, and the gap between men and women tends to be wider. This is illustrated by data in the following table, from Girwa block, Udaipur, here the male literacy rate in rural areas is more than three times that of women.

Year	Rural			Urban		
	Male	Female	Total	Male	Female	Total
1975-76	21.6	4.03	13.1	64.0	14.5	53.7
1995-96	45.5	13.3	29.6	87.4	67.9	78.4

Source: Girwa Block Profile.

G1.2 Education

Due to socio-cultural pressures, girls have limited access to education compared with boys. Parents perceive a substantial opportunity cost in sending girls to school, as is illustrated by the example in Box G1. Most girls make an important contribution to family labour and are involved in: taking care of their younger siblings; helping with household chores; or doing agricultural work, including herding of animals (Seva Mandir, 2000a). Furthermore, parents are more likely to get a good return on their investment from boys going to school, since girls' access to well-paid work is limited. Girls' access to higher education is also constrained by the fact that girls still marry and have children when teenagers. It is not unusual for women to become grandmothers by the age of 30.

BOX F3

The Opportunity Cost of Schooling

Ganga (a mother), who lives in Pratapgarh block, decided to withdraw her daughter Amri (aged 11) from school, despite the fact she did not have to pay any fees to send her there. Ganga did so because of the pressure she was under, working outside the home for livelihood, and without much support in the house from her husband, who is an alcoholic. Ganga needed Amri to do household chores, and look after the animals and her two younger brothers.

G1.3 Health

Anecdotal information from one village study in Udaipur district suggests that the health status of women is lower than that of men. A number of women were reported to be suffering from gynaecological disorders, which were thought to be primarily related to poor sanitation and poor personal hygiene (Seva Mandir, 2000a). In Sagatdi, despite medical facilities being available at the village, medical expenses and consultations are lowest for women (Sagatdi group discussion).

G2 Gender, Farm Work and Management

The gender division of labour varies from one ethnic group to another and from one livelihood group to another. This topic was not investigated in detail in the project survey, so here we present one example of the gender division of labour as it relates to agricultural work, derived from another study. The study was done in a tribal village in Jhadol block, Udaipur district (Seva Mandir, 2000a). Most of the agricultural work in the village is done by adult women. The breakdown of the work between men and women is given below.

G2.1 Crop production

Adult males make the major contribution to ploughing, fencing and irrigation of crops; and sowing is roughly equally divided. Women are primarily responsible for other crop-related tasks, namely: weeding and hoeing operations; harvesting, grain collection, threshing, and the application of manure and commercial fertilisers. Seasonal migration by men may place additional burden on women.

G2.2 Animal husbandry

It is mainly women who feed the cattle with forage at the homestead, but men may assist if the women are busy with other tasks. Children usually do the herding. Women tend to have more responsibility for goats and chickens than they do for large ruminants.

G2.3 Mechanisation and drudgery

Some activities that were undertaken by women, notably the grinding of foodgrains, have now been mechanised, flour mills are now reasonably accessible in most rural areas in Udaipur district. The introduction of handpumps and tap water has also reduced the burden of women in many villages in India, including the two covered by the project survey in Rayadurga.

G3 Gender and Off-farm Work

Female rural workers account for 23 percent of RNFS employment, according to NSS data. For them non-household manufacturing, trading and 'other services' (especially personal services) generate the most non-farm employment. Much of this is either (a) part-time and low-paid, as in subsectors like *bidis* and matches, or (b) involves casual labour, for example in construction. In some places, such as Gujarat, rural female workers are taking over low-paid jobs from male workers, as the latter move into more remunerative activities in the non-farm sector (Fisher *et al.*, 1997).

Tribal and SC women tend to have more flexibility and mobility than higher caste women, when it comes to taking-up wage labour or becoming involved in trade or home-based production. This is because the latter have to adhere to caste norms and maintain seclusion (Unni, 2000).

Year						
Working Population and Sex Distribution (Sex ratio) in Occupations						
Tehsil status	Working population (including marginal workers)		Sex distribution among cultivators		Sex distribution among agriculture Labour	
	Men	Women	Male	Female	Male	Female
1971 * (Includes Arnod block)	54 (Marginal workers not included)	16 (Marginal workers not included)	76.85	23.15		
1981 (Includes Arnod block)	57	42.5	63.77	36.29	28.68	71.32
1991 (Only Pratapgarh Block)	54.05	43.54	59.47	40.53	31.21	68.79

*Agriculturists (Cultivators) and Agriculture labour Combined.

Source: Pratapgarh Block Profile.

The district-level data for Udaipur (see Udaipur district profile) show a large increase in women involved in agriculture wage labour, while the block level data for Pratapgarh shows that most agricultural labourers are women (see Table G3). However, this trend was not reflected in several of the village studies. The information available shows that in some villages women are occupied in government relief, sand extraction and construction.

In Pratapgarrh, more women have joined in the work force since 1961 as both cultivators and agriculture labour. Some changes in computing women's labour since 1981 has also led to a more just representation of women in the workforce. More women are entering into agricultural labour (near their homes) and are fast replacing men who are seeking other wage labour in urban centres, the closest being Pratapgarrh town. Thus, the pattern in this block corresponds with the one noted in the first paragraph of this section.

Those women who become involved in paid off-farm work do so primarily when there are troughs in their agricultural labour calendar. In Udaipur district this is in the months of April and May (Seva Mandir, 2000a). Men, on the other hand, look for off-farm work from October or November onwards, i.e. at the end of the *kharif* season or after ploughing the land for the *rabi* season.

G3.1 Local work

Generally speaking, women in Udaipur district are not involved in seasonal labour migration. In this district women's involvement in off-farm work tends to be primarily in, or near to, the village where they live. This is so that they can also carry out their domestic responsibilities, e.g. cooking, washing clothes, feeding and milking animals. They are involved in both unpaid work and income-generating activities.

Unpaid work includes firewood collection for the household, fetching water and grazing the animals. Fetching water is a major burden in some villages. For example, in Tulikakhet village, where there is only one hand-pump for drinking water, women have to trek three to four kms from the village to obtain it.

Income-generating Activities

Men and women tend to have different preferences, as is illustrated by the following table from Tulikakhet village, Kotra block, Udaipur. Women are less keen than men to go long distances for wage labour, and more positive than men about collection of non-timber forest products (NTFPs).

Village	Members	Minor forest produce		<i>Tendupatta</i> collection		Wage labour	
		Yes	No	Yes	No	Yes	No
Tulikakhet	Male	-	-	-	-	39	3
	Female	42	-	4	38	-	-
	Youth	42	-	-	-	-	-
Hasreta	Male	15	45	10	50	60	-
	Female	35	25	45	15	15	45
	Youth	10	50	58	2	-	60

Source: Astha survey report.

Self-employed income-generating activities may include firewood collection, and collection of various NTFPs (referred to as minor forest produce in the above table) for sale. The latter include gums, medicinal plants, honey, grass, fruits, leaves for plate-making and *tendu* leaves for use in *bidi*-making. *Tendu* leaf collection, which is primarily undertaken by women, is an important income-generating activity in some of the villages surveyed in Udaipur district and Pratapgarrh block. Women usually have discretion over the use of the income they earn from this activity (Astha village survey).

A large percentage of women are involved in agricultural wage labour: in Girwa block the figure was 43.9 percent in 1997. Women do not go far for agricultural or other types of wage labour. The kinds of local labour they do include bunding, cutting on others' fields, making bricks and tiles, construction work, and sand-mixing. The importance of non-agricultural wage labour has increased over time.

G3.2 Migration

The extent to which women become involved in migration varies dramatically from district to district, and social group to social group. Distress migration tends to be driven by marginal landholdings or landlessness, and an absence of livelihood options near the home.

In Udaipur district there is very little migration by women, which may be partly related to the fact that only a small percentage of households are landless. Women prefer to take up work in or near to the village, and only migrate for wage labour as a last resort. The survey work in Hasreta village and the two Pratapgarrh villages found that the women stay at home while the men migrate.

By contrast, in parts of Gujarat migration by women is high. The study by Uma et al. (1999), cited in section E2.2, found that in one tribal village of Gujarat's Panchmahals district as many as 37 percent of the seasonal migrants were women. Another study, this time of tribals in three villages of Bharuch district, found that 80-98 percent of the women were migrating with their families (Joshi, 1998). The study points out that seasonal migration involving the whole household imposes an extra burden on women, as they have to cope with the dual responsibilities of wage labour and managing their children. In the village, on the other hand, the responsibility of looking after the children is shared with older family members.

G4 Gender and Diversification into the RNFS

Much of female rural labour is part-time and casual, concentrated in the agricultural labour sector. In some cases rural women seem to be entering the workforce as labourers to replace male workers who are finding more remunerative RNFS employment. On the other hand, the census data suggest that female employment in 'other services' is growing fast. They point also to the importance for rural women of the secondary sector, which generates more than half of female employment in the RNFS, much more than for men (Fisher et al., pp 38-39). Services, in contrast, are less important for women than for men. Moreover, manufacturing employment for women continues to grow. Manufacturing outside the household is expanding much faster than household manufacturing, shifting women away from being family workers to more highly paid work as self-employed single workers, or even employees.

For women non-household manufacturing, trading and 'other services' (especially personal services) generate the most non-farm employment. Much of this work is part-time and low-paid, for example in sub-sectors like bidis and matches; or involves casual labour, for example in construction (ibid.). Rural women are constrained from entering most better-paid types of work by their lack of education, their low caste and their domestic obligations, which tend to prevent them taking up work away from their village. Nevertheless, in principle RNFS employment could provide an important opportunity for many rural women to take up more remunerative work, beyond casual labour and outside the household.

Poonia* and Jamna (Mhendi Kheda, Pratapgarh)	Income (a) Wage labour. Kept by either of them. (b) Sale of smallstock. Income is kept by Jamna. Expenditure : (a) Spices and food stuffs from the market. Purchased by woman. (b) Education of children. Woman pays after consulting with male head. (c) Illness. Both husband and wife spend money. (d) Marriage. The man spends, but always seeks advice from family and community. No tribal marriage is possible without community's support. (e) Clothing. Either one purchases according to the need, but mostly males.
Roopla and Ganga (Haripura, Pratapgarh)	Income. Each of them keeps what they earn from their wage labour. Roopla gives irregularly but spends 30-40% of income on alcohol and the rest on social customs (gifts at marriage). Expenditure. Ganga sometimes sells agriculture produce to buy things for the home. As a result of Roopla's alcoholism, Ganga plays a major role, including obtaining credit.
Gautam and Leela (Mhendi Kheda, Pratapgarh)	Income : (a) Agriculture Income. Both Gautam and Leela manage this. (b) Animal husbandry. Both work. Husband sells cattle outside if necessary. (c) Wage Labour. Leela (wife) manages. (d) Social Obligations. Gautam decides and contributes in cash/kind. Expenditure. Most expenses related to daily purchases, clothes, spices, education, illness are managed by both. Expenses at marriage are managed by the husband.
Heeralal and Suraja (Haripura, Pratapgarh)	Income and Expenditure. Heeralal is the chief manager of both income and expenditure in his family. He provides for the family's needs, as Suraja does not earn anything independently.
Gangabai (Sagatdi, Girwa block)	Income. According to Gangabai, a widow, money earned by men is given to women for household expenditure. Women also control savings and give it to the men when required, and do not give them money for unnecessary extravagance. Expenditure on (a) medicine, household things, etc. is discussed by couple. (b) Emergency needs at women's parents place are also discussed by the couple, but decisions depend more on the husband.

* Man's name is given first.
Source: Individual case studies from project survey.

G5 Decision-making in Financial Matters

The influence of men and women varies by social group and from household to household. Here we give the example of tribals in Udaipur district, where women seem to have a significant influence over financial decision-making and control over money that they earn themselves. Women from poorer households in Anantapur district seem to have a similar status and degree of influence (see Tables 6 and 7). In other parts of semi-arid India, however, men have more control and influence. For example, among tribals in Gujarat's Bharuch district "even women's own income tends to be controlled by men" (Joshi, 1998).

Tribals

Among tribals in Udaipur district and Pratapgarh block, money is generally kept with the women, while purchases are made by the men. However, there is a lot of variation, and the situation can be quite complex, as is illustrated by the examples in Table G5. Women tend to have the right to retain and spend income that they have earned themselves. Women are involved in the decision-making over expenditure; and in some cases, or in certain spheres (e.g. household items), wives have at least as much influence as their husbands. In others, the final decision is taken by the man. Credit is generally obtained, and managed, by the husbands.

Alcoholism

It is quite widespread among tribal men, which leads to conflicts between husbands and wives. The latter try to retain control of the money, but their husbands may retain cash for drinking or may force their wives to release it. Alcoholism can also make it difficult to obtain credit. Ganga, whose husband is an alcoholic (see Table G5), says that no one lends to alcoholics. She borrows from her employers and the village *Sarpanch* cum headman of the nearby village, as he is kind to his labourers.

Alcoholism was also prevalent in one of the Anantapur villages, Vadrahonnuru (see Table G6). Here, it has resulted in women handling at least 70 percent of family income and expenditure, and taking responsibility for most family matters.

Mechiri	Vadrahonnuru
<ol style="list-style-type: none"> In the past, men and women used to share all work-related responsibilities equally, but the entire income used to come under the control of men. Now women have equal control over family income and expenditure. After the advent of transport facilities women are involved in marketing of their produces and major purchases for the family. In the past only about two percent of women were educated. Now many women are educated. Women's awareness about various health and hygienic problems increased due to doctors and NGOs. TV, radio, films, etc are also contributing a lot in increasing the awareness of women. Now women's role has increased from being marginal to an equal in the important events like marriages. In the past no credit/ financial sources were available to women. Now, through SHGs, women are accessing bank credit. Government is issuing ration cards, house sites, loans, etc, in the name of women. Women are also directly accessing many development and welfare schemes directly from the government. General awareness of women has increased due to TVs, radio, films, etc. Now women are able to take many precautions to avoid illness, diseases, etc. Now the village has piped water supply and handpumps. Due to improvement in education and awareness, women are taking up many activities, like sale of vegetables, milk products, tailoring, etc. 	<ol style="list-style-type: none"> In the past men and women used to share all work-related responsibilities equally, but the entire income used to be under the control of men. Now men being addicted to alcohol, most of the responsibilities are entrusted to women. Women are entrusted up to 70 - 90 percent of family responsibilities. Women are handling at least 70 percent of family income and expenditure. After the advent of transport facilities, women are involved in marketing of their produces, major purchases for the family. Now women's role has increased from being marginal to a majority in the important events like marriages. In the past no credit was available to women. Now women have SHGs. They are also raising about 60 percent loans from big farmers by pledging the labour of their family members. In the past, women did not have any forum to discuss or resolve their domestic or personal problems. Now 30 percent of women are discussing their problems with other women and approaching the <i>panchayat</i> or elder persons. In the past women were not directly involved in inter-household disputes. Now women are involving themselves, and approaching <i>panchayat</i> and also police. Women's drudgery has come down due the handpumps and tap water. Health awareness (especially pregnancy-related issues) has increased because of government health workers and NGOs. In the past only big farmers were the main source of credit. Now, finance companies, SHGs and moneylenders also provide credit. Recently some women received assistance from NGOs to raise sheep and take for trades.

G6 Changes in the Status and Position of Women in Anantapur District

Among all the groups surveyed in Anantapur, women appeared to have experienced the greatest improvement in almost all aspects of life. The three reasons for this are: (i) their initial abject condition; (ii) improvement in physical and social infrastructure; and (iii) special programmes like SHGs for women. It appears that improvement in physical and social infrastructure played the basic role in transforming the condition of women, especially in Rayadurga *mandal*. However, accompanying these improvements there have been increases in their work loads and responsibilities. The changes identified in group discussions with women in Rayadurga *mandal* are shown in Table G6.

G7 Effects of Drought on Men and Women

G7.1 Food consumption

One coping mechanism is to reduce consumption of food, and people surveyed in Udaipur thought they would have to do this during the current drought. Discussions in Sagatdi village about the effects of the current drought on general food intake and nutrition indicated that women were worst affected. This is consistent with the findings of other studies. In particular, a study of the 1983 drought in Karnataka found that women were more disadvantaged than men in relation to both food-sharing arrangements and subsequent morbidity (Caldwell, 1986, cited in Agarwal, 1991).

G7.2 Disposal of liquid assets

The assets that are disposed of first when a shock is experienced tend to be smallstock, utensils and jewellery. These happen to be women's main, if not only, assets. There is a logic to disposing of these assets first - rather than productive assets like bullocks, ploughs and land. Nevertheless, the fact remains that women would be left with nothing to fall back on if they were abandoned by their husbands, or if there was another drought and the jewellery had not been replaced (Agarwal, 1991). Disposal of smallstock would also reduce their income-generation, and might lower their status too.

G7.3 Work burden

Women's work burden tends to increase during a drought. Arrangement of water for household purposes, arranging fodder for animals, and the management of other routine expenses are increased burdens for women (Sagatdi group discussion).

G7.4 Migration

Drought tends to increase the number of people who migrate in search of work, and as a result wage rates are depressed. Since most of the people who migrate are men they will be more affected than women by any adverse effects of migrating for work during a drought year. (Of course, if women migrate they would experience the same effects.) Men might be adversely affected by migration in search of wage labour, in that:

- men who do not normally migrate might have to do so; and
- men who migrate may have greater difficulty in finding work, due to increased competition, or because there is less work available, and might experience food shortages as a result.



POVERTY IN SEMI-ARID INDIA

H1 Introduction

In India, the measurement of poverty has been dominated by the concept of the poverty line, which is defined on the basis of the minimum calorie intake required to sustain a healthy life. Estimates of the number of people below the poverty line (known as BPLs) are usually based on household consumer expenditure data, collected by the National Sample Survey Organisation. The most popular measure is the headcount index, which indicates the incidence of poverty. The next section looks at data using the headcount index.

The poverty headcount index has a number of weaknesses, including the following:

- it does not reflect changes in the depth of poverty, i.e. how far below the line people are;
- it reflects a pre-occupation with the eradication of mass hunger and starvation, while in India other factors (such as health and education) have received less attention (Unni, 2000);
- being based on household expenditure, it is not amenable to gender disaggregation, and any gender differences are hidden; and
- it assumes that poverty, despite its complexity, can be captured in one simple objective measurement.

The nature of poverty is discussed further in section H3.

H2 Poverty Line Trends

H2.1 State-level data

Table H1 contains the average data for DP and NDP states. It should be mentioned that it is unweighted data. (Iyengar, 2001, Appendix Table 7 has detailed data on poverty by state for the years 1973-74 through 1993-94.)

Year	DP states	NDP states	All India
1973-74	48.73	52.88	51.06
1977-78	43.85	51.56	48.18
1983	35.83	43.63	40.22
1987-88	32.93	37.07	35.25
1993-94	29.13	36.57	33.31

Source: Iyengar, 2001, Compiled from NSS Reports

It is interesting to note that the poverty levels have been consistently lower in the DP states and the level has also fallen faster than in the NDP states. The long term trend data reported in the India Development Report (IGIDR, OUP 2000), for rural and urban areas separately, also confirm that the DP states have performed better even in rural areas (Iyengar, 2001, Appendix Tables 16 and 17).

We have some estimates for absolute number of persons living below poverty line that are based on population estimates for 1993-94. Table H2 contains data on number of persons living below poverty line in rural and urban area in DP and NDP states. (N.B. There are some discrepancies in this table which GIDR has been asked to clarify.)

States	Rural		Urban		Combined	
	Persons (Lakh)	Percentage	Persons	Percentage	Persons	Percentage
Drought states	596	24	410	35	1006	27
Non drought states	1695	44	284	28	1979	40
All India	2291	37	694	32	2985	36

Source: Iyengar, 2001, Compiled from Data from Rural Development Department, Government of Gujarat, Gandhinagar, 1999.
For any clarifications, GIDR may be contacted.

It is interesting to note that poverty in urban areas in DP states is higher than the urban areas in NDP states. Extent of urbanisation in DP states is about 32 percent, whereas it is 21 percent in NDP states. One possible explanation for this is that a higher proportion of poor rural households

in DP states could be moving to urban areas in search of livelihood, and thereby swelling the ranks of the poor. However, the project survey found little evidence of permanent migration of households from rural to urban areas; although permanent migration of young adults is not unusual. Such individuals, however, tend to be literate, and were able to obtain work in the urban centres (see Box E3 as an example); and hence would probably not be classified as below the poverty line.

H2.2 District level analysis

States having larger proportion of DP districts have been able to achieve higher economic development. The state level poverty profiles and changes in them suggest that states having less than one third DP districts or no drought prone area, i.e., NDP states, have a higher proportion of the population living below the poverty line. Let us look at Table H3 below to observe the poverty profile and changes therein.

Percent of population below poverty line	Population below poverty line 54.88% (national average in 1973-74)		Population below poverty line 38.86% (national average in 1993-94)	
	Number in DP states	Number in NDP states	Number in DP states	Number in NDP states
< 20	Nil	Nil	Nil	1
20 - 30	Nil	2	4	2
30 - 40	1	Nil	3	1
40 - 50	3	Nil	Nil	4
50 - 60	3	3	Nil	1
60 - 70	Nil	4	Nil	Nil
Total No. of States	7	9	7	9

Source: Iyengar, 2001, Compiled from Appendix Table S7.

It may be observed from Table H3 that most states have experienced decline in poverty over time. NDP states show higher poverty than the DP states. We can see from column three that in 1973-74, seven out of nine NDP states had more than 50 percent people living below poverty line, whereas in DP states it was three out of seven (see column two). In 1993-94, five out of nine NDP states had more than 40 percent of the population below poverty line, whereas none of the DP states did. Thus, DP states seem to have performed better over time.

A point that emerges from the analysis is that drought proneness is not necessarily associated with higher poverty among the resident population. The statement, however, needs some qualification, because we have observed that within the DP and NDP states the DP districts have shown lower levels of economic development. Is it possible that the poverty in the country is concentrated mainly in the DP districts whether they are in DP or NDP states? Again the answer is not clear because states such as Madhya Pradesh (MP) and Bihar and even Uttar Pradesh (UP) to an extent have less than one third of DP districts. It is not likely that poverty in the DP districts in these states is so high as to take the state average way above the NDP districts. Therefore, the chances are that poverty in NDP districts may also be higher. It would be desirable to have district level poverty estimates.

Gujarat, Haryana, Karnataka, and Tamil Nadu are four DP states in which the CMIE indices²⁵ for DP districts in 1985 and in 1993 are higher than the national value of 100 (see Iyengar, 2001 for details). The situation in the other three DP states is the following. In Andhra Pradesh (AP), DP districts had less than 100 both in 1985 and 1993 and there was a marginal decline in the value from 83 to 81. DP districts in Maharashtra seem to have suffered adversely. The index value came down from 101 in 1985 to 85 in 1993. In Rajasthan, the values were below 100 in both the years, but there was a marginal increase from 52 to 54. It is interesting to note that in 1985, there were only four states — Bihar, MP, Orissa and Rajasthan - in descending order, that had lower than 100 index value. Only one, Rajasthan, is a DP state. In 1993, UP and West Bengal also joined them. It may be useful to recall that in 1993 CMIE index construction, weight for secondary and tertiary sector economic activities was raised by 15 percent.

Looking at the state and district level data on development and poverty, AP and Rajasthan are both drought-prone states and poor among the other DP states, and the index values for DP districts are lower than the state averages. District-level data are discussed in the next sub-section.

H2.3 Poverty line trends in Anantapur district²⁶

Anantapur

The district has recorded a steep, but erratic, decline in poverty levels since the late 1970s. In the case of rural households, there was a decline

²⁵ The Centre for Monitoring of the Indian Economy (CMIE) has built a "Relative Index of Development", based on nine development variables. They have developed this proxy indicator, because there is a lack of comparable income information by district. The nine development variables that have been used include ones from agriculture, industry and service sectors. Details are given in GIDR Report 1.

²⁶ Equivalent poverty headcount data were not available for Udaipur District.

in the poverty index from 75.9 percent in 1977-78 to 38 percent in 1993-94 (see Table H4). Nevertheless, the district's incidence of poverty is one of the highest in the state, whose overall average is 27 percent. But open unemployment is very low. It is paradoxical that the poverty ratio is 38 percent while the unemployment rate is less than three percent. Low productivity and earnings per worker explain the above paradox. There is a lot of under-employment and disguised unemployment in the district.

H2.4 The poverty headcount index, occupation and social groups

Poverty Index by Occupation

Table H4 shows that in Anantapur the incidence of poverty is lowest among self-employed people in the agricultural sector (at 24 percent) and outside the agricultural sector (34 percent); and highest among rural labour households. Among the latter, the 1993-94 data show that the incidence is almost identical for those working in agriculture (47 percent) and those not (48 percent). Previously, however, the incidence had always been higher among households involved in agricultural labour.

This pattern is unlikely to be unique to Anantapur. Bhalla (1994) provides evidence that poverty is highest among labour households depending on agriculture, mining and construction. These are the three activities in which casual labour is most concentrated, so they may be acting as a sponge for absorbing workers who cannot find self-employment in agriculture (as discussed in sections D5.1 and 5.3). Wage data show that agricultural labour is the lowest-paid occupation in rural India, making it the last resort for finding rural employment (Fisher *et al.*, 1997).

Occupational classes	Percentage of rural households below poverty line			
	1977-78	1983	1987-88	1993-94
Agriculture				
Self-employed	67.28	43.59	42.41	24.00
Agriculture labour	89.10	75.21	84.74	47.00
Non-agriculture				
Self-employed	79.17	44.82	69.58	34.00
Other labour	75.00	69.40	79.59	48.00
Other classes	76.67	55.34	40.28	37.00
Total rural households	75.92	57.39	69.61	38.00

Source: SPWD District Profile of Anantapur, adapted from Galab *et al.* (1997)

Poverty Index by Social Groups

One study, citing NSS data for Andhra Pradesh as a whole, reports that poverty among scheduled castes was highest (96 percent), followed by economically backward castes (52 percent) and then forward castes (32 percent); artisans and small service providers had more poverty among them (untitled poverty study). This supports the widespread view that the incidence of poverty is generally higher in the lower castes.

Type of Work	ST	SC	Others	Total
Self-employment				
Agricultural	38.0	20.1	43.3	37.8
Non-agricultural	5.9	10.7	14.4	12.7
<i>All</i>	44.0	30.8	57.7	50.5
Labour household				
Agricultural	37.8	49.3	23.2	30.3
Non-agricultural	10.1	10.2	6.9	8.0
<i>All</i>	47.9	59.5	30.2	38.3
Other household	8.2	9.7	12.1	11.2
TOTAL	100.0	100.0	100.0	100.0
Percentage of HHs	10.7	21.3	68.0	100.0

Source: Unni, 2000.

Relationship between Sources of Income and Social Groups

As indicated in Table H5, the principal major source of income among the SCs and STs is wage labour. The percentage of labour households among SCs (59.5 percent) is approximately double that of other households (30.2 percent) - excluding STs, who are in an intermediate position (47.9 percent). The most widespread type of wage labour for all groups is agricultural. The percentage of agricultural labour households is highest among SCs (49 percent), followed by STs (37.8 percent), and substantially lower (23.2 percent) among other social groups.

Conversely, the pattern of self-employed households mirrors that of labour households, in that the percentage of self-employed SC households (30.8 percent) is approximately half that of others (57.7 percent), again excluding STs (44.0 percent). The majority of self-employment is agricultural for all groups, but the proportion is highest among tribals (86 percent), and lowest among SCs (65 percent), with the 'other' category in between (75 percent).

Table H5 covers both rural and urban dwellers. There may well be some differences in the distribution of the three categories of households between rural and urban areas, and this may be related to some of the differences. For example, in Udaipur district a higher percentage of tribals than SCs live in rural areas, so one might expect a higher proportion of tribals to be dependent on agricultural labour: conversely, those SCs living in urban areas may have better access to non-farm labour opportunities than tribals do.

In conclusion, we can say that, according to poverty lines estimates:

- there is a higher incidence of poverty among ST and SC (and to a lesser extent OBC) households;
- there is a higher incidence of poverty among labour households; and therefore
- there is a higher proportion of labour households within STs and SCs.

H3 Broader Aspects of Poverty and the Poor

It is widely recognised that poverty is a multi-dimensional phenomenon that is associated with other factors, in addition to low income and inadequate access to food. There is no standard widely agreed definition of poverty: some people define it narrowly and others more broadly, but there has been a general tendency to broaden the definition. For example, the World Bank has recently defined poverty as "pronounced deprivation in well-being", and includes within this: material deprivation, low levels of health and education, vulnerability and voicelessness and powerlessness (the World Bank, 2000).

In the Indian context, it can be argued that the conventional consumption-based measure of poverty, with its focus on the eradication of hunger, is not appropriate any more, since famine and starvation have not been experienced in recent years (Unni, 2000). For this reason, a broader definition and indicators are called for, including "adequate provisioning for education, health, housing, etc" (ibid).

The range of definitions, or concepts, ranging from uni-dimensional to very broad is graphically represented in Baulch's 'pyramid of poverty concepts', which is reproduced here as Figure H1 (Baulch, 1996). PC stands for private consumption, CPR for common pool resources and SPC for state-provided commodities. The conceptual differences between 'poverty' and some other related terms (such as 'destitution', 'ill-being', 'powerlessness' and 'vulnerability') has become blurred, since the latter are widely used in conjunction with the former (ibid.)

H3.1 The dimensions of poverty

The different dimensions of poverty are inter-related. For example, we noted earlier that, generally speaking, literacy and a good education enable people to obtain better paid work; and this work may be more certain than casual wage labour.

Education

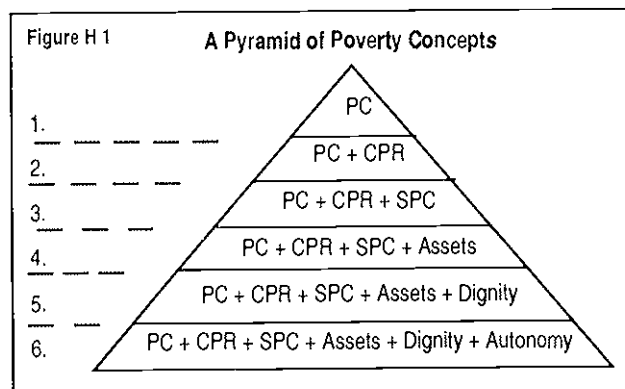
Literacy is one indicator of education that is widely available in India, and which was discussed in Chapter B. We saw there that literacy tends to be lower in rural areas and among women.

Vulnerability

Measuring vulnerability is difficult, since it is a dynamic phenomenon²⁷. Furthermore, there is a growing consensus that "it is neither feasible nor desirable to capture vulnerability in a single indicator" (ibid). For example, if we wanted to compare the vulnerability to drought of SMF households in Rajasthan and AP, it would be misleading to do so solely on the basis of household stocks of foodgrains. This is because access to grains from the PDS and other state schemes may also be an important determinant of vulnerability, and AP's PDS and cheap rice scheme are arguably the best in India. Thus, households in AP might not find it necessary to keep large stores of grains. In fact, the superiority of AP's PDS and rice scheme may be the main reason why farmers in AP have made a bigger switch from foodgrain crops to cash crops than farmers in Rajasthan.

External Threats and Internal Coping Capabilities

As was discussed in Chapter F, there are both external and internal dimensions of vulnerability. The external dimension relates to the type, severity and frequency of threats or shocks to which the household or individual is exposed, whereas the internal dimension is linked to the



²⁷ The relative vulnerability of groups with different livelihood systems is even more difficult to measure, as is illustrated by the example given below from Anantapur.

ability of the household to cope with the shocks by drawing on material assets or capital or support networks (social capital). The most vulnerable households "are those that are both highly prone to adverse external events and lacking in the assets or social support systems that could carry them through periods of adversity" (Ellis, 2000). It would be desirable to have indicators for both the external (shocks) and internal dimensions of vulnerability.

Voicelessness and Powerlessness

Poor people are often lacking in self-confidence and self-esteem (the World Bank, 2000). This is probably particularly pronounced in India, given the caste system and the correlation between caste and poverty. However, things are changing in a positive direction. For example, lower caste people can now attend the same meetings as higher caste people, which was not the case in many areas only 30-40 years ago, and recent constitutional amendments have made special reservations for the disadvantaged scheduled castes and scheduled tribes, and women, to be elected to the local *panchayati raj* institutions (PRIs). Although the economic impact of these changes on livelihoods is not well-understood, the social and political power configurations are believed to have changed to some extent (Pratapgarh block profile).

H3.2 More on vulnerability

The External Dimension - Types of Shock

Different groups may be vulnerable to different types of shocks. It is worth noting what kinds of shocks there are, and how they might affect different groups. Some shocks that directly affect livelihood activities are listed in Tables H6 and H7, together with an indication of which livelihood groups are most affected by them.

Resilience

Diversity of activities contributes to resilience, provided the activities have little or no covariance in their susceptibility to any given shock. Households with livelihoods based on a diverse portfolio of activities, with minimal co-variate risks, will be most resilient to shocks, i.e. they will be able to recover from the shock more quickly than others. Conversely, households with only one major activity, or with two or more activities that have high degrees of covariance, will be the least resilience, i.e. will take longest to recover.

Sensitivity

As was noted earlier, sensitivity refers to the magnitude of a system's response to a shock. A small shock, such as illness of an able-bodied, working family member for one month, could produce a low-magnitude response in one household and a large one in another. An example of the former might be sale of three goats to provide alternative income while the family member is not available for wage labour; while an example of the latter might be loss of regular work as a result of the illness.

Figure H2 shows four types of small or marginal farm (SMF) based livelihood systems. (A similar figure could be constructed for other groups, such as different types of labour households.) In type 1 there is hardly any co-variate risk between self-employed agriculture and the other principal activity (e.g. mining). In type 2, for which the second principal activity is sand extraction or construction, there is a moderate degree of co-variation, as drought also has a moderate negative impact on these activities. In type 3, for which the second principal activity is seasonal agricultural wage labour, there is a high degree of co-variance in the susceptibility of this activity and self-employed agriculture to drought. In type 4, there is no second activity to fall back on, so this system is most susceptible to drought. Within type 4, farmers who are heavily dependent on one crop will be more vulnerable to shocks than those with a more mixed cropping system.

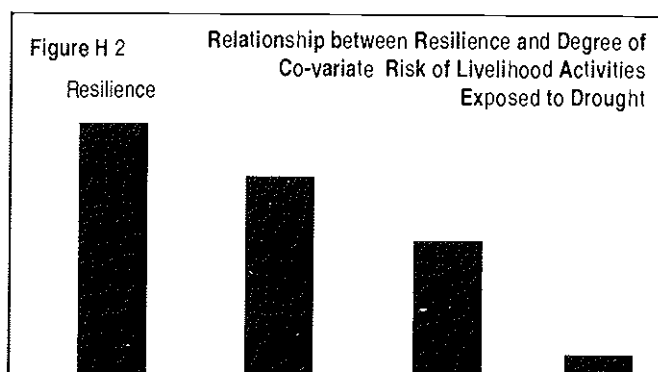
People with livelihood activities that require major investments may be more vulnerable in one way than those with livelihood activities that do not require major²⁸ investments. They may be vulnerable to losing their assets (e.g. livestock), or to making a loss on their investment (e.g. crop production). Rural labour households are not vulnerable to this kind of risk, or at least not to the same extent. Where major investments are financed primarily from loans, people are also exposed to the risk of indebtedness, and to getting tied into a 'poverty ratchet' (Chambers, 1983). These issues are discussed further in Section H4.1 below with reference to the situation in Anantapur District.

Death or serious illness of an able-bodied adult may have both a direct effect and an indirect effect on livelihood activities. The direct effect is the loss of a key factor of production. The indirect effect is that they may require substantial expenditure (on the ceremony and medical treatment respectively), which may necessitate either a re-allocation of expenditure, the sale of liquid assets or taking out a loan. Whichever way the money is raised, the expenditure may have a negative effect on livelihood activities in terms of the opportunity cost that it represents. Smaller households, *ceteris paribus*, may be more vulnerable to death and illness, as loss of one person means loss of a larger percentage of family labour.

The Internal Dimension

We saw in the chapter on coping strategies that when a major shock occurs, people cope by: 1. selling liquid assets; 2. drawing on savings, stocks and reserves; 3. accessing CPRs; 4. diversifying income sources; and 5. drawing on social capital. (Coping mechanisms 1-3 and 5 are all buffers of various kinds that protect the household from the shock.) It follows, therefore, that households that lack these assets and options will be most vulnerable to shocks.

²⁸ It is important to note, however, that 'major' is not just an absolute term, but a relative one too: for example, Rs 5000 might be minor for some groups, but major for others.



For example, resource-poor families may be more sensitive to serious illness. This is because human capital is their main asset, and they may have few other assets that they can sell or use to cover them during the illness, and may find it more difficult to cover the cost of medical treatment. Households and groups that lack buffers are likely to be affected more quickly and more critically by a given shock. For example, it has been observed that landless, footloose migrants in Tamil Nadu live "in a permanent zone of very low income and very high insecurity. It just takes one illness in the family, or one wedding, for the whole thing to fall apart" (Nagraj, cited in Sainath, 1996).

Type of shock	Effect of shock	Group(s) affected	Comments
<i>Related to annual crops</i>			
1. Output price shocks (fall)	Loss of revenue are not usually large	Farmers*	Year-to-year price changes
2. Input price shocks (increase)	Increased expenditure	Farmers	Year-to-year price changes are not usually large
3. Drought	Poor harvest	Farmers, agricultural wage labourers (esp. those without access to non-agric. labour)	Where crop inputs are financed primarily through loans this can result in high levels of indebtedness
4. Pest outbreaks	Poor harvest	— ditto —	— ditto —
<i>Related to livestock</i>			
5. Disease outbreak	Death of livestock	Any livestock-keeper (farmers, pastoralists, labour households)	Worst possible shock for livestock-specialists?
6. Drought	Death of livestock	— ditto —	
7. Drought	Distress sale of productive livestock**	Any livestock-keeper (farmers, pastoralists, labour households)	Other shocks generating need for cash can have this effect
8. Loss of grazing rights	1.Reduction in herd size; 2. reduced productivity; or 3. migration with herd	Any livestock-keeper, esp those with large herds and/or little private land of their own	This can happen due to decisions by forest department, village or panchayat
<i>Related to trees and forests</i>			
9. Theft of trees on private land	Loss of trees and their products	Farmers	Tree pest outbreaks can have same effect
10. Fall in price of tree crops/products	Loss of revenue	Farmers	For example, in the 1980s in India the price for eucalypt poles fell sharply.
11. Theft of trees from community-managed forest	Loss of revenue or subsistence product	Any member of community.	Usually by people from another community.
12. Loss of forest product harvesting rights	Loss of revenue or subsistence product	Tribals and other forest-dependent people	Usually due to decisions by forest department
<i>Others</i>			
13. Loss of water (e.g. due to lower water table)	Could prevent irrigation in winter season	Potentially all groups	Could force people to migrate for work
14. Death of healthy adult (or serious illness)	Loss of able-bodied family member	All groups	This is doubly bad, in that (a) production is negatively affected, and (b) costs are incurred

* As used here, the term 'farmers' includes agro-pastoralists, i.e. people with mixed crop/livestock systems.

** As opposed to livestock that are kept primarily as liquid assets

Type/effect of shock	Group(s) affected	Comments
1. Loss of permanent job (e.g. in factory or government)	Households with member in permanent job	
2. Loss of or recurrent & major seasonal work (e.g. mining)	Households with member involved in such work	
3. Loss of market share for RNFS product (due to competition from mass-produced goods)	Households involved in cottage industries	For example, Meghwal shoe makers in Udaipur
4. Loss of able-bodied family member (due to death or serious illness)	All groups	Production is negatively affected and costs are incurred.

H3.3 Poverty and time

Poverty is a dynamic phenomenon, with many households moving into or out of poverty at any one time. Thus, the point in time at which the poverty status of a sample is estimated may determine which side of 'the line' they appear. For example, during and after a drought year it would not be surprising if most farmers appeared worse-off on the basis of various indicators of income, consumption and assets owned²⁹. Whereas, during and after a year of good rains they might move above the 'poverty line', however that is defined. This kind of fluctuation is illustrated by the steady state line in Figure H3.

Earlier, in section E5, we discussed the concepts of positive and negative adaptation, which are also dynamic in nature, and could respectively involve households moving into poverty or out of poverty. These are also represented in Figure H3.

H3.4 Gender and poverty

Gender and Education

We saw in Chapter B that literacy rates and educational levels are lower in women than in men, particularly in rural areas. One would expect that this would limit the types of non-farm work available to them to those that are less well-paid, and there is evidence of this. In addition, off-farm work involving women is usually restricted to opportunities in or near the village. Of these, perhaps the most common is agricultural labour, which tends to be less well-paid than other forms of unskilled labour, such as construction work. It appears that the increased migration by men has, in some situations, resulted in women replacing men in doing agricultural labour near to the home. Nevertheless, the survey in Pratappgarh found that women may prefer to do agricultural wage labour rather than other wage labour, because they prefer to work near their homes, as is shown in the following table (PRAYAS).

Men's priorities		Women's priorities	
Agriculture	I	Agriculture	I
Non-farm wage labour	II	Agriculture labour	II
Agriculture labour	III	Non-farm wage labour	III
Selling fuelwood and logs	IV	Selling fuelwood and logs	IV

Source: PRAYAS Survey Findings

Gender and Wage Labour

Not all rural women are involved in wage labour. For example, in one of the Pratappgarh villages women from only half of the households did it (PRAYAS). Women's involvement in wage labour may be an indication of a household's poverty. Wage rates are generally higher for men than

²⁹ Some farmers, however, might be able to benefit from the drought situation. For example, one farmer in Bhilwara District, Rajasthan, told one of the authors (CC) that during drought years he took advantage of the distress sales of livestock and bought several cattle at bargain prices, with a view to selling them later when prices had returned to normal.

they are for women. However, if the income of different household members is pooled, then one could argue that it does not matter if women's wage rates are lower than men's, as they will still benefit from men's higher wages. This, of course, raises the issue of decision-making processes and the relationship between husbands and wives, which was discussed in section G5.

Gender and Health

Gender aspects of the relationship between health and work will obviously depend on the gender division of labour and the types of activities in which different households and individuals are involved. As the latter are highly variable, it would be difficult to generalise. Some activities that are generally undertaken by men are known to be hazardous to health: for example, mining and quarrying and application of pesticides. Men also tend to be more involved in seasonal labour migration, which may expose them to particularly poor living conditions and sanitation. On the other hand, the amount of work that women do tends to be higher than that done by men, and this is liable to affect their health. Women also have the extra burden of pregnancy and the risk of gynaecological complications.

Women and Vulnerability

Women have arguably become more vulnerable, due to an increase in their responsibilities, coupled with decline in family support due to breakdown of joint family system. They are also affected by male migration; male family members' addictions to alcohol, etc.

H4 Poverty and Vulnerability in the Focus Districts

H4.1 Anantapur

The project survey found that all groups studied (viz. small and marginal farmers, wage labourers, rears of small ruminants, women, dairy farmers and weavers) believe that their socio-economic conditions have improved during the last 20 years or so. During that time, the degree and nature of vulnerability experienced by these groups have changed. These are quite complex and vary for different groups, so it is difficult to make generalisations as to whether people are more or less vulnerable overall than they used to be. In this section we focus on a comparison of the vulnerability of two major groups, namely small and marginal farmers (SMFs) and landless labour households, an issue that came up in group discussions during the survey.

Small and Marginal Farmers

The information about the incidence of poverty based on the headcount index (in section H2.4) suggests that rural labour households (47 percent) are twice as likely to be below the poverty line as households that are self-employed in agriculture (24 percent). They have two advantages over labour households, namely: (a) their land is an asset that can be mortgaged or, as a last resort, sold³⁰; and (b) in principle, they can also diversify by combining self-employment in agriculture with seasonal wage labour. Nevertheless, if we consider vulnerability there is evidence from Anantapur (and elsewhere in AP) that the SMFs may be more vulnerable than the labour households.

SMFs in Anantapur are strongly orientated towards cash-crops³¹, rather than subsistence crops, as was discussed earlier. Thus, they are vulnerable to shocks, in the form of: (i) reduced prices for their crops³²; and (ii) poor harvests (due to pest outbreaks, poor rains, etc.) They also spend a lot of money on agricultural inputs, so substantial increases in input prices could also threaten the profitability of crop (especially groundnut) production. Furthermore, pesticides have tended to be less effective recently, due to: (a) pesticide resistance (in cotton pests); and (b) adulteration (see Table C 11). Inputs are financed to a large extent through loans, which exposes SMFs to a high degree of risk, in that crop failure results in heavy indebtedness.

Poor Harvests

There was a drought in Anantapur in 1997, and in 1999 a virus seriously affected the groundnut harvest. Losses in groundnut production in Anantapur district totalled Rs 5.5 billion in 1999 (Menon, Parvathi, 2000 - cited in SPWD Anantapur Report). Pest problems again had a negative effect on the groundnut crop in 2000.

Labour Households

They do not take loans to make major investments in crop production, so they are not exposed to the risk of indebtedness as a direct result of crop failure.

Labour households could, of course, find themselves without wage labour as a result of crop failure, but this does not seem to have happened. Wage rate data for AP as a whole suggests that demand for casual wage labour has been consistently buoyant over at least the last 20 years. Real wage rates have been rising throughout this period, *albeit* at a slower rate since the early 1990s (SPWD Anantapur Report). Furthermore, the project survey found that landless labourers are organising themselves into groups, for the purposes of negotiating with potential employers to be paid on the basis of a piece rate, which is more remunerative than a daily wage. The fact that they have been able to do this suggests that the demand for casual labour remains strong.

³⁰ However, land is not a very liquid asset, as people are even reluctant to mortgage it.

³¹ Elsewhere in Andhra Pradesh, smallholders have focused on hybrid cotton as their principal crop, again at the expense of food crops. In 1988, restrictions on private sector imports of seed were lifted, and subsequently the SMFs became increasingly dependent on imported seed. In 1997/98, following two years of cotton crop failure, over 300 cotton farmers committed suicide, mainly due to indebtedness (Butcher, 2000). Adulteration of seeds and pesticides, and failure of bore-wells due to fall in groundwater table, are also thought to have contributed to crop failure.

³² Price changes affecting groundnut producers were discussed in section C3.3.

Labour households have experienced several changes during the last 20 years that have affected their vulnerability, some negative and some positive. Changes that may have increased their vulnerability include: the breakdown of patron-client relations, which may have led to an increase in the cost of credit; the decline of attached labour, and more dependency on casual labour; and a decline in livestock holdings, leaving them with less liquid assets to buffer them against shocks.

There have been other changes that have reduced their vulnerability to certain kinds of shocks. Landless labourers now have access to a more diverse range of work opportunities, some non-farm, and this appears to have cushioned them against the effect of failure of the groundnut crop. Improved transport infrastructure has increased their mobility and hence their work options. These include: regular migration for additional employment and higher remuneration; employment in public works in and around the villages; daily commuting to nearby towns for work (e.g. in construction); and regular employment in the manufacturing and service units that have been coming up in recent years (especially in Anantapur *mandal*, with its proximity to the district's main urban centre, Anantapur town). However, there is no guarantee that demand for labour, and hence wage rates, will remain high. In the future, these households could be vulnerable to a significant fall in wage rates, or availability of casual work. Their ability to 'weather' such a shock would depend partly on whether they have built up a substantial portfolio of assets during the last two decades.

Suicides, Stress and Vulnerability

Suicides are arguably an indicator of acute stress experienced by rural households. In parts of AP they have been occurring more frequently in recent years and are a relatively new phenomenon. There has recently been a high level of suicides among SMFs in AP as a whole, with estimates for 1997-98 ranging from 307 to 349. A survey of 92 households in which a suicide had taken place found that 89 percent of them were cultivators of cotton and 13 percent of groundnut; and that, on average, they were highly indebted by the loans they had taken to finance their crop inputs³³ (Chowdary et al., undated). Towards the end of 2000, newspapers reported at least 26 cases of suicides in Anantapur district owing to failure of the groundnut crop, at least partly due to bud necrosis. There does not appear to have been a comparable level of suicides among landless labour households: the absence of newspaper reports on such suicides suggests they are minimal.

The fact that suicides are taking place among SMFs growing groundnut and cotton, but not among landless labour households, suggests that the former are experiencing greater stress and shows that they are more vulnerable to certain types of shocks, and to becoming heavily indebted as a result of crop failure. On the basis of this evidence one can argue that SMFs have recently been, and currently are, more vulnerable than labour households - and in that respect they are poorer.

Relationship between Consumption Indicator and Vulnerability, Crop Failure and Indebtedness

There is clearly a major divergence between the NSS consumption indicator of poverty and indicators of vulnerability, such as suicides and indebtedness. There may also be a divergence between this indicator and the profitability of agriculture. It will be interesting to see how the NSS poverty measurements for the late 1990s compare with those of the early 1990s and late 1980s: in particular, whether they show a continuing downward trend in the incidence of poverty among farmers; or whether they somehow reflect the reduced profitability of groundnut production and the increased indebtedness of groundnut producers.

H4.2 Udaipur: vulnerability to drought

The survey findings in Udaipur illustrate how different livelihood groups are affected in different ways by another external shock - drought.

SMFs

Within the farmer group, some have been badly hit by the consecutive droughts. Last year, in Prayatna Samiti's operational area, even some *Dangis* (a moderately well-off group whose main activity is self-employed agriculture) were looking out for wage labour for the first time. They did not, however, experience the high level of indebtedness that was observed among SMFs in Anantapur. The fact that their agriculture activities (livestock and a range of crops) are more diverse may be one reason for this.

SMF/Wage Labourers

In Kotra block, the tribals (SMFs for whom seasonal migration is an integral part of their livelihood system) were also badly hit by the drought. They are normally involved in seasonal migration to Gujarat for agricultural wage labour, but the drought resulted in a lack of employment opportunities in the cotton fields and many had to return. Unlike the rural labour households in Anantapur, they do not have a variety of wage labour options. By contrast, in Kotra's Tulika ka Khet village, those tribals who migrate to Kelva to work in mining were relatively unaffected by the drought and were relatively better off.

Drought may change the relative status of different groups, given that the impacts of drought, and the sensitivity to drought, vary considerably between groups. The findings show that drought can have a negative effect on livestock production, as well as crop production; and that those households that seek to maintain animals during a drought year face a heavy expenditure on purchases of fodder, unless they are particularly well-endowed with forage on their farms. In this respect, those who depend on wage labour are better off during a drought year, provided it is in a sector that is not negatively affected by drought (Seva Mandir case study). On the other hand, those who have cattle in a good rainfall year will be better placed to benefit from crop production that year than those who do not.

□

³³ There is some crop insurance, but this is insufficient to deal with the scale of crop failure that has been experienced.

IMPROVING LIVELIHOODS: CONSTRAINTS AND OPTIONS

Generally speaking, two of the poorest groups in semi-arid India are (a) landless labour households and (b) small and marginal farmers³⁴. The former is the predominant livelihood group in AP, whereas the latter is the predominant one in Udaipur. One might expect SMFs to be less poor, given that they own land, but the discussion in section H4 showed that SMFs are exposed to risks to which the landless are not exposed, and in some respects are more vulnerable.

DFID's Natural Resources Systems Programme, which funded the research on which this report is based, is primarily interested in the contribution of natural resources to sustainable livelihoods and poverty eradication, and in recommendations for further research in this area. Thus, this chapter is primarily concerned with NR-related livelihood options, and less so with the non-farm sector. As SMFs tend to be more dependent on the natural resource base than landless labour households, the chapter is more relevant to them. Nevertheless, animal husbandry and the use of common pool natural resources are both NR-related activities that landless labour households, and particularly women, are often involved with. In addition, improvements to the farm-based livelihoods of self-employed farmers can result in indirect benefits to agricultural wage labourers by increasing the demand for their services, and hence the wage rate.

We have seen that secondary data at both the macro- and micro-levels, and primary data from the project survey, show that a large proportion of households with farms have been diversifying into off-farm work of various kinds during recent decades. We have also seen that members of poorer farming households (in terms of farm size or quality, income, education etc) tend to diversify into casual unskilled wage labour (primarily in construction, agriculture and mining and quarrying). Wealthier households, on the other hand, tend to diversify into semi-skilled work, new enterprises of their own or salaried employment.

There are several reasons why diversification has been taking place, including a mixture of 'push' and 'pull' factors. The latter include better access to, and availability of, off-farm work, particularly outside the village of residence and particularly in urban centres. For poorer households, however, the survey results and secondary sources show that 'push' factors are the main driving force behind diversification, particularly where it involves seasonal migration (see section E6). The off-farm opportunities available to them are generally limited to unskilled labour, which is generally not well remunerated, so they spend less time away from the farm than people with access to semi-skilled or skilled work. The reasons they gave for preferring agriculture were:

- it is a more certain source of food for survival than off-farm work;
- casual wage labour is seen by some as a kind of bondage, whereas when working their farm they are their own boss; and
- wage labour outside the village is full of hassles.

Nevertheless, as a result of several trends, both crop production and animal husbandry are generally making smaller contributions to people's livelihoods than they did in the past. Thus, seasonal labour migration is now an integral part of the livelihood strategy of a large proportion of households.

There is still scope, however, for research, development interventions and policy and institutional changes to improve the contribution of natural resources to livelihoods. The experience of NGOs that have been working in this field for many years (such as AKRSP and SWDF in Gujarat) has shown that enhanced NR productivity in rural areas can dramatically reduce seasonal migration to urban centres and elsewhere (see, for example, Joshi, 1998). Nevertheless, the fact remains that the rapidly growing importance of non-farm activities in people's livelihoods is a pervasive phenomenon. While NR-related interventions may slow down this trend, or bring it to a temporary halt in some areas, the trend seems set to continue.

This chapter begins (sections I.1 and I.2) by summarising the main constraints on the livelihoods of the poor in semi-arid regions. The emphasis is on constraints on NR-based activities (section I.1). We then (in sections I.3 and I.4) seek to identify opportunities for easing those constraints, or for further research into the nature of certain constraints and how best to address them

I 1 Constraints on NR-based Activities

There are two major types of natural capital that are used by the rural poor, namely farms and (CPRs). Their contributions to people's livelihoods can be enhanced in two ways: either through technological improvements, which have a direct impact on the quality and quantity of *natural capital*; or through changes to *policies and institutions*, which affect, for example, access to natural capital and the size of the benefits that people can derive from processing and marketing the products of natural capital. Policies and institutions are particularly relevant to CPRs.

With reference to farms, a major challenge is how to produce more from traditional land and water resources. There is a need to develop both land-saving and labour-saving technologies. It is not just a question of producing more, however, but also of enhancing the profitability of agriculture.

11.1 Constraints on crop production

Several factors have been acting on constraints on crop production, which we briefly summarise here. First, in chapter B, data were presented that show that there has been a steady reduction in farm size. This has probably been a major push factor, to some extent cancelling out the gains in productivity that have been experienced with several crops.

³⁴ Livestock specialists are a minority group in both focus districts and states and hence have been given less attention.

Second, there has been soil erosion and a deterioration in soil structure and . It has been estimated that the productivity of some 80 percent of India's cultivated lands is being reduced due to wind and water erosion (Virmani, 1999). The loss of surface soil has caused a significant chemical deterioration, with the result that more inputs (especially fertilisers) are needed to sustain agricultural production (ibid).

Third, despite a dramatic increase in the use of inorganic fertilisers (section C1), which has presumably been an important contributor to the major yield increases experienced by many crops, soil fertility is still a constraint in the focus districts, for various reasons. Application rates of animal manure are almost certainly in decline, since the number of livestock units per household has generally declined faster than farm size - at least in Udaipur. In addition, the degradation of the forests is likely to have reduced the quantity of nutrients derived from leaf litter from the forests deposited in the fields.

Fourth, in the two focus districts there has also been a trend towards bringing more marginal and less fertile lands under cultivation. This has come about in two ways: through the privatisation of common lands (mainly forests and pastures), both legally and illegally; and through the use of private 'wastelands' for crop production. Last, but not least, the highly degraded state of the CPRs has a negative effect on the overall condition of the watersheds, including private arable land. This is illustrated by the leaf litter example in the previous paragraph, as well as increased soil erosion, and the deposition of stones in farmers' fields.

Fifth, the cost of production has also increased substantially, as a result of: (a) a major shift towards purchased inputs; and (b) the increased cost of abstracting groundwater for irrigation. There was also a substantial increase in potassium and phosphate fertiliser prices in 1992, when they were decontrolled.

Finally, the availability of water is also an important and growing constraint in both of the focus districts and many other semi-arid areas. This is related to moisture regimes and retention, and groundwater exploitation. The intensification of groundwater exploitation has resulted in falling water tables in the focus districts and elsewhere, and the drying up of open wells in many areas, at least at certain times of the year. In Udaipur and Pratapgarh, it meant that people in some of our survey villages were not able to grow a rabi crop in 2000, because they had no water for irrigation. Water use has been becoming increasingly inequitable in areas where only bore wells can access groundwater, as they are very capital-intensive and only the better-off can afford them.

Water consumption has been increasing for several reasons, including: the rapidly increasing numbers of people; the cultivation of more water-intensive crops or crop varieties; the abstraction of water for use in construction and mining (particularly in Udaipur); and competition between urban and rural users.

The trend of falling water tables is obviously not sustainable. Competition for water has been intensifying, and open wells are drying up in some areas. In parts of Gujarat, water is routinely transported to villages by tanker during the dry season. In Udaipur, lakes have reached record low levels, and power cuts have become longer, due to the effect on hydro-electric capacity. Although the current drought is partly responsible for this situation, these phenomena provide a graphic illustration of what is to come in a normal rainfall year in the foreseeable future, if water consumption continues to grow.

1.1.2 Constraints on animal husbandry

Forage

In Udaipur district (and probably elsewhere) numbers of livestock units, and even more so livestock units per household, have been declining in recent years, as the availability of forage from farms and CPRs has become constrained. Drinking water for livestock during the dry season, and particularly during drought years, has become a constraint in some semi-arid areas during the last two-three decades (Prayatna Samiti village surveys; Conroy et al., 2000).

1.1.3 Land-based common pool resources

Both the quantity (area) and quality of CPRs have tended to decline substantially in recent decades (B1.4). Both forests and pastureland became heavily degraded in many areas. As a result, the collection of various NTFPs has ceased to be a livelihood activity in some areas, and has diminished in importance in others. Encroachment has been a major factor in the shrinkage of CPRs.

1.1.4 Profitability and marketing of NR-based products

The profitability of various enterprises is reduced by the marketing arrangements that are in place.

Annual Crops

We have seen that SMFs often take loans from traders to finance the purchase of crop inputs. It is often a condition of the loan that the farmer sells his crop to the trader, which tends to mean that he is obliged to sell his crop at well below the market price.

NTFPs

People who collect NTFPs are also usually obliged to sell the product to one buyer - either a state agency or a private trader who has been given an exclusive licence by the state government. This kind of monopsony means that prices offered to the collectors are generally poor.

Livestock

Households, particularly the poor, tend to be in a weak bargaining position when it comes to selling their animals. Smallstock are kept primarily

as a liquid asset, and are a valuable component of people's coping strategies. Nevertheless, distress sales mean low prices: and low prices tend to mean low inputs, and hence low productivity (e.g. in terms of growth rates or reproductive performance).

I.1.5 Policies and institutions

Policies and institutions have a major influence on the problems and constraints being experienced in relation to groundwater use, land-based CPRs, and the marketing of NTFPs. These issues will be discussed further in section I.3.

I 2 Constraints on Non-farm Sector Activities

Constraints on the following three types of capital tend to limit the NFS options open to households and individuals:

- Human capital (literacy, formal education and vocational skills).
- Financial capital to cover the start-up costs of establishing a new business.
- Social capital, for example, contacts and networks of people, who can help in finding work and in upgrading skills.

I 3 Improving NR-based Activities: Opportunities and Research Constraints

NR-based activities can be enhanced through technological change and through the reform of policies and institutions.

I.3.1 Soils, fertility and yields

Nutrient Management

There is a general need to research SMFs' nutrient management methods, to improve understanding of this constraint and to identify ways in which they can be improved. Regarding improvement of practices, there is evidence that in Udaipur (Seva Mandir, 2000a), and generally among the *Bhil* tribe of north-west India (Sankaran, 1991), there is a need for better management and application of manure. Most *Bhil* farmers store cattle dung in heaps out in the open. This cattle dung, due to absence of aerobic conditions in the storage site, is not adequately decomposed at the time of its application in the field (Seva Mandir, 2000a). It can also dry out and be blown away by the wind (Sankaran, 1991). This type of manure is of inferior quality and leads to the problem of termites in the crops. Only a few farmers are making farmyard manure. Research is needed into the reasons why farmers follow this practice, and into factors affecting the adoption of more effective methods of preparing and applying manure.

Farmers do, however, have their own traditional methods for increasing soil fertility and soil quality, including the planting of green manure crops and the importation of clay soil to fields containing sandy soils, and subsequent mixing of the two (Ubeshwar Vikas Mandal, undated). There has been a lack of systematic research on indigenous methods of improving and maintaining soil quality, and their efficacy and suitability under current conditions. Nutrient flows within the farming system has been identified by WIRFP as a "prime candidate" for research.

Crop Varieties

HYVs tend to be water- and nutrient-intensive. Given that soil fertility and water availability tend to be important constraints in semi-arid regions, there is a need for the identification and/or development of improved varieties that are less input-sensitive, and more robust under low or irregular rainfall conditions.

Western India Rainfed Farming Project (WIRFP) has shown that it is possible to find improved varieties that satisfy farmers' criteria and that can increase yields substantially, but that have not been released in the areas concerned (DFID, 1999). There is a need throughout India to gain a better understanding of farmers' varietal preferences and criteria, and to see whether suitable varieties are available. Participatory plant breeding programmes may also be required, where suitable varieties do not exist.

I.3.2 Learning from threats presented by market liberalisation and globalisation³⁵

The experiences of groundnut producers in Anantapur, and hybrid cotton producers elsewhere in AP, illustrate how market liberalisation and globalisation can have a negative effect on SMFs. A combination of low profitability, crop failures and large loans for inputs recently resulted in a few hundred suicides among SMFs and heavy indebtedness among a much larger number. Market liberalisation contributed to these problems by increasing the price of fertilisers and decreasing the price of groundnuts.

It is generally accepted that globalisation will be a long-term phenomenon, and it is important, therefore, that less developed countries like India adapt to it as effectively as possible, minimising any negative effects and getting the maximum benefits from the opportunities that it presents. Lessons need to be learned from these experiences, so that recommendations can be made for policy measures that will help to avoid a repetition of them among smallholders producing not only groundnut and hybrid cotton, but other cash crops that are significantly affected by global market forces.

The relative contributions of different factors to the heavy indebtedness of the groundnut and cotton smallholders, and to the associated suicides, need to be explored further and disentangled.

³⁵ Defined here as the process of integration in product markets and financial markets.

These factors include:

- drought;
- heavy dependence on one cash crop;
- a period of good and/or rising prices for the crop, followed by a period of stable or declining prices;
- heavy dependence on purchased agricultural inputs;
- increased cost of inputs;
- adulteration of pesticides and seeds;
- pest outbreaks;
- pesticide resistance;
- heavy dependence on moneylenders to finance agricultural inputs; and
- the relationship between suicide and crop failure and indebtedness.

Regarding the last point, indebtedness has long been a part of Indian rural society, whereas suicides associated with indebtedness are apparently a relatively recent phenomenon - atleast on the scale recently observed in AP. A better understanding is needed, therefore, of why it is that the incidence of suicides has increased dramatically. It could, for example, be associated with the scale of the indebtedness, or with the relationship between the smallholder and the moneylender. *We recommend, therefore, that a study be undertaken of these issues that examines the experiences of the groundnut and hybrid cotton producers, and perhaps compares these with those of other SMFs involved in cash crop production who have not (yet) experienced similar problems.*

1.3.3 Maximising opportunities presented by market liberalisation and globalisation

Market liberalisation and globalisation have had positive effects as well as negative ones. Free trade in some agricultural products could also benefit SMFs in India, either by increasing the profitability of current activities (e.g. through higher output prices), or by providing new opportunities. An example of the latter is floriculture, which has become established in parts of Karnataka. Better access to export markets could benefit smallholders, commodities that are expected to experience a growth in international demand during the next 20 years include: fresh horticultural produce, cocoa, livestock products, fish, animal feeds, oils and fats (Greenhalgh and Kleih, 2000). Of these commodities, ones of particular relevance in semi-arid India include animal feeds and livestock products (in particular, leather and meat).

Sorghum is a potentially important raw material for animal feeds, which could represent an alternative market to compensate for the reduced consumption of sorghum by humans (Kleih et al., 2000). In the case of leather, India has "failed to exploit the substantial potential for marketing its leather goods abroad" (Fisher et al., 1997). There is also potential for increasing meat production from small ruminants (Naidu et al., undated) and the amount of meat exported (Rathore, 1993). Research into the opportunities presented by globalisation could identify relevant commodities and develop and propose strategies that would enable the potential benefits to be realised.

1.3.4 The impact of seasonal migration

Seasonal labour migration is a common and growing phenomenon in many parts of semi-arid India (sections E2.2 and E6.5). Two livelihood groups are involved: (a) landless labourers; and (b) small and marginal farmers, to whose livelihoods agriculture is making a declining contribution. In the case of the latter, our survey found that in Udaipur it is mainly men who migrate, the women staying behind at the farm.

Impact on Women's Labour

Men belonging to SMF households, who migrate to obtain casual wage labour, tend to remain in their village for the peak agricultural operations of the kharif season, and then migrate. Nevertheless, seasonal migration by male family members is bound to have some impact on crop production, and on women's work load. Furthermore, in other groups (e.g. livestock specialists, men involved in semi-skilled work) men sometimes migrate during the kharif season too, and recent research has shown that this can represent a major additional burden for women as far as crop production is concerned (Vardhan, 2000). This issue merits further investigation to see whether women are facing any difficult labour peaks during the period when their husbands are away.

Male seasonal migration may also require women to spend more time looking after the household's animals, which may be a problem, particularly where cattle are concerned.

Impact on Women's Financial Position and Vulnerability

Men's absence on seasonal labour migration could change the intra-household dynamics of financial decision-making, and increase women's vulnerability to shocks. For example, women may have less influence over what their husbands do with their income, and may have less access to it. Remittances could be infrequent and irregular, making financial planning difficult for them, and making them more vulnerable at certain times. As a result, they might have to rely more on their own ability to generate income. *We recommend that research be undertaken on this topic, about which little is known at present.*

Income and Investment

Another important issue is the impact of seasonal migration on farm management and inputs to the farm, in the form of both cash and labour. To what extent are remittances invested in agriculture? (In Box E.3 we suggested that the answer was very little, but this was based on one village case study.) What effect does prolonged absence from the farm have on farm maintenance? There seems to have been very little research on this subject in India, and given the increasingly pervasive nature of seasonal migration by SMFs there is a strong case for improving understanding in this area.

Impact on Men

Seasonal migration for manual labour may also be having significant impacts on men. It appears to be associated with poor living conditions, including poor water and sanitation facilities. Migrants' work situations may also leave a lot to be desired: they may be in a weak bargaining position, and their illiteracy may make them prone to exploitation by employers. *These and other potential impacts on men need to be investigated systematically.*

1.3.5 Improving water availability, management and use

Water Harvesting Technologies

Technologies such as checkdams, have a role to play in combatting falling water tables. One issue, however, is whether (a) they result in a substantial increase in total benefits; or whether (b) their main effect is to redistribute water in favour of upstream communities at the expense of others downstream. The effect they have depends to a large extent on the amount of 'wasted' runoff that can be harvested in the catchment.

There is a widespread belief that annual runoff in semi-arid India is 30-40 percent of annual rainfall, whereas the reality is that in large areas it is less than five percent (KAWAD, 2001). However, even in the latter situation, if checkdams constructed along a river were to reduce the pace at which the water flows, downstream users might also benefit, in terms of: (a) reduced flooding in the rainy season; and (b) increased water availability in the summer season.

In south India, including Anantapur district, surface storage tanks traditionally played a major role in water conservation and groundwater recharge, and were used in irrigation. Their use has declined during the last 150 years or so, and under present conditions of intensive land use they may require too much space to be viable (Bhaskara Rao, 1998). However, there is potential for converting them into percolation tanks, which can be deeper and have a smaller surface area (ibid).

The more efficient use of water (e.g. through drip irrigation) can also help to put water use on a more sustainable footing. For example, flood irrigation (as practised by the tribals in Udaipur and other parts of south Rajasthan, north-east Gujarat etc.) can be inefficient, but alternatives, such as drip irrigation, are available.

Limits on the potential contribution of supply-side interventions mean that demand management should be a major component of any water resources strategy, yet it has been generally neglected until now. Collective action by users to manage demand is one possible form of intervention. It would involve, for example, users agreeing to restrictions on additional or deeper tubewells, and on crops having high water requirements (e.g. sugarcane). An interesting example comes from the work of Tarun Bharat Singh (TBS), an NGO working in Rajasthan's Alwar district. TBS constructed about 350 water harvesting structures on the Arvari rivulet, a tributary of the Yamuna, and subsequently formed an informal organisation with the people of the 70 villages affected, called the "Arvari Parliament". The Parliament has resolved, among other things, not to allow any tubewells in the 70 villages. SOPPECOM, an NGO working in Pune district, Maharashtra, has also been working on the creation of village institutions to regulate water use.

The scale of the problem is so great that what is needed is a comprehensive package of measures. Policies and institutions are fundamentally important. There are limits to what can be achieved through voluntary demand management, as the biggest users tend to be the most powerful and are likely to resist any form of restraint. Other important measures include reform of electricity charges and tariffs, so that farmers who abstract large quantities pay higher rates. More effective state regulation of water abstraction by major users is also needed, including controls on the sinking or deepening of borewells.

1.3.6 Animal husbandry

Since forage availability tends to act as a constraint on animal numbers, it is important to maximise the net benefits of animal production for a given number of animals. Three important ways of achieving this are through: (a) improved local breeds; (b) improved health care and disease management; and (c) improved marketing systems.

Improved Local Breeds

A large proportion of India's livestock, particularly among the poorer groups, consists of non-descript animals, whose performance tends to be mediocre. There is substantial scope, therefore, for improving performance through the promotion of improved breeds. (There is a parallel here with improved crop varieties.) The AP government has been promoting improved breeds of sheep. Research into people's preferences and criteria will provide a sound basis for identifying superior breeds that meet people's requirements, and do so more effectively than non-descript animals.

Health Care

Disease is one of the most important constraints on livestock productivity in India, and can be a major cause of mortality. The government's livestock services focus on this, but they primarily target large ruminants, and they tend not to reach poor livestock-keepers, especially women

(Matthewman and Ashley, 1996). There is a need, therefore, for trained para-vets, and for the identification of technologies that can be obtained and applied locally, and require only limited expenditure. There is, of course, some indigenous ethnoveterinary knowledge, but this tends to be limited to certain individuals and groups. There is a strong need for various kinds of ethnoveterinary research. For example, the "validation of ethnoveterinary medicines in non-laboratory animals ... needs to be greatly expanded"; and until now there has been a lack of "credible formal studies that compare the costs and benefits of choosing ethnoveterinary alternatives over conventional ones" (McCorkle et al., 1999).

Marketing of Smallstock

This can be improved if the owner's short-term cash needs can be met by low-cost credit, for example through a loan from a self-help group. The owner is then in a better position to market the animal, as (s)he can sell the animal when prices are high, and when (s)he is less desperate to sell it. There have been a few interventions in Rajasthan to form SHGs of goat keepers (e.g. by BAIF) or sheep owners (e.g. by M.R. Morarka Foundation), with a view to improving marketing. The animals are sold by the SHG on behalf of its members, and weighing scales are sometimes made available to the SHG: both of these factors help members to obtain higher prices.

Share-rearing

Beck noted that the subject of share-rearing was under-researched and had only been commented on in passing in studies that mention it (Beck, 1994). That was in 1994, but we believe that it remains the case now. There is evidence that it is a widespread practice in India, and it may be "one of a number of unrecognised and semi-discovered systems of village resource redistribution which exist and from which the poor gain benefit" (ibid). Beck argues that state planners involved in IRDP, or other government schemes intended to benefit the poor, should take account of indigenous systems "before intervening in the rural economy with grand development programmes". He points out that Proshika, a major NGO in Bangladesh, has adapted the share-rearing system in its development programmes by making the terms more favourable to the rearer. *Systematic research is needed into indigenous share-rearing systems in India, with a view to developing more effective pro-poor and pro-women livestock interventions that build on these systems.*

1.3.7 Land-based common pool resources

Most of our recommendations on CPRs are concerned with institutional arrangements for their management and use. NTFPs from CPRs are discussed separately in the next section.

Poor or non-existent management of common pool resources has been a key factor in their degradation and erosion. Widespread encroachment of CPRs ensures that there will be some form of conflict if an attempt is made to introduce some form of rehabilitation and more effective management. Development initiatives of this nature have had mixed results, with management frequently breaking down when, or even before, the development agency withdraws. As the boundaries of jurisdiction over land are not properly and justly defined, neither the state nor the people feel responsible for its management.

Management Systems and Use Rules

Decisions about management systems and use rules may be dominated by better-off groups and/or by external agencies, and may not reflect the priorities of poor and weaker groups. Such decisions can affect the nature of the benefits derived from the resource (e.g. forest or pasture land); and different groups within a community may prefer different types of benefits. It is important, therefore, that the poorer groups (including women) are effectively represented on management committees, and that development agencies take account of their needs at the start of any intervention.

Given that CPRs tend to be relatively important to poorer groups, whose privately owned land is small or non-existent, there is a case for creating rules and arrangements that would benefit the poor differentially. This may be politically impossible in most villages, but there are precedents that suggest it would be worth investigating, particularly in villages where a development agency has a long-term presence and some leverage on this issue. One example of a precedent is a village in Udaipur district whose management committee has allowed selective felling of fodder trees on community-managed pasture land, but only by members who lack fodder trees on their private land (Jain, 2000).

Forage Management and Use on Common Lands

Small ruminants are not well suited to stall-feeding, compared to large ruminants, and tend to require grazing. Thus, there is a need to investigate options for silvi-pasture rehabilitation and management that are more 'small-ruminant friendly', including a range of options involving regulated grazing (Conroy, 2000).

1.3.8 Collection, processing and marketing of NTFPs from common lands

In semi-arid areas with significant areas of forest remaining NTFP collection and marketing may still be an important activity; and where forests are currently regenerating under JFM or watershed development programmes, production of certain NTFPs (e.g. fruits, gums) may increase in the foreseeable future. NTFP collection tends to be particularly important for poorer groups, as the returns are generally too low to be of interest to the better-off (Saigal et al., 1996).

Policy, legal and institutional issues are also of paramount importance in relation to livelihood activities involving NTFPs. They determine how the revenue from NTFP sales is distributed to different stakeholders in the collection and marketing chain.

In three of the villages in Udaipur where the project survey was undertaken people were involved in collection of tendu leaves, which they sold for use in bidi-making.

Two of the collaborating NGOs (Astha and Prayas), which have been working in these areas for many years, have been successful in helping tribals to organise themselves more effectively to fight for and obtain substantially higher wages for this activity. One component of the strategy was the formation of a tribal co-operative society - another example of the strengthening of social capital among the poor (Prayas, Pratapgarh block profile).

Processing and Marketing of NTFPs

Local people could, in principle, increase local value addition and net revenues further by processing NTFPs and marketing. Initiatives to promote such enterprises have met with only limited success so far, but one in Karnataka has achieved significant progress. It has established units for the processing of honey, forest fruits (into jams and pickles) and herbal medicines, which are performing well financially; and management of the first two has been taken over by the local people (Capistrano, 2000).

However, in many states the legal, policy and marketing environments for NTFP collection and processing operate to the detriment of local people who want to derive an income from NTFPs. In most Indian states "the marketing environment for realising the full value from NTFPs is constrained by exploitative governmental regulations restricting sale, processing and transport" (Saxena, 1997). Often local people have no right to process NTFPs or sell them on the open market. There is a need for legal and policy changes, therefore, before local people can maximise the potential benefits from NTFPs.

As entry barriers to NTFP collection and marketing are low, there is always the possibility of new (and wealthier) entrants becoming involved, as the returns become more attractive. It is important, therefore, that there is strong policy support and well-defined and enforceable rights for poor local people who are most dependent on NTFPs (Capistrano, 2000).

I 4 Opportunities and Research Constraints in the Non-farm Sector

14.1 Asset-building and access to opportunities in the NFS

Section E5 discussed how the lack of various types of capital limits the opportunities and returns available to people in the non-farm sector, and went on to discuss asset-building strategies, giving some examples. It is clear that for the rural poor to obtain work in most of the more dynamic RNFS sub-sectors they will need to strengthen their human capital - including their literacy and vocational skills - as many of them have been doing.

In order to improve their bargaining position when dealing with employers they also need to develop their social capital, by forming informal or formal groups. The group-bargaining over work payments done by landless labourers in Anantapur is one example of this. The formation of a tribal co-operative that was described in the previous sub-section is another example. External agencies can play an important role in assisting groups in the development of social capital, as in the last example.

SHGs are proving to be a valuable form of social capital in many of the villages we surveyed, and have the potential to improve poor people's access to financial capital. NABARD has begun giving loans to SHGs, recognising them as *bonafide* borrowers.

A detailed analysis of the prospects for different RNFS sub-sectors in semi-arid India is beyond the scope of this study. Instead, we refer the reader to the book by Fisher et al., 1997. This contains much relevant information and analysis, including a comparison of three different groups of sub-sectors (those given in Table D2 of this report, i.e. high-share, high-growth and emergent) in terms of four determinants of competitive advantage: factor conditions, supporting industries, size and structure of firms and demand conditions.

14.2 Support for seasonal migrants and diversification

Seasonal labour migration is an important and well-established component of the livelihood systems of many landless labour households, and an increasing proportion of SMFs. It would be desirable, therefore, to identify and promote ways of increasing the net benefits to migrants. WIRFP has identified four potential ways of doing so (DFID, 1999) :

1. Increasing the productivity of migrant labour (i.e. raising the net earnings) by delinking it from debt, the advanced sale of labour and high interest payments.
2. Increasing migrants' legal awareness of labour legislation and rights.
3. Increasing bargaining power by strengthening migrants' social capital. As was noted earlier, the landless labourers covered by the project survey in Anantapur have developed themselves into groups, so that they are in a stronger bargaining position when negotiating with potential employers. Such groupings are absent in many parts of semi-arid India, and WIRFP is planning to support their development in its project area. *Research into how the Anantapur groups formed themselves, and how they function, could be useful to development agencies and projects (such as WIRFP) in other parts of the country.*
4. Improving conditions of employment through on or off-site arrangements for childcare, health and hygiene, education and skill training.

14.3 Labour-saving interventions for women

For women, even more than for men, their time is a major constraint on what they can do. They may find it difficult to take up income-generating opportunities in the NFS if there are heavy demands on their time from their subsistence activities, such as the fetching of water, and the collection of firewood and fodder for domestic use. We noted in Chapter G that women's drudgery has been reduced in some of their tasks (e.g. flour-milling), and further labour-saving interventions (e.g. improved water supply infrastructure) would ensure still more free time for more productive uses³⁶.

³⁶ In Gujarat, a well-known NGO, SEWA, initiated water supply improvements that saved local women up to six hours of water collection time, which they were able to invest in micro-enterprises, such as gum collection, salt panning and handicrafts (Farrington and James, 2000).

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Abbreviations

AI	All India
AH	Animal Husbandry
AP	Andhra Pradesh
BPL	Below the Poverty Line
CARG	Compound Annual Rate of Growth
CMIE	Centre for Monitoring the Indian Economy
CPR	Common Pool Resource
DFID	Department for International Development
DP	Drought-prone
GIDR	Gujarat Institute of Development Research
GSDP	Gross State Domestic Product
HYV	High Yielding Variety
IRDP	Integrated Rural Development Programme
ML	Moneylender
NABARD	National Bank for Agriculture and Rural Development
NDP	Non Drought-prone
NFS	Non Farm Sector
NR	Natural Resources
NSDP	Net State Domestic Product
NSS	National Sample Survey
NTFP	Non Timber Forest Product
OBC	Other Backward Castes
PC	Private Consumption
PDS	Public Distribution System
RNFS	Rural Non Farm Sector
SC	Scheduled Castes
SHG	Self-help Group
SLF	Sustainable Livelihoods Framework
SMFs	Small and Marginal Farmers
SPC	State-provided Commodities
SPWD	Society for Promotion of Wastelands Development
ST	Scheduled Tribes
WIRFP	Western India Rainfed Farming Project

This project sought "to provide a sounder understanding of: current livelihood and coping strategies of poor rural households in semi-arid areas of India; the factors constraining them; and the macro-level forces shaping their evolution and adaptation".

The study sought to investigate a number of key issues, including:

- *How can we explain the portfolios of livelihood activities in which different households are involved?*
- *What are the coping strategies of different groups of households, and how have they changed over time?*
- *What are the main constraints on people's choices of livelihood and coping activities?*
- *Are households more or less vulnerable now than they were?*

DFID's Natural Resources Systems Programme which funded the research on which this report is based, is primarily interested in the contribution of natural resources to sustainable livelihoods and poverty eradication, and in recommendations for further research in this area.

Mission

To Prevent, Arrest and Reverse Degradation of Life Support System, Particularly Land and Water so as to Expand Livelihood Opportunities in a Sustainable and Equitable Manner through Peoples Participation

SPWD

Society for Promotion of Wastelands Development

14 A, Vishnu Digamber Marg, New Delhi - 110002