

**A REPORT ON**  
**INCOME AND NUTRITION EFFECTS OF SHIFTS**  
**FROM SUBSISTENCE TO CASH CROPPING,**  
**ESPECIALLY ON THE POOR FARMERS,**  
**WOMEN AND CHILDREN**

**Vol. I : MAIN REPORT**

Sponsored by :

**THE INDIAN COUNCIL OF AGRICULTURAL RESEARCH**  
**NEW DELHI**

**INSTITUTE OF SOCIAL STUDIES TRUST**  
No. 57, 1st Floor, 16th Cross, Gayathri Devi Park Extension,  
Vyalikaval, Bangalore-560 003

**INDIA**

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TABLE OF CONTENTS

|   | Page Nos. |
|---|-----------|
| Chapter 1 - INTRODUCTION . . . . .  | 1 - 14    |
| Chapter 2 - METHODOLOGY . . . . .   | 15 - 31   |
| Selection of Villages and<br>Households . . . . .   | 21 - 25   |
| Some Features of the Field<br>Enquiry . . . . .   | 26 - 31   |
| Chapter 3 - THE STATE BACKGROUND . . . . .  | 32 - 55   |
| Chapter 4 - SURVEY DATA AND FINDINGS - I<br>HOUSEHOLD DETAILS AND EFFECTS OF CROP<br>SHIFTING ON FARM INCOMES . . . . . | 56 -123   |
| General Characteristic of Sample<br>Households . . . . .  | 58 - 62   |
| Land Ownership . . . . .  | 62 - 71   |
| Allocation of land to Crop varieties . . . . .  | 71 - 86   |
| Reasons for Shift in Cropping Pattern . . . . .   | 87 - 90   |
| Gross Farm Incomes: Definition . . . . .  | 90 - 93   |
| Income Effects of Shift by Categories of<br>Farmers . . . . .   | 94 -101   |
| Income Effects of Shift in Crop Varieties . . . . .   | 102-110   |
| Paid-out Farm Expenses as Ratio of Gross<br>Farm Income . . . . .   | 110-112   |
| "Margins" as Proxy for Net Farm Income. . . . .   | 112-117   |
| Regression Exercises . . . . .  | 117-123   |
| Chapter 5 SURVEY DATA AND FINDINGS - 2<br>GROSS HOUSEHOLD INCOMES AND EXPENDITURES. . . . .                             | 124-164   |
| Relative Share of other income (OIN) . . . . .  | 127-133   |
| Household Expenditure . . . . .   | 134-142   |
| Food Expenditure level . . . . .  | 142-147   |
| Food Expenditure of Marginal and Small<br>Farmers . . . . .   | 147-151   |
| Food Expenditure and Household Size . . . . .   | 151-156   |
| Retention of Foodgrains Output . . . . .  | 156-164   |
| Chapter 6 EFFECT OF CROP SHIFTS ON NUTRITION AND<br>HEALTH OF WOMEN AND CHILDREN . . . . .                              | 165-215   |
| Pattern of Food Expenditure . . . . .   | 166-171   |

|   |         |
|---|---------|
| Nutritional Requirements: NIN                               |         |
| Recommendations . . . . .                                   | 171-174 |
| Nutritional Status of Sample Households . . . . .           | 174-183 |
| Gross Income and Nutritional levels . . . . .               | 183-186 |
| Cropping Pattern Changes . . . . .                          | 186-193 |
| Regressions . . . . .                                       | 193-195 |
| Nutrition and health of Women in Poorer Families . . . . .  | 195-204 |
| Health of Women and Children of poorer households . . . . . | 204-210 |
| Health of Children . . . . .                                | 210-215 |

|           |  |         |
|-----------|--|---------|
| CHAPTER 7 | CONCLUSIONS & RECOMMENDATIONS . . . . .                    | 216-246 |
|           | Main conclusions: Extent of shift . . . . .                | 217-221 |
|           | Effect of shift on Gross Farm Income . . . . .             | 221-224 |
|           | Household Incomes & Expenditures . . . . .                 | 225-228 |
|           | Food Expenditure levels . . . . .                          | 228-229 |
|           | Marginal and Small Farmers . . . . .                       | 229-230 |
|           | Retention of Foodgrains Output . . . . .                   | 230-232 |
|           | Crop Shifts and nutrition of poor families                 | 232-233 |
|           | Nutritional Status . . . . .                               | 233-237 |
|           | Nutrition and health of women in poorer families . . . . . | 237-238 |
|           | Health of Women & Children . . . . .                       | 238-241 |
|           | Recommendations . . . . .                                  | 241-246 |

Appendices:

1. Proposal submitted to ICAR
2. Questionnaire
3. Regressions
4. Bibliographic references

## LIST OF TABLES

Page Nos.

|                |  |    |
|----------------|--|----|
| 1) Table 2.1   | : Agricultural Zones of Karnataka Spread over Districts and Taluks . . . . .                                       | 16 |
| 2) Table 2.2   | : Districts and Taluks selected for choice of Households for Field Study . . . . .                                 | 20 |
| 3) Table 2.3   | : Villages-wise number of Households covered in the Stratified Sample . . . . .                                    | 24 |
| 4) Table 3.1   | : Net Area Sown and Area Irrigation for Selected Years . . . . .   | 34 |
| 5) Table 3.2   | : District - wise Area irrigated by wells and borewells 1990-91 . . . . .  | 35 |
| 6) Table 3.3   | : District-wise data on Average Area Sown and Area under Food Crops - 1980-1981 and 1989-1990 . . . . .            | 36 |
| 7) Table 3.4   | : Foodgrains production in Karnataka 1980-81 to 1991-92 . . . . .  | 40 |
| 8) Table 3.5   | : Comparative Growth Rates in Crops Production: All-India and Karnataka 1979-80 to 1988-89 (percentages) . . . . . | 42 |
| 9) Table 3.6   | : Number of operational holdings and operated area by size group of holdings: Karnataka . . . . .                  | 46 |
| 10) Table 3.7  | : Position of Selected Districts in the year 1990-91 . . . . .   | 49 |
| 11) Table 3.7A | : Main rural features 1990-91. . . . .   | 50 |
| 12) Table 3.7B | : Availability of Public Amenities in the selected districts 1990-91 . . . . .                                     | 50 |
| 13) Table 3.8  | : Main Agricultural Characteristics-Selected Districts 1990-91 . . . . .   | 52 |
| 14) Table 4.1  | : Household size and related characteristics: District-wise comparison . . . . .                                   | 58 |
| 15) Table 4.2  | : Size-distribution of sample households . . . . .   | 60 |
| 16) Table 4.3  | : Household composition Male & Female Adults and Children . . . . .  | 61 |



|                  |   |    |
|------------------|---|----|
| 17) Table 4.4.1  | : District-wise distribution of households by size of land owned (Before Shift)                                 | 65 |
| 18) Table 4.4.2  | : District-wise distribution of households by size of land owned (After Shift)                                  | 65 |
| 19) Table 4.5.1  | : Proportion of wet land Owned to Total land Owned (Before Shift)   | 69 |
| 20) Table 4.5.2  | : proportion of wet land Owned to Total land Owned (After Shift)  | 69 |
| 21) Table 4.6.1  | : Owned & Cultivated land Holdings (Before Shift)   | 71 |
| 22) Table 4.6.2  | : Owned and Cultivated land Holdings (After Shift)  | 71 |
| 23) Table 4.7.0  | : Allocation of owned land among crop categories; Household distribution: After shift (AS)                      | 76 |
| 24) Table 4.7.1  | : Allocation of Total Land owned among crop categories by Marginal Farmer Households (Holdings Upto 2.5 Acres)  | 77 |
| 25) Table 4.7.2  | : Allocation of Total Land owned among crop categories by Marginal Farmer Households (Holdings 2.51 to 5 Acres) | 77 |
| 26) Table 4.7.3  | : Allocation of Total Land owned among crop categories by Marginal Farmer Households (Holdings Above 5 Acres)   | 78 |
| 27) Table 4.8.1  | : Households Cultivating Food grains: Marginal and Small Farmers (upto 5 acres) (BS & AS)                       | 84 |
| 28) Table 4.8.2  | : Households Cultivating Food grains: Medium & Large Farmers (Above 5 acres) (BS & AS)                          | 85 |
| 29) Table 4.9    | : Reasons for Change in Cropping Pattern  | 88 |
| 30) Table 4.10   | : Gross Farm Income by Income range: Household Distribution By Categories of Households                         | 94 |
| 31) Table 4.11.1 | : Distribution of Households by Gross Farm Income (Marginal Farmer Households) (Before Shift & After Shift)     | 97 |
| 32) Table 4.11.2 | : Distribution of Households by Gross Farm Income (Small Farmer Households) (Before Shift & After Shift)        | 98 |

|     |               |  |     |
|-----|---------------|--|-----|
| 33) | Table 4.11.3: | Distribution of Households by Gross Farm Income (Medium to Large Farmer Households) (Before Shift & After Shift) . . . . .                                 | 99  |
| 34) | Table 4.12    | : Average Gross Farm Incomes Before and After Shift : District-wise (In Current Prices) & (In Constant "AS" Prices) . . . . .                              | 101 |
| 35) | Table 4.13    | : Gross Farm Income by Income Ranges:Household Distribution by Type of Crop Grown (For All Districts) (In Current Prices & Constant "AS" Prices) . . . . . | 104 |
| 36) | Table 4.14    | : Distribution of Households according to Proportionate Change in Land Under Commercial Crops and in Income From Commercial Crops . . . . .                | 106 |
| 37) | Table 4.15    | : Proportion of Paid-out Farm Expenditure to Farm Income : Distribution of Households - (All Districts) . . . . .  | 111 |
| 38) | Table 4.16    | : Average Excess of Gross Farm Income Over Paid out Farm Expenditures:After Shift : By Categories of Farmer Households (Current Prices) . . . . .          | 113 |
| 39) | Table 5.1     | : District-wise Average Land Owned & Average Incomes (Rs.) . . . . .   | 128 |
| 40) | Table 5.2     | : Average Land Owned & Average Incomes : All Districts (Rs.) . . . . .   | 129 |
| 41) | Table 5.3     | : Proportion of Other Income (OIN) to Gross Income (GRIN) By Farmer Categories:District-wise (Per cent)  |     |
| 42) | Table 5.4     | : Marginal Farmers : Household Distribution - Gross Farm Income (FIN) and Gross Household Income (GRIN) :Comparative Position . . . . .                    | 132 |
| 43) | Table 5.5     | : Frequency Distribution of Households by Income Ranges : Total Sample of Marginal Farmers and Small Farmers - GRIN & FIN (Households) . . . . .           | 133 |
| 44) | Table 5.6     | : Distribution of Households according to Household Expenditure (HHE) . . . . .  | 135 |
| 45) | Table 5.7     | : Proportion of HHE to GRIN : by Income Ranges. . . . .  | 136 |
| 46) | Table 5.8     | : Proportion of HHE to GRIN : by Categories of Households . . . . .  | 137 |

|     |             |  |     |
|-----|-------------|--|-----|
| 47) | Table 5.9   | : Average Gross Income & Expenditures by Categories of Farmers (Rs.) . . . . .   | 140 |
| 48) | Table 5.10  | : Distribution of Households by levels of Annual Food Expenditures:District-wise (Rs.) . . . . .   | 143 |
| 49) | Table 5.11  | : Distribution of Households according to Proportion of FEX to HHE by Gross Income(Rs:). . . . .   | 145 |
| 50) | Table 5.12  | : Distribution of Households : Proportion of FEX to HHE by Household size . . . . .  | 147 |
| 51) | Table 5.13  | : Distribution of Households according to Food Expenditure by Categories of Households . . . . .   | 148 |
| 52) | Table 5.14  | : Average Gross Income & Average Food Expenditure District-wise : Categories of Households (Rs.) . . . . .   | 149 |
| 53) | Table 5.15  | : Distribution of Households by Total Food Expenditure and Household size:All Districts. . . . .   | 152 |
| 54) | Table 5.16  | : Average Size, Income Level and Food Expenditure of Marginal Farmer Households : District-wise . . . . .  | 154 |
| 55) | Table 5.17  | : Proportion of Foodgrains Output Retained : By Categories of Households All Districts . . . . .   | 158 |
| 56) | Table 5.18  | : Proportion of Households Retaining over 50 Percent to Total Households Retaining Any Part of Output : District-wise and Category-wise. . . . .             | 160 |
| 57) | Table 5.19  | : Relative Proportion of Households with 5 or More members and Households Retaining Over 50% of Output : By Category of Households : All Districts . . . . . | 162 |
| 58) | Table 6.1.1 | : Proportion of Expenditure on Food Items to Total Food Expenditure (Marginal Farmers) (Before Shift & After Shift) . . . . .                                | 167 |
| 59) | Table 6.1.2 | : Proportion of Expenditure on Food Items to Total Food Expenditure (Small Farmers) (Before Shift & After Shift). . . . .                                    | 168 |
| 60) | Table 6.1.3 | : Proportion of Expenditure on Food Items to Total Food Expenditure (Large Farmers) (Before Shift & After Shift). . . . .                                    | 169 |

|     |            |  |     |
|-----|------------|--|-----|
| 61) | Table 6.2  | : Daily Per Capita Intake of Principal Nutrients: Household Distribution, Farmer Category-wise (No. of Households) . . . . .                               | 176 |
| 62) | Table 6.3  | : Per Capita Nutritional Status of Sample Households : District-wise Averages (Marginal Farmers) & (Small Farmers) . . . . .                               | 179 |
| 63) | Table 6.4  | : Daily Per Capita Intake of Principal Nutrients according to Gross Income and Gross Expenditure of Household After Shift: All districts . . . . .         | 184 |
| 64) | Table 6.5  | : Daily Per Capita Intake of Principal Nutrients Household Distribution According to Cropping Pattern : Before & After Shift (No. of Households) . . . . . | 187 |
| 65) | Table 6.6  | : Daily Per Capita Intake of Principal Nutrients according to Proportion of Own Output Retained : All Districts (No. of Households) . . . . .              | 191 |
| 66) | Table 6.7  | : Per Capita Intake of Principal Nutrients of Households . . . . .   | 197 |
| 67) | Table 6.8  | : Comparative Levels of Principal Nutrients for Women and Children : After Shift . . . . .   | 201 |
| 68) | Table 6.9  | : Morbidity among Adult Women of Sample Households . . . . .   | 208 |
| 69) | Table 6.10 | : Protective Foods Given to Children . . . . .   | 212 |
| 70) | Table 6.11 | : Immunization of Children below 5 years of Age : All Districts . . . . .  | 215 |

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

## CHAPTER I

### INTRODUCTION

The proposal submitted by the Institute of Social Studies Trust (ISST), Bangalore to the Indian Council of Agricultural Research (ICAR) in August, 1987 aimed at conducting in the Karnataka State a case study of the "Income and Nutrition Effects of Shifts from Subsistence to Cash Cropping, specially on the poor farmers, women and children". The study which involved the collection of both secondary data from available sources and of primary data from a sample survey of randomly selected households was to be completed in about 36 months from the starting date. Following the approval of the proposal by the ICAR, regular work of the project commenced in October 1989 with the end of September 1992 as the target date for submission of the report to ICAR.

Preliminary work on the survey such as preparing a detailed outline of the different aspects of the study as well as their time profiles commenced on schedule in September 1989. The plan was to undertake initially the collection and tabulation of secondary data relating to the agricultural situation in Karnataka in terms of area under cultivation, irrigated and non-irrigated areas, types of irrigation facilities, size-distribution of holdings, principal agricultural crops (field as well as tree crops), agro-climatic regions, tractors and other agricultural implements in use, market facilities,

banking and financing agencies, fertilizer consumption, production of different crops, costs and prices of agricultural inputs and outputs etc. Along with this, the framing of a questionnaire covering the principal items of enquiry at the micro-level was undertaken. A pilot survey of 15 households in Lakkur and Hoskere villages was conducted in Kolar and Mandya districts respectively to test the adequacy and consistency of the draft questionnaire as well as to prepare a detailed set of instructions on the interview procedures to be followed in the field study by investigators. The task of identifying the villages for the field study was taken up in consultation with the Karnataka State authorities, to ensure that the sample villages presented a fair coverage of the divers cropping patterns in the State. The procedure adopted in this regard as well as the methodology utilised for selection of households and such other details are explained later (Chapter - II). The field survey was in two rounds, the first of which was from August 1990 to December 1990. A second round of visits to the same households was undertaken in the period November 1991 to January 1992. The subsequent period has been occupied with data verification, computer entry, derivation of primary as well as secondary tables and writing of the report. For a variety of reasons some of which were unavoidable, both field collection of data and the subsequent

analysis have taken somewhat longer than was anticipated at the start, which we regret.

This report is based essentially on the quantitative and qualitative information gathered during the field studies. The secondary data which relate to state or district level information are used whenever necessary as counter checks on orders of magnitude, that is to say to judge whether the field data are generally consistent with comparable macro-data for the state or district as shown in official sources; and when there are deviations, to track the reasons for them.

The causal chain from shift in cropping pattern to the health and nutrition status of the rural poor, is long and complex and has presented the team with both methodological and measurement problems, not all of which have been capable of resolution. We discuss this in some detail below and it is only necessary to mention at this stage that the inter-relationships derived from the data collected for this limited sample should be used with caution. While very considerable care has been taken to cover the different agro-climatic regions of the Karnataka State, it would not, for instance, be correct to blow-up the field data for state level estimates of any kind, as the sample used is not fully random. Allowing for such limitations the study has revealed in various ways (some of which could be



relevant for formulating agricultural, health or poverty-alleviation programmes) linkages between operational variables and objectives which deserve attention. The shifts from subsistence to commercial farming in Karnataka have for instance benefited the agricultural households in general. But their impact on the income, consumption, food security, health and nutrition of different strata of farming households seem to be different. Supporting data for this observation and its ramifications are set out in the subsequent chapters. It is hoped that such indicative conclusions will be of some help in defining further research studies more precisely as well as in policy consideration.

## II

The specific objectives of the study as set out in the ISST proposal and approved by ICAR are as follows:

1. To examine, describe and measure the impact on health and nutrition status of farmers who have shifted from subsistence and semi-subsistence farming to cash cropping, especially on the poor women and children.
2. To examine, describe and measure any other related changes brought about by the shift and
3. To develop an innovative methodology for its study, documentation and analysis.

It is well-known that because of changes in the economic and technological environment of agriculture, especially after independence, the markets for all agricultural crops have grown in size and become accessible to farmers of all sizes. These changes have been a consequence partly of autonomous developments in the economic and technological spheres in India as well as outside, and partly of Government policies undertaken with the intention of improving agricultural productivity and raising the level of agricultural incomes. In virtually all States, improvements in transport, market and financing facilities have resulted in the use of new technologies and replacement of production for own consumption by production for sale on the market in respect of virtually all crops. This is true of Karnataka also. The exercise of this choice is sometimes in the form of a shift in technology to obtain better yields of the food crops traditionally grown by households; sometimes from one kind of food crop to other, more easily marketed food crops; sometimes to a non-food crop of high marketable value; or finally, to a combination of all three. Exactly why a household exercises one or the other of these options is a matter for inquiry at the micro-level.

In general the exercise of this choice by the farming household is based on expectations of a larger volume of

output and of a higher income. These expectations may be generated by a multiplicity of causes - such as the availability of new irrigation facilities, promotion policies of government to stimulate agricultural production, better information about the use of inputs available to farmers, adoption of new varieties of seeds or new methods of cultivation by other farmers in the region, setting up of regulated markets or processing facilities in the locality and so on. While it would be difficult to decide a priori which of these elements have been dominant, each or some limited set of these factors have been instrument variables in some part of each state. This is related to the variety of agro-climatic regions in each state, which enhances the technical suitability of some crops, or some modes of production for each such region, given the land-ownership and labour situation in the area. We have not examined these relationships in any great detail in this Report, as they lie outside the scope of the approved project. But we have, to the extent necessary, made use of the available secondary data on these broader aspects of agricultural change in Karnataka in designing the field study and conducting the interviews with households.

The main question on which we have focussed in this inquiry is whether and in what way the shift from one cropping pattern to another has affected the food

security of the household, and thereby the health and nutrition of women and children in these households. As mentioned earlier, the driving factor for the shift is the expectation of a higher income, in monetary and/or real terms. By definition, production for sale implies that the objective of the activity is maximisation of sales proceeds, which is palpably a monetary objective. This shift from subsistence to commercial farming thus involves the replacement of the 'real income' objective in part or wholly by a "money income" objective. However the household will also be incurring all the time money expenditures of various sorts, both for production and marketing. Since these will have been incurred in the process of securing gross income, it becomes necessary to derive the 'net income' of the household from its farming activities; and to examine how the 'net income' varies before coming to any judgment on the effect of shifts in the cropping pattern. Both the conceptual and measurement difficulties in respect of 'net income' are, as is generally appreciated, formidable. While we have sought to obtain the necessary information to work out the hypothesis in terms of 'net income', we have had difficulties in reconciling these derived magnitudes with the responses given by the households about their consumption expenditures, savings and borrowings. We have therefore used the gross income data provided

directly by the respondents, whenever income-expenditure comparisons are needed.

Details on the methodology of the field survey are set out in the next chapter. Prior to that, the underlying relationships on which the field survey methods and analysis of data are based may be mentioned briefly.

As observed earlier, the shifts in cropping pattern are motivated by a desire to raise the annual income obtained by the household from farming operations. This increase could be partly in real terms, in the form of a larger volume of food products retained for the household's use and partly in money terms, or wholly in money terms. When the household has used all its land for the cultivation of non-food crops like cotton, mulberry or linseed, the farm income earned will obviously be wholly in money terms. In all other cases, whatever portion of the crop is retained for home use has to be converted into money terms on the basis of an appropriate sale price for the commodity to derive the gross income.

Given the increase in household income, an analysis of the expenditure pattern will reveal how the higher income has been distributed between consumption and other uses of income (saving, repayment of loans, etc). Consumption expenditure is further broken down into expenditure on food and other durable or non-durable

consumer goods and services. The first set of relationships to be established are therefore the following:

$$Y = f (L_A; L_Q, M, P_N) + O \quad (1.1)$$

$$C = f (Y, H_S, S_N) \quad (1.2)$$

$$C_F = f (C, F_M, P_F) \quad (1.3)$$

Where  $Y$  = gross household income,  $L_A$  = Land area owned (cultivated),  $L_Q$  = quality of  $L_A$ ,  $M$  = pattern of crop output,  $P_N$  = sale prices of farm products,  $O$  = non-farm income,  $C$  = total consumption expenditure,  $H_S$  = size of household,  $S_N$  = net saving (or dissaving),  $C_F$  = total food expenditure,  $F_M$  = quality and kinds of food consumed, and  $P_F$  = prices of food items consumed.

The presumption in this set of relationships is that a part of the increased income will show up as an increase in the food expenditure of the household and contribute directly to an increase in its food security as well as health and nutrition levels. However, for a proper assessment of such change, one should know the situation of the household, before the shift in cropping pattern, and compare it with the situation after the shift. Also, the link between income and expenditure involves not only leads and lags attributable to custom or inertia but also disparate changes depending on the facilities available to the household or its motivations

to borrow. The ratios between total expenditure and food consumption in real terms are also changeable. Not all of these elements can be captured in equations worked out in the course of surveys with a short time-span, except to the limited extent of "remembered figures" of respondents. Allowance has however to be made for the lack of precision in such remembered information.

The second set of relationships is even more complicated. Increased consumption expenditure on food items may or may not mean a better nutritional intake for all members of the family. This depends not only on the size of the food basket but on its composition, intra-family distribution and the work-pattern of members of the household. While information on the volume and pattern of food items consumed can be obtained through interviews and other ways, data on intra-family distribution and the work-pattern of members of the household require participatory observation or self-monitoring by households stretched over a considerable period. For the present, however, it has been assumed that the nutritional level of the household is a simple function of the size of the food basket and its composition, and the relative nutritional values of the items in the basket. That is to say

$$N_H = f (F_M, N_M) \quad (1.4)$$

Where  $N_H$  = nutritional level of the household and  $N_M$  = nutritional value of the items per unit of consumption. From this household aggregate, average availability of nutrition per capita within the family is assessed, as a first step to comparing the situation after the shift with the one before. Further refinements are based essentially on a rough and ready allocation to women and children, in terms of "adult equivalence".

Assuming an increase in nutritional intake the results should show up directly in the physical appearance and capacity of the members of the household. It should also mean a decline in morbidity and mortality and in better work-performance. For significant evidence of improved physical growth and work-capacity, it is necessary to maintain over a period an anthropometric record of the men, women and children of the family. This has to be combined with other health data in drawing firm conclusions on the nutritional impact. Largely because of budgetary and time constraints, it has not been possible to collect these vital statistics for each member of the sample households in full detail. However, fairly extensive health data for women and children have been put together.

The main reasons for examining health data is that morbidity and mortality in the household are largely determined by nutritional intake. This is admittedly



not a unique relationship; other variables - such as the activity-pattern of the household, environmental factors, public health and medical facilities available to the household - have a bearing on it. But the manner and extent to which these affect an individual's health are even less susceptible to precise analysis. Assuming as a first approximation that common public health programmes such as drinking water and sanitary protection, malaria eradication, immunisation and nutrition and hygiene counselling are available in equal measure to all families, the impact of the shift of incomes of different households can be linked to the health record of households, at either the household aggregate or per capita levels. Care has however been taken in the interpretation of these averages wherever there are doubts about equal accessibility to common facilities, due to social or economic constraints.

Though the project included two rounds of visits to the sample households, the interval between them was not long enough to permit any definite observations on changes in different magnitudes over time. Whenever these have occurred in a clearly identifiable fashion within the intervening period, they have been taken into account. Apart from this, because the number of observations over time are limited, no trend analysis has been attempted. However, cross-household analysis

has been undertaken systematically, bearing in mind the size, gross income and cropping pattern variations. Virtually all of the conclusions drawn from the survey data are based on such inter-household comparisons in each district and on some comparison between the six districts covered in the project. While no measurements of change in nutrition levels or the impact on health status applicable to the state as a whole have been generated in the study, these comparisons indicate the general direction of the impact of the shift in cropping pattern; and on this basis, certain judgments on the approach to food security programmes have been attempted.

This report is structured as follows; the next chapter (chapter -II) is devoted to a discussion of the methodology of the field survey. In chapter - III the principal elements of the Karnataka State's agricultural background are described. A detailed discussion of the data generated by the field survey is taken up in chapters - IV to VI. The final chapter of this volume, chapter - VII contains our conclusions and recommendations. This is followed by a few appendices on the ISST's original proposal to ICAR; the questionnaire used for the field survey; details of the regression equations cited in chapters IV & VI and a list of official and non-official sources of secondary data as well as of technical studies utilised in the course of

the survey. Detailed Statements on land utilisation, gross farm incomes, gross household incomes and expenditures relating to the districts covered in the sample survey are given separately in Volume-II.

## CHAPTER II

### METHODOLOGY

With twenty districts spread over 191791 sq.kms and containing, according to the 1991 Census, a population of 44.81 million, Karnataka is a large state. Full coverage of farm households in the state for a study of the complex linkages between size of land holding, cropping pattern changes, income and expenditures, food security and nutrition, health and welfare of women and children was obviously not a task that could be undertaken within the confines of the ICAR project. It was therefore decided to limit the detailed inquiry to a sample which broadly reflected the diverse characteristics of the agrarian situation in Karnataka.

In pursuance of this, state-and district-wise data pertaining to the land-use pattern and agricultural characteristics were put together, in consultation with the Karnataka Government's Directorate of Agriculture, Planning Department, Census authorities, and District Officers in-charge of agriculture, planning and statistics. Karnataka has been divided into ten agricultural zones according to the type of soil, fertility, topography, and rainfall as follows:

**Table 2.1 Agricultural Zones of Karnataka -  
Spread over Districts and Taluks**

| Sl. No. | Name of the Zone              | Type of the Soil  | Geographical Coverage of the Zone                   |   | Rainfall Range in MMs |
|---------|-------------------------------|---|---|---|-----------------------|
|         |                               |   | District  | Taluks  |                       |
| 1.      | North Eastern transition Zone | Shallow to medium black clay soils in major area. Red lateritic soil in remaining areas           | Bidar<br>Gulbarga                                   | All 5 talqs.<br>2 talqs.                                      | 829.5-<br>919.0       |
|         |                               |   | Total 7 talqs.                                      |   |                       |
| 2.      | North Eastern Dry Zone        | Deep to very deep black clay soils in major areas, Shallow to medium black soils in minor pockets | Gulbarga<br>Raichur                                 | Remain-<br>ing 8 talqs.<br>3 talqs.                           | 633.2<br>806.6        |
|         |                               |   | Total 11 talqs.                                     |   |                       |
| 3.      | Northern Dry Zone             | Black Clay medium & deep in major areas and sandy loams in remaining areas                        | Raichur<br>Bijapur<br>Bellary<br>Dharwad<br>Belgaum | 6 talqs.<br>All 11 talqs.<br>8 talqs.<br>5 talqs.<br>5 talqs. | 464.5<br>785.7        |
|         |                               |   | Total 35 talqs.                                     |   |                       |
| 4.      | Central Dry Zone              | Red sandy loams in major areas shallow to deep black soil in remaining areas                      | Chitra-<br>durga<br>Hassan<br>C.Magalur<br>Tumkur   | All 9 talqs.<br>1 talq.<br>1 talq.<br>6 talqs.                | 455.5<br>717.4        |
|         |                               |   | Total 17 talqs.                                     |   |                       |
| 5.      | Eastern Dry Zone              | Red loamy soils in major areas. Clay lateritic soils in remaining areas                           | Tumkur<br>Bangalore-<br>Kolar                       | 2 talqs.<br>All 11 talqs.<br>All 11 talqs.                    | 679.1<br>888.9        |
|         |                               |   | Total 24 talqs.                                     |   |                       |
| 6.      | Southern Dry Zone             | Red sandy loams in major areas and in remaining areas, pockets of black soil                      | Mandya<br>Tumkur<br>Mysore<br>Hassan                | All 7 talqs.<br>2 talqs.<br>8 talqs.<br>2 talqs.              | 670.6<br>888.6        |
|         |                               |   | Total 19 talqs.                                     |   |                       |

| Sl. No. | Name of the Zone         | Type of the Soil   | Geographical Coverage of the Zone |             | Rainfall Range in MMs |
|---------|--------------------------|--|-----------------------------------|-------------|-----------------------|
|         |                          |  | District                          | Taluks      |                       |
| 7.      | Southern Transition Zone | Red sandy loams in major areas and in remaining areas red loamy soils          | Mysore                            | 3 tlqs.     | 611.7-                |
|         |                          |  | Hassan                            | 4 tlqs.     | 1053.9                |
|         |                          |  | C.Magalur                         | 1 tlqs.     |                       |
|         |                          |  | Shimoga                           | 5 tlqs.     |                       |
|         |                          |  | Total                             | 13 tlqs.    |                       |
| 8.      | Northern Transition Zone | Shallow to medium black clay soils & red sandy loamy soils in equal proportion | Belgaum                           | 4 tlqs.     | 619.4-                |
|         |                          |  | Dharwad                           | 10 tlqs.    | 1303.2                |
|         |                          |  | Total                             | 14 tlqs.    |                       |
| 9.      | Hilly Zone               | Red clay loamy soils in major areas  | U.Kannada                         | 6 tlqs.     | 904.4-                |
|         |                          |  | Belgaum                           | 1 tlq.      | 1303.2                |
|         |                          |  | Shimoga                           | 4 tlqs.     |                       |
|         |                          |  | C.Magalur                         | 5 tlqs.     |                       |
|         |                          |  | Dharwad                           | 2 tlqs.     |                       |
|         |                          |  | Hassan                            | 1 tlq.      |                       |
|         |                          |  | Kodagu                            | 3 tlqs.     |                       |
|         |                          |  | Total                             | 22 tlqs.    |                       |
| 10.     | Coastal Zone             | Red lateritic & coastal alluvial soils   | U.Kannada                         | 5 tlqs.     | 3010.9-               |
|         |                          |  | D.Kannada                         | All 8 tlqs. | 4694.4                |
|         |                          |  | Total                             | 13 tlqs.    |                       |

Source: Development of Agriculture in Karnataka  
Government of Karnataka, 1985-86, pp-58

As will be seen from Table 2.1, except for districts in the Hilly and Coastal zones, all others are in zones which are partly or wholly dry. However, substantial investment in medium or large irrigation projects have enabled the cultivation of wet or garden crops in several of these districts in dry zones - as, for instance in the Mandya, Raichur and Dharwad districts. In more recent years, heavy investment in tube-well irrigation by both the public and private sectors has made it possible for farmers in some of the dry districts also to benefit from a shift to irrigated crops.

Given the limited number of districts to choose from, selection at the district level had to be "judgmental" rather than random. For selecting a truly random sample, a state-wide list of farming households would have been ideal. However, such a list for a recent enough year was not made available to us from the Government of Karnataka for various reasons. A village listing was considered but not pursued because of the likelihood that a small percentage selection on a random basis from such a limited population would not have yielded a fully articulated sample of the diverse agro-climatic and other characteristics of the farming population. A larger stratified sample was a possibility; but this had to be given up because of the heavier budgeting and administrative load of covering a

sufficient number of households from each environment or stratum to facilitate size-of-holdings or income-wise comparisons. After scrutiny and preliminary check of the error factor and other implications, it was decided to select from six taluks in six different districts substantially representative of the state's agro-climatic characteristics, a sample of about 500 farming households from two villages in each district.

Information on taluk-wise agriculture and related conditions is available from the 'District Census Handbooks'. Taking this into account, six districts were selected in consultation with the Directorate of Agriculture and concerned district authorities, for selection of taluks and villages. In addition to reflecting broadly the agro-climatic variations in the state, the choice of districts has also been influenced by their different historic backgrounds and life-styles. Among the districts listed in Table 2.2 below, three (Mandya, Kolar and Chitradurga) were part of the former Mysore State, one (Dakshina kannada) belonged to the former Madras Presidency, another (Raichur) to the Hyderabad state and one (Dharwad) to the former Bombay Presidency. These disparate backgrounds have contributed in some measure to variations in education and health facilities, food habits, agricultural practices and cultural preferences of people in these areas.



**Table 2.2 : Districts and Taluks selected for choice of Households for Field Study**

| Sl No | District         | Taluk      | Principal Zone          | Other main criteria for districts/taluk selection  |
|-------|------------------|------------|-------------------------|--|
| 1.    | Raichur          | Sindhanoor | Northern, Dry Zone      | (i) assured irrigation for over 40 per cent of land in the district<br>(ii) large-scale cultivation of paddy and cotton            |
| 2.    | Chitradurga      | Challakere | Central, Dry Zone       | (i) medium irrigation facility and proximity of large market for oilseeds  |
| 3.    | Mandya           | Maddur     | Southern, Dry Zone      | (i) assured irrigation facility for a major part of district<br>(ii) large-scale cultivation of paddy and sugarcane for the market |
| 4.    | Kolar            | Malur      | Eastern, Dry zone       | (i) dry-land farming and borewell irrigation<br>(ii) large-scale cultivation of horticultural crops for the market                 |
| 5.    | Dharwad          | Kalghatgi  | Hilly, transition zone  | (i) rain-fed cultivation of food and commercial crops  |
| 6.    | Dakshina Kannada | Sullia     | Coastal, high rain fall | (i) natural irrigation from rain and rivulets<br>(ii) cultivation of plantation and horticultural crops as well as paddy           |

It will be observed from Table 2.2 that the selected taluks cover a variety of agricultural practices. Dry and wet land farming, horticulture and plantations are all in vogue in these taluks; crops raised vary from food crops such as paddy, ragi, jowar, and bajra to commercial field crops like cotton, sugarcane and

oilseeds; tree farming like mulberry, eucalyptus and coconut; garden crops such as fruits, vegetables and flowers; and plantation varieties like cashew, rubber, cocoa and arecanut. The development of irrigation and large urban markets have promoted in these taluks substitution of commercial cultivation for farming for own consumption to a greater or less extent. Despite the "judgmental" choice there is reason to believe that the sample households surveyed in these taluks constitute an adequate microcosm to study in some detail the effects of shifts in the cropping pattern on income, food consumption, nutrition and health of varying types of farming households.

#### Selection of Villages and Households

In the selection of villages extensive use has been made of village-wise records maintained at the district and taluk headquarters, as well as of information provided by several government functionaries. The ISST team has benefitted greatly from discussions with and guidance from Chief Secretaries of Zilla Parishads, Principal Agricultural Officers, Planning Officers and officers of the Sericulture and Horticulture Departments in the districts. Based on the household data contained in the Village Level Index Cards maintained by the District Statistical Officers, a sample of two villages from each taluk was selected bearing the following criteria in mind:

- (a) the number of households should be between 400 and 450, and the population (according to latest recorded figures) about 2500. This enabled the choice of villages with a certain uniformity in size, level of development and institutional facilities;
- (b) Diversity in land-use pattern and utilisation of irrigation facilities (from all sources) so as to allow for a fair distribution of households with different cropping patterns.
- (c) Nearness of the villages to taluk headquarters, and accessibility by road; this enabled the study to take into account a pre-requisite for commercial cultivation, viz, market proximity.

A complete list of farming households in each of the villages so selected and the details of land owned by individual households were procured from the village-level Agricultural Assistants. These households were grouped into three categories of farmers, viz, marginal farmers (possessing land below 1 hectare or 2.5 acres), small farmers (with land holdings between 1 and 2 hectares or 2.5 to 5.0 acres of land) and large farmers

(with land holdings in excess of 2 hectares or 5.0 acres)\* A 10% sample of households from each of these three categories was selected at random, yielding a "stratified" sample of households from each village, Except in Chikka-arasinakere in Maddur taluk and Nannivala in Challakere taluk, where some special weight is attached to scheduled caste households (because of a concentration of such households), their selections in other villages has been at random. The total of households so chosen from the six taluks came to 550, the number of households from each village varying from 42 to 47 households.

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\* This classification differs from the one followed by the Karnataka Government. They have sub divided the "big farmers" as defined here (i.e with land above 5 acres) into two categories of "medium farmers" (between 5 to 10 acres) and "large farmers" (over 10 acres). Since our objective has been to focus on the marginal and small farmers, we have confined stratification only to three categories.

**Table 2.3 : Villages-wise number of Households covered in the Stratified Sample**

| S1 No | Name of District | Name of Taluk | Villages selected  | Total farming households in sample | No of house-holds included |
|-------|------------------|---------------|--------------------|------------------------------------|----------------------------|
| 1.    | Raichur          | Sindhanoor    | Pagadadinne        | 474                                | 46                         |
| 2.    | Raichur          | Sindhanoor    | Hosahalli (K)      | 451                                | 47                         |
| 3.    | Chitradurga      | Challakere    | Dodda-ullarthi     | 485                                | 47                         |
| 4.    | Chitradurga      | Challakere    | Nannivala          | 594                                | 46                         |
| 5.    | Mandya           | Maddur        | Hosakere           | 386                                | 46                         |
| 6.    | Mandya           | Maddur        | Chikka-arasinakere | 576                                | 45                         |
| 7.    | Dharwad          | Kalaghatgi    | Gangigatti         | 406                                | 46                         |
| 8.    | Dharwad          | Kalghatgi     | Devikoppa          | 426                                | 42                         |
| 9.    | Dakshina Kannada | Sullia        | Jaloor             | 776                                | 46                         |
| 10.   | Dakshina Kannada | Sullia        | Aranthode          | 475                                | 46                         |
| 11.   | Kolar            | Malur         | Lakkur             | 518                                | 47                         |
| 12.   | Kolar            | Malur         | Kudiyanoor         | 323                                | 46                         |
| Total |                  |               |                    | 5890                               | 550                        |

The fact that except in the case of households in each stratum of farmers, the choice has been selective perhaps enhances the error when quantitative dimensions obtained from the field study are extended to a larger entity, such as the district or the state. This could probably have been minimised by working with a fully random sample of a larger number of households taken from a state-wide frame. But as mentioned earlier such a frame was not available, nor were the budgetary provisions of the ICAR project adequate enough to enable the ISST to prepare an articulated state-wide list of farming households. Given this limitation, care has been taken to make sure that the stratified sample of 550 households ultimately chosen is free from any preconceived bias. However, given the purpose of the study, viz. the relationships between shifts in cropping patterns and other variables, the choice upto the village level has been influenced by two necessary criteria- viz. that pre-conditions for exercise of choice in cropping decisions exist, and that these pre-conditions are not all uniform. This has been of help in elucidating somewhat more clearly the relationships between the size of land owned, the decisions to shift and the consequences on food security and nutrition.

### Some Features of the Field Enquiry

The body of information gathered at the household level extended all the way from basic data for household identification through demographic details to the land and other assets held by the household; present and past cropping patterns; use of fertilizers and manures; activity patterns of members of the household; disposal of farm output and food security; reasons for shift in cropping pattern; effects on gross household income and expenditure; details of expenditure on food items before and after shifts; other households expenditure, savings and indebtedness; personal habits affecting health; details regarding the health, medical care, morbidity etc., of the women and children in the family; and data on family planning, immunisation, local hospital and medical facilities. In addition, the perception of the head of the household on the benefits (or losses) of one kind or another attributable to the shifts in cropping pattern-and in particular about food security, health and family welfare-were also canvassed. The questionnaire used for the household survey is shown as Appendix II.

Given the large number of personal questions to be canvassed with each adult of the sample households, data collection at the field level turned out to be a time-consuming process. Visits to the villages had to be during slack periods of farming households- which meant

that periods of such intense activity as sowing, transplanting, weeding, irrigating or harvesting had to be avoided. Nor could all members of the family be interviewed together, or at a stretch. Each household therefore required repeated visits and on an average not more than three households a day could be covered by a team of two investigators. Since the teams visiting the villages consisted of both men and women investigators, there were a number of practical difficulties for these teams to stay continuously in the field for long periods. It was therefore necessary for the ISST to arrange the field visit to each taluk separately, thus spreading each round of the enquiry over a few months.

The field visits were undertaken in two rounds for a couple of reasons which appeared prima facie useful. It was thought worthwhile to check if there was any perceptible change in the cropping pattern and other household decisions between one agricultural season and another, because of some specific change in the environment. Secondly, since a large part of the data collected was based on what the members of the household remembered about "how much of what and for what reason", it was considered judicious to go over the same ground once again to get some idea of how good these recollections were. The desire to undertake a second visit to the same households with only a short interval was also a factor in opting for a moderate sized sample.



Data collected from the households on food consumption had to be such as to enable the calculation of per capita nutritional intake of men, women and children in the farming households. Hence details of the household's food budget at the time of enquiry included the quantities used and/or the expenditure incurred for each food item per month, presently as well as before the shifts in cultivation. Alongside, information was gathered on the household's farm output of food crops retained for home consumption and additional quantities bought from the market. While the nutritional value of the household's daily food consumption could be worked out for all the family members together, attempts to secure data on intra-family distribution were not successful. Consequently, it has not been possible to test the validity of the general view that intra-family distribution of food consumption is skewed against women and girls.

The nutritional values of food articles in terms of K.Calories of energy, grams of protein, fat and some of the mirco-nutrients have been derived from the equivalences worked out according to the Nutritive Value of Indian Foods by the National Institute of Nutrition, Hyderabad. These are then compared with the norms of daily nutritional requirements for men, women and children relative to their levels of activity as indicated by the NIN. As will be explained later these norms have been used to speculate on the possible

distortions in intra-family nutritional distribution implied in the field data. Needless to add, conclusions reached this way can hardly be definitive and care should be exercised in using them for policy purposes.

The methodology of the present study differs in several respects from the proposal originally submitted to the ICAR. That proposal was designed for a deeper analysis of the nutritional and sociological implications of a shift in cropping patterns, and required a much larger budgetary provision than was finally accepted. It was also pointed out to us by the Karnataka Government officials that a study of one taluk, however intensive, would be inadequate for a state with such diversity of agro-climatic features. The sample survey had therefore to be re-designed to suit the twin requirements of a smaller budget and greater diversity of agro-economic conditions. Hence the substitution of sample households from twelve (12) villages in six (6) districts, instead of six (6) villages from one taluk, viz., Malur.

This has had several consequences. For one thing, it altered significantly the pattern and cost of travel, accomodation for field staff, etc, associated with the field study. Except two villages selected from the Malur taluk all others were farther away from Bangalore and required the field staff to stay there for two to three weeks at a stretch. It also enlarged the size of the sample and hence the time needed for collection of data

in two different rounds. However, extending the survey to six different districts made the undertaking of any elaborate baseline study difficult.

Despite this change in sample design, and a consequent increase in the sample size, we have been able to collect much of the data indicated in the original proposal, on household characteristics, land and other assets held, income and expenditure details, food expenditure etc. (See Appendix II for details of the questionnaire used). We have also collected specific data on the health, education, work habits and other particulars regarding women and children. But for reasons already mentioned, we have not ventured on any anthropometric study of individual members of these households. Likewise, while we have enough information on inter-district or inter-household variations in food articles consumed, we have not gone into the details of the type and quality of diet of each member of each household.

Similarly, the sample survey does not throw much light on "special" or "protective" foods given to children. The responses in most cases were that whatever food was cooked for the households was given to the children also - apart from breast-feeding of infants. For one thing, most marginal or small farmer households were not aware

of the availability or importance of protective foods, for another, their incomes were not such as to enable them to buy "protective" foods from the shops.

On such questions as intra-family distribution of food, cooking methods etc., reliable data may have been obtained through the use of "self-monitoring" by respondents over a year or so. But this was clearly not possible within the available budget or trained staff. In the absence of this body of information, we have had to fall back on household averages for estimation of nutritional intake, and general health and morbidity data for judgements on nutritional deficiency. Note has also been taken in this context of other elements like public health and hospital facilities, availability of doctors and other para-medical personnel and family planning workers, as these have an important bearing on the health record of the households.

Based on the data collected for the survey, several conclusions have been derived which, though inadequate in some quantitative respects, are significant for the direction of change over time that they indicate. These offer in our judgment ground for some public policies as well as for thinking on future research programmes.

Details of the data generated by the survey and the team's analytical and policy observations on these follow.



## CHAPTER III

### THE STATE BACKGROUND

Though Karnataka is amongst the more urbanised and industrialised states of India, the 'agriculture and allied activities' sector still contributes the main part of the state's domestic product and employment. However, the rapid growth of urban population - from about 24 per cent of total in 1971 to over 30 per cent in 1991 - along with other trend - or policy - induced changes in agriculture, has had considerable impact on the pattern of land utilisation as well as on the character of agriculture in the state. New demands for agricultural commodities have come into existence; expansion of transport and communications, market and credit facilities have enabled farmers to cater to these new demands. Likewise, the production side has benefitted from extension of irrigation and rural electrification, supply of high yielding varieties of seeds and fertilizers, soil testing facilities and agricultural extension services. It is against this general back ground of the state of agriculture in Karnataka that the present study has been undertaken.

While there is overall change in the state, its scope is expectedly limited by natural, societal and technological factors. Limitations imposed by nature are particularly important for agriculture, given its total dependence on the availability of suitable land

and adequate water. As will be seen from Table 2.1, the greater part of the State lies in agro-climatically dry zones, with average annual rainfall ranging between 450 mm and 900 mm. Precipitation from the south-west monsoon, on which the kharif cultivation depends, is mostly in the coastal and hilly zones stretching north to south along the western part of the state. The plains, which are on the lee-ward side of western ghats thus receive much less of this monsoon. Even after allowing for supplemental winter rains from the east much of agriculture is limited to the cultivation of 'dry crops'.

However, with the land slope being eastwards, some areas of the dry zones have benefitted from river-flows which have been or are being, harnessed for irrigation. The main part of the irrigated tract is in the Kaveri river basin along the southern districts, and the Tungabhadra-Krishna river systems in the north. Since both these are interstate riparian systems, utilisation of river flows for irrigation and other purposes in Karnataka are subject to maxima defined by the awards of committees specially appointed for the purpose. The fact that even the permitted quantities of river-flows under these awards are yet to be utilised by the state has, however, imparted a certain urgency to public investment in major irrigation projects in these projects. Some of these projects have also been World-

Bank financed. In consequence, there has been a comparative neglect of tank-fed and bore -well irrigations. It is largely in the 1980's that these programmes have been taken up in earnest, (see table 3.1). Likewise, there has been in recent years somewhat more interest in the utilisation of research on dry-land cultivation done by ICRISAT and similar organisations.

TABLE 3.1

Net Area Sown and Area Irrigated for Selected Years

('000 hectares)

| Year    | Net Area Sown | Area Irrigated |       |       |                 |               | Total  |
|---------|---------------|----------------|-------|-------|-----------------|---------------|--------|
|         |               | Canals         | Tanks | Wells | Tube/Bore wells | other sources |        |
| 1979-80 | 10330.4       | 551.5          | 343.7 | 358.1 | -               | 134.2         | 1387.5 |
| 1980-81 | 9898.6        | 546.6          | 303.7 | 363.7 | -               | 146.8         | 1360.8 |
| 1981-82 | 10390.9       | 580.3          | 321.3 | 402.1 | -               | 167.0         | 1470.7 |
| 1982-83 | 10356.3       | 604.9          | 293.0 | 416.5 | 2.2             | 169.8         | 1486.4 |
| 1983-84 | 10605.1       | 660.9          | 316.6 | 431.3 | 4.9             | 176.6         | 1590.7 |
| 1984-85 | 10549.3       | 704.6          | 362.3 | 442.4 | 20.2            | 199.7         | 1729.2 |
| 1985-86 | 10172.2       | 734.8          | 242.0 | 439.1 | 41.8            | 217.5         | 1675.2 |
| 1986-87 | 10627.5       | 799.6          | 257.9 | 449.1 | 73.1            | 235.4         | 1815.1 |
| 1987-88 | -             | -              | -     | -     | -               | -             | -      |
| 1988-89 | 10502.0       | 845.6          | 234.1 | 512.9 | 135.0           | 274.1         | 2091.7 |
| 1989-90 | 10708.0       | 840.8          | 281.6 | 519.7 | 152.7           | 299.5         | 2094.3 |
| 1990-91 | 10381.8       | 862.1          | 239.8 | 540.1 | 173.5           | 297.6         | 2113.1 |

"Other Sources" include - Lift Irrigation and Pickups  
 (Source: Karnataka at a glance, Various issues: 1980-81 to 1991-92 Government of Karnataka, Bangalore)



While the net area sown has fluctuated narrowly around an average of about 10.6 million hectares (depending on annual rainfall) the area under irrigation has grown steadily over the year from 1,387,500 hectares in 1979-80 to 2,113,100 hectares in 1990-91, or by 52 per cent. This has come about substantially in the area irrigated by dug-wells and bore-wells, a good part of the latter being in the dry districts of the state, as may be seen in the table below.

Table 3.2

District-wise Area Irrigated by Wells and Borewells  
1990-91

| Districts       | (Hectares) |                 |
|-----------------|------------|-----------------|
|                 | Wells      | Tube/Bore wells |
| Bangalore       | 9800       | 3300            |
| Bangalore Rural | 17100      | 14100           |
| Belgaum         | 68600      | 28200           |
| Bellary         | 27400      | 13700           |
| Bidar           | 38500      | 900             |
| Bijapur         | 112200     | 4200            |
| Chickmagalur    | 2400       | 1500            |
| Chitradurga     | 34700      | 20500           |
| Dakshin Kannada | 32500      | 1300            |
| Dharward        | 18500      | 27900           |
| Gulbarga        | 35600      | 500             |
| Hassan          | 2200       | 6700            |
| Kodagu          | -          | -               |
| Kolar           | 33800      | 34300           |
| Mandya          | 7400       | 300             |
| Mysore          | 30000      | 400             |
| Raichur         | 29400      | 2300            |
| Shimoga         | 5400       | 2700            |
| Tumkur          | 29800      | 10600           |
| Uttar Kannada   | 4800       | 100             |
|                 | 540100     | 173500          |

Source: Karnataka at Glance 1991-92

For the state as a whole, it would appear that the extension of irrigation facilities has not adversely affected the area under food crops. Traditionally, the principal commercial crops have been cotton and groundnut, both of which are cultivable in the dry zones. Sugarcane has been a natural competitor to paddy in the highly irrigable areas, and there is some evidence of farmers in such areas shifting to sugarcane cultivation on a sizeable scale. But in the relatively drier districts, where additional irrigation is attributable to the acceleration of the tube-well and dug-well programmes since the mid-1980's, there has been a noticeable rise in the acreage under food crops.

Table 3.3 District-wise data on Average Area Sown and Area under Food Crops - 1980-81 and 1989-90

|                 | Net Area Sown |         | Area under Food Crops |         |
|-----------------|---------------|---------|-----------------------|---------|
|                 | 1980-81       | 1989-90 | 1980-81               | 1989-90 |
| Belgaum         | 902824        | 930000  | 493809                | 569400  |
| Bellary         | 471085        | 611000  | 270428                | 375300  |
| Bidar           | 348321        | 362000  | 306289                | 318200  |
| Bijapur         | 1168033       | 1378000 | 536472                | 848700  |
| Chickmagalur    | 252766        | 288000  | 129157                | 153400  |
| Chitradurga     | 496157        | 570000  | 338685                | 370300  |
| Dakshin Kannada | 192141        | 217000  | 159251                | 163200  |
| Gulbarga        | 1178163       | 1198000 | 755136                | 908200  |
| Kolar           | 306476        | 381000  | 94194                 | 194400  |
| Raichur         | 946986        | 956000  | 501155                | 683200  |
| Bangalore       | 392148        | 402000  | 265148                | 261200  |
| Dharwad         | 1105546       | 1053000 | 587852                | 564600  |
| Hassan          | 342007        | 371000  | 250659                | 241900  |
| Kodagu          | 140469        | 148000  | 65353                 | 47700   |
| Mandya          | 242263        | 278000  | 223486                | 197300  |
| Mysore          | 492994        | 536000  | 376821                | 353200  |
| Shimoga         | 307448        | 326000  | 281876                | 285500  |
| Tumkur          | 503636        | 589000  | 296326                | 285500  |
| Uttar Kannada   | 109142        | 114000  | 94229                 | 89400   |

Source: Karnataka at a glance Food crops include: Cereals & Pulses 1980-81 & 1990-91

Part of this increase may be a reflection of the increase in net area sown during the decade. But part of it could will be due to a deliberate choice in favour of food crops by the farmers in the changing environment. The drought years in the first half of the 1980's had probably enhanced for the farmers the importance of securing some part of their foodgrains requirement from their own lands. The availability of irrigation against this background, together with rising food prices, high yielding varieties of seeds, better knowledge of market conditions, rural electrification and improvements in dryland farming may have contributed to this sentiment. Whatever the reason, in 10 of the state's 19 districts, the area under food crops increased noticeably, and in some of these (e.g. Bijapur, Bellary, Dharwad & Gulbarga) even spectacularly.

However, the increase in the area under commercial crops - principally, sugarcane, groundnut and cotton - was even more widespread between 1980-81 and 1990-91. Only in Bijapur, Dakshina Kannada, Gulbarga, and Raichur district, there is a decline in the acreage under commercial crops, with the decline being quite marked in Bijapur (26.3%) and Raichur (41.9%). Both these districts also witnessed in the same period substantial increases in irrigated area, by 156.1% and 109.1% respectively. It is thus possible that in these districts the advent of irrigation enabled both an

extension of net area sown, as well as some substitution of food crops for commercial crops.

But for the state as a whole, the dominant tendency was clearly in favour of commercial crops. Area under commercial crops increased in sixteen (16) of the state's districts, as compared to ten (10) in the case of food crops. Five of these districts-Belgaum, Bellary, Chikkamagalur, Hassan and Mysore-show increase for both food and commercial crops. It is only in two districts, Bellary and Hassan, that the increase has been higher for food crops, both relatively and absolutely. Except in these cases, it does not seem that there was any clear preference for food crops in the utilisation of cultivable land.

Certain other developments in the 1980's may have also contributed to the relative attraction of commercial crops. As the area under irrigation was extended, land of relatively poor quality was brought under the plough, and much of this was better suited to tree crops or field crops of higher market value than to foodgrains. In terms of price parity, commercial crops hand an edge and prevailed over traditional food crops. Lands in the vicinity of large urban markets were utilised for cultivating fruits and vegetables, grapes and other

fruit trees\*, well as flowers, casurina and other varieties of fire-wood. Schemes such as the sericulture project and social forestry supported by the World Bank further encouraged the cultivation of other tree crops like mulberry and eucalyptus on a substantial scale. Market conditions also favoured increased cultivation of a variety of plantation crops in the hilly and coastal zones of the state.

The objective situation in Karnataka is such that one would have expected the state's agricultural policy to be aggressively in favour of additional food production. Apart from odd years of adequate and well-distributed rainfall, when total food grains (cereals, millets, and pulses) production has exceeded 72 lakh tonnes, it has generally fluctuated between 62 lakh and 67 lakh tonnes. The following table (III.4) shows clearly the stagnancy in the level of foodgrains output between 1980-81 and 1991-92

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\* These are also food articles, but the area under this is not included in "food crops area"

Table 3.4

Foodgrains production in Karnataka  
1980-81 to 1991-92

| Year    | Cereals<br>& Millets | Pulses | Total | 3-Year Average<br>Production |
|---------|----------------------|--------|-------|------------------------------|
| 1980-81 | 57.14                | 4.88   | 62.02 | 69.03                        |
| 1981-82 | 66.78                | 6.01   | 72.79 | 69.15                        |
| 1982-83 | 55.18                | 5.11   | 60.29 | 65.03                        |
| 1983-84 | 66.89                | 6.24   | 73.13 | 68.74                        |
| 1984-85 | 61.81                | 6.03   | 67.84 | 67.08                        |
| 1985-86 | 53.00                | 4.89   | 57.89 | 66.29                        |
| 1986-87 | 67.51                | 5.87   | 73.38 | 66.37                        |
| 1987-88 | 56.12                | 6.68   | 62.80 | 64.49                        |
| 1988-89 | 62.71                | 4.62   | 67.33 | 67.83                        |
| 1989-90 | 65.12                | 5.46   | 70.58 | 66.91                        |
| 1990-91 | 57.40                | 6.35   | 63.75 | 67.22                        |
| 1991-92 | 72.05                | 8.10   | 80.15 | 71.33                        |

Source: R. Dwarakinath, Karnataka: "Poor Growth in Food Yield Levels" -in The Deccan Herald, Bangalore dated 27.11.1992.

That this has occurred against the background of a steady increase in the area under irrigation and some rise in cultivated area is clearly indicative of a neglect of programmes benefiting productivity. Productivity levels of land under rice, jowar and ragi which make up about 75 per cent of food crops area, have either remained stagnant or declined over the period 1980-81 to 1990-91. While the output per hectare (in terms of kilograms) increased by less than one per cent for rice, it fell by 9.86 per cent for jowar, 4.79 per cent for ragi, 0.34 per cent for wheat and 2.78 percent for pulses. It is only in the case of the minor foodgrains bajra and maize that productivity levels went

up by 20 per cent and 7.54 per cent respectively.\*

This record contrasts with the growth in regard to commercial crops. As observed earlier, there has been increased diversity of such crops as well as a rise in the area devoted to their cultivation. Additionally, output growth rates for crops in this category have on the whole been better than in respect of food-grains, as may be seen from the state's performance, compared to the all-India levels for the period 1979-80 to 1988-89.

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\*R.Dwarakinath loc.cit

Table 3.5

Comparative Growth Rates in Crops Production:  
All -India and Karnataka 1979-80 to 1988-89

(percentages)

|       | <u>Food-Crops</u> |           | <u>Commercial Crops</u> |           |      |
|-------|-------------------|-----------|-------------------------|-----------|------|
|       | All-India         | Karnataka | All-India               | Karnataka |      |
| Rice  | 2.6               | -0.3      | Groundnut (pods)        | 1.8       | 4.3  |
| Jowar | -1.1              | -0.7      | Rape, Mustard           | 8.7       | 3.2  |
| Wheat | 4.3               | -5.3      | Cotton (lint)           | -0.4      | -2.3 |
| Grams | -1.0              | 2.9       | Chillies (Dry)          | 2.0       | -1.6 |
|       |                   |           | Potato                  | 5.1       | 5.8  |
|       |                   |           | Sugarcane               | 2.8       | 5.2  |
|       |                   |           | Banana                  | 4.4       | 6.9  |

Source: Interstate Economic Indicators: Govt. of Karnataka  
 (Planning Department) Sept. 1991 pp 110-111

The point to note here is briefly this. Karnataka has chronically been a food-deficit state and has depended on allocations from central food stocks as well as purchases from neighbouring states, particularly Andhra Pradesh. Over the years, there has been a substitution of rice and wheat for ragi and jowar, with an increase in urbanisation and in rural incomes derived from commercial crops. Superior quality seeds and newer methods of farming have been slow to reach "coarse grains" cultivation; it is only with the advent of hybrid ragi suitable for irrigated areas and the adoption of maize in the northern districts that farmers growing coarse grains have gained to some extent. But this has not had any major impact on the production of coarse grains, and the state's needs for rice and wheat from other sources have kept growing. Overall, there seems to be a tacit acceptance of the view that food



security for the state as a whole cannot be secured through increased production within the state.

The state does not have an extensive public distribution system and, rural households depending on market purchases for all or part of their food supply have suffered badly during drought years, when both local output and allocations from central food stocks have largely been absorbed in the urban areas. In the early 1980's the State Government therefore introduced in rural areas a "Green Card" system together with an extension of fair price shops. This scheme, fashioned on a similar scheme operative in Andhra Pradesh, aimed at supplying foodgrains at subsidised prices to poor farmers and landless labourers in rural areas (as also the urban poor). If successful, the green card system could have given the poorer farmers a measure of food security, and possibly weakened the preference for cultivation of food crops. But the scheme has not been implemented well enough to have such an effect; and it has in recent years been somewhat neglected. Hence it may have been irrelevant to decisions regarding inter-crop shifts in the area under cultivation.

Overall, the ambience for farming in the state is one in which "food security" is not amongst the clear objectives of the state's agricultural policy. On the contrary there have been several scheme undertaken for

encouraging sericulture, forestry and other non-food crops. Certain infra-structure facilities, common to both food and non-food cultivations - as for instance, irrigation and soil-testing facilities, regulated markets and transport facilities, access to credit and extension services etc. have, however been created. In this environment, decisions on the allocation of land and other resources between food and other crops have largely been governed by the specific needs of farmer's households and the local conditions affecting their judgments from year to year. These have naturally varied from district to district. Before we discuss such divergences, there are a few other state-wide characteristics pertaining to the rural sector which we may briefly note.

Karnataka has long had the reputation of being a relatively "developed" state. However, in terms of a composite index of infrastructure development used for inter-state comparison by the Centre for Monitoring the Indian Economy ,Bombay (CMIE), Karnataka ranked only 10th among the states\*. Its administrative services, which until recently had a fair reputation for efficiency and integrity, have deteriorated. For the foreseeable future, the state is expected to be

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\* Inter-State Economic Indicators, 1991 (Government of Karnataka) - Page - 37

seriously deficit in electric power and other energy sources. While road and rail transportation facilities have improved somewhat, nearly two-thirds of the state villages are still not connected by all-weather roads.

These general characteristics may to some extent be due to the somewhat disparate development profiles of the different regions from the surrounding states which were combined with the former state of Mysore to form 'Karnataka' in 1956. But basically they reflect the substantial urban rural difference in the provision of infra-structural facilities that persists in the state. Together with the predominance of dry farming, they probably account for the relatively low levels of agricultural productivity in Karnataka. As estimated by the CMIE, income generated in 1984-85 per hectare of gross cropped area was only Rs.2728 in Karnataka, as against Rs.7822 in Kerala, Rs.3639 in Tamil Nadu, Rs.3390 in Andhra Pradesh and Rs.3179 for All-India. At this level, it was in the same category as the industrially forward and relatively dry states of Maharashtra and Gujarat.

With over 70 per cent of the population still in rural areas, and around 65% of "main workers" constituting cultivators and agricultural labourers (as defined in the 1981 census), this condition of the state's rural economy has meant a pretty low level of living for the farming community. Increases in rural population and

rural households have led, on the one hand, to migration to urban centres and on the other to a decline in the average size of holdings. According to provisional results of the Agricultural Census 1991, the average size of holding had declined from 2.41 ha in 1985-86 to 2.13 ha in 1990-91. This overall decline has been accompanied by an increase in the number of holdings of less than 2 ha and a decrease in those above 4 ha. as may be seen from the table below.

Table 3.6

Number of Operational Holdings and Operated Area by Size of Holdings:Karnataka

| Size groups              | No. of holdings<br>(000') |                 |                  | Operated area<br>(000' hectares) |                  |                  |
|--------------------------|---------------------------|-----------------|------------------|----------------------------------|------------------|------------------|
|                          | 1985-<br>86               | 1990-<br>91     | % vari-<br>ation | 1985-<br>86                      | 1990-<br>91      | % vari-<br>ation |
| (1)                      | (2)                       | (3)             | (4)              | (5)                              | (6)              | (7)              |
| Marginal<br>(below 1 ha) | 1792<br>(36.4)            | 2262<br>(39.2)  | 26.2             | 866<br>(7.3)                     | 1072<br>(8.7)    | 23.7             |
| Small<br>(1-2 ha)        | 1293<br>(26.3)            | 1586<br>(27.5)  | 22.7             | 1889<br>(15.9)                   | 2308<br>(18.7)   | 22.2             |
| Semi-medium<br>(2.4 ha)  | 1035<br>(21.0)            | 1163<br>(20.1)  | 12.4             | 2878<br>(24.2)                   | 3200<br>(26.0)   | 11.2             |
| Medium<br>(4-10 ha)      | 646<br>(13.2)             | 636<br>(11.0)   | -1.5             | 3881<br>(32.7)                   | 3770<br>(30.6)   | -2.9             |
| Large<br>(over 10 ha)    | 153<br>(3.1)              | 129<br>(2.2)    | -15.4            | 2365<br>(19.9)                   | 1971<br>(16.0)   | -16.6            |
| All sizes                | 4919<br>(100.0)           | 5776<br>(100.0) | 17.4             | 11879<br>(100.0)                 | 12321<br>(100.0) | 3.7              |

Note: Figures within brackets indicate percentage to respective column totals.

Source: Karnataka Agricultural Census 1991-92 (provisional)

For the state as a whole, the marginal and small farmers with holdings of 2 ha. or less constituted 66.7% the total in 1990-91. However, between them, they held only 27.4% of operated area. Thus the greater part of the operated area, 72.6%, was under the control of farmers with holdings of over 2 ha. Prima facie, this indicates a high degree of inequality in land ownership. But in the dry zones of the state, even farmers in the "semi-medium" category (i.e. having between 2 and 4 ha. ) may not be economically better-off than the small farmers in the areas with good irrigation and soil quality. Hence for a clearer appreciation of the impact of skewness in land distribution, it may be necessary to include some part of this category of "semi-medium" holdings among the relatively worse-off. Even with this adjustment, the basic picture is unlikely to change much.

If this is the ground reality, the urge for food security should be a pretty strong one, at least for the marginal and small farmers. The shifts in operated area from medium and large holdings to holdings of a smaller size between 1985-86 and 1990-91 may at first sight suggest that medium and small farmers acquired or leased-in additional land to improve their food security. However, the fact that increases in the area under commercial crops have been more widespread than increases in the area under food crops weakens any such inference. It is, of course, possible that food

security has been sought through an improvement in economic status generally, rather than directly through additional food production for own use. Since this is an issue that has to be decided empirically rather than by deductive logic, we take it up in the analysis of field data. Meanwhile it may be useful to complete the background to the field study, by noting some of the environmental factors of the six selected districts of Chitradurga, Dakshina Kannada, Dharwad, Kolar, Mandya, and Raichur.

A few of these factors along with state averages whenever relevant are shown in Tables 3.7, 3.7A & 3.7B below.

Table III-7

## POSITION OF SELECTED DISTRICTS IN THE YEAR 1990-91

|   | CHITRADURGA   | D.KANNADA   | DHARWAD   | KOLAR  | MANDYA   | RAICHUR  | STATE AVERAGE  |
|---|---|---|---|--|--|--|----------------|
| 1.Sources of Irrigation                       | Thungabhadra & Vedavathi (irrigation rather poor)                                 | Nethravathi Seetha Payaswani                          | Malaprabha Thungabhadra Varada (poorly irrigated)         | Mainly tanks and bore wells                                  | Canals (well irrigated)  | Thungabhadra (Partial irrigated)                     | --             |
| 2.Actual annual Rain falls(mm) (1991)         | 766   | 4822  | 982   | 1827   | 882  | 623  | 1252           |
| 3.Density of Population(per sq.km) (1991 (P)) | 281.8   | 319   | 255   | 269  | 331  | 165  | 234            |
| 4.Literacy rate (percentage) (1991 (P))       | 46.4  | 65.5  | 48.8  | 42.7   | 41.2   | 28.8   | 47% (1991 (P)) |
| 5.Medicals (#) (Hospitals) (Numbers)          | 571   | 851   | 726   | 485  | 469  | 433  | 589            |
| 6.Transport facilities (Road & Rail)          | Comparatively Good roads,Rail facilities, 66.6% of the Vill. with pucca appr.rds. | Road good alongCoastal Taluks. Not so good in others. | Good roads and Rail connections                           | Good road and rail facilities. 1/3 villages with pucca roads | Good roads & rail facilities. 57% vills. with pucca approach roads | Less than average only 46% villages have pucca roads | --             |
| 7.Villages Electrified (percentage)           | 98.7  | 100.0   | 99.8  | 98.7   | 98.9   | 98.6   | 98.8           |
| 8.Major crops                                 | Ragi, paddy Jowar, G.Nut and cotton   | Paddy,Ragi, Arecanut, coconut,plantations & Fruits    | Cotton,G.Nut, paddy,jowar, pulses                         | Paddy,ragi, Tree crops, Pulses,Veg. and fruits               | paddy,ragi, ragi,jowar, sugarcane Tree crops fruits                | Paddy,jowar, cotton, sugarcane                       | --             |
| 9.i)Credit & Non-Credit Co-ops                | 723   | 983   | 2388  | 1236   | 1246   | 786  | 1845           |
| ii)Commercial & Grassroots Banks              | 195   | 462   | 326   | 185  | 127  | 161  | 215            |
| iii)Primary Land Dvpt. Banks                  | 9   | 8   | 17  | 11   | 7  | 9  | 8.85           |
| 10 Industries (Numbers)                       | Edible oil, Silk weaving, Handloom  | Totally backward Beedi,Cashew, Tiles and Fertilizer.  | Ginning and Spinning, Edible oil, Handloom & Engineering. | Tiles, Silk yarn, Gold mine & Engineering.                   | Animal feeds, Sugar and Silk yarn and Cement.                      | Gold mines, Sugar, Ginning and spinning.             | --             |

Karnataka at a glance 1991-92.

Hospitals, P.M.C, P.H.U, Dispensaries, Sub Centres, Central Govt, E.S.I, Police, Prison &amp; ...

**Table 3.7A**  
**Main rural features 1990-91**  
 (percent, except rainfall)

| DISTRICTS   | Rural Pop./<br>Total<br>Population<br>(##) | Net Area<br>Sown/<br>Reporting<br>Area | Irrigated<br>Area/<br>Net Area<br>Sown | Area under<br>Comm.crops/<br>Net Area<br>Sown (#) | Average<br>Actual<br>Rainfall<br>(mm) |
|-------------|--|--|--|---|---------------------------------------|
| Chitradurga | 73.00                                      | 57.87                                  | 22.1                                   | 34.5  | 706                                   |
| D.Kannada   | 71.69                                      | 26.26                                  | 43.1                                   | 1.0   | 4022                                  |
| Dharwad     | 65.05                                      | 70.53                                  | 14.8                                   | 37.2  | 902                                   |
| Kolar       | 76.64                                      | 47.82                                  | 23.9                                   | 34.4  | 1027                                  |
| Mandya      | 83.70                                      | 48.19                                  | 41.5                                   | 24.8  | 882                                   |
| Raichur     | 79.19                                      | 68.90                                  | 20.8                                   | 21.8  | 623                                   |

(#): Includes Cotton, Groundnut, Sugarcane, Mulberry only. Land arecanut & Plantation crops has not included for want of re data.

(##): 1991 Census data (Provisional)

**Table 3.7B**

**Availability of Public Amenities in the Selected Districts 1990-91**

| DISTRICTS   | Roads/<br>Sq.kms | Schools,<br>Colleges/<br>1000 Pop. | Beds/<br>1000<br>Pop. | Post offi-<br>ces/1000<br>Populatn. | Commer-<br>cial<br>Banks | Co-op.<br>Socie-<br>ties |
|-------------|------------------|------------------------------------|-----------------------|-------------------------------------|--------------------------|--------------------------|
| Chitradurga | 0.59             | 1.24                               | 1.000                 | 0.218                               | 99                       | 723                      |
| D.Kannada   | 0.83             | 0.88                               | 1.979                 | 0.289                               | 440                      | 983                      |
| Dharwad     | 0.74             | 0.80                               | 0.943                 | 0.182                               | 204                      | 2084                     |
| Kolar       | 0.76             | 1.44                               | 1.033                 | 0.184                               | 119                      | 1236                     |
| Mandya      | 1.70             | 1.24                               | 0.655                 | 0.222                               | 101                      | 1246                     |
| Raichur     | 0.41             | 0.78                               | 0.382                 | 0.216                               | 77                       | 786                      |

Source: Karnataka at a Glance 1991-92.



It will be seen that these districts represent a fair range of variation, from the densely populated Dakshina Kannada and Mandya to the relatively sparse ones of Raichur and Chitradurga. The table also shows that there is no clear leader in all respects-with for instance, very little difference among them in regard to rural electrification or road conditions. All of them except Chitradurga and Raichur have a good network of commercial banks and co-operative credit institutions. Save for Dakshina Kannada and to some extent Dharwad, all of them have rather inadequate hospital facilities, and have a literacy rate less than the State averages. However, intra-district differences become more vivid when it is recognised that the somewhat poorly endowed districts in these respects, such as Raichur and Chitradurga are also large in area. Educational and hospital facilities are distributed unequally and poor access to schools and hospitals inevitably affects the poor people in the rural areas to a greater extent.

Turning now to specific agricultural characteristics of these districts, Table 3.8 brings together their relative status vis-a-vis the state as a whole.

Table 3.8

**Main Agricultural Characteristics**  
**Selected Districts 1990-91**

| District             | Net area sown/<br>Reporting area<br>(percent) | irrigated area/<br>Net area sown<br>(percent) | Area under commercial crops/<br>Net area sown<br>(percent) | No. of operational holdings<br>( '000) | Average size of holding<br>(ha) |
|----------------------|---|---|--|--|---------------------------------|
| Chitradurga          | 57.87   | 22.1  | 34.5   | 293                                    | 2.6                             |
| D.Kannada            | 26.26   | 43.1  | 1.0  | 268                                    | 1.2                             |
| Dharwad              | 70.53   | 14.8  | 37.2   | 392                                    | 2.9                             |
| Kolar                | 47.82   | 23.9  | 34.4   | 306                                    | 1.5                             |
| Mandya               | 48.19   | 41.5  | 24.8   | 393                                    | 0.8                             |
| Raichur              | 68.9  | 20.80   | 21.8   | 384                                    | 3.0                             |
| <b>State Average</b> | <b>54.5</b>                                   | <b>20.4</b>                                   | <b>17.4</b>  | <b>5776</b>                            | <b>2.1</b>                      |

Source : Karnataka at a glance 1991-92

In terms of land utilised for cultivation, Dakshina Kannada, Kolar and Mandya are below the state average of 54.5% for different reasons. In Dakshina Kannada, only a narrow strip of land between the Western Ghats and the sea-coast is suitable for cultivation; hence the low percentage is essentially a reflection of the topography of the district. In the case of Kolar, however, it is the acute water scarcity which limits cultivation. A major effort has been made to overcome this through the use of underground water sources, as shown by the proportion of irrigated area to total net area sown-which at 23.9% exceeds significantly the state

average of 20.4%. These resources are not inexhaustible, and in the absence of adequate rainfall, or any substantial river-flow, the overall scope for borewell irrigation is also limited. In Mandya a good part of the district to the north of the Kaveri command area is quite dry and substantially under-utilised. However, in Mandya and Raichur the possibility exists of additional irrigation development in the dry zones, and a consequent extension of cultivation of water-dependent crops of various types.

As is well-known, Karnataka is largely a "ryotwari" area, and some of the land reforms undertaken by the state government in the early 1970's have enabled the tillers to acquire ownership rights in the lands they cultivated for long as permanent tenants. With the growth of rural population, there has been a gradual decline in the average size of the holding and a preponderance of marginal and small holdings. (see Table 3.6 ). This is true of selected districts also. In the three districts of Dakshina Kannada, Mandya and Kolar in which both population density and proportion of irrigated area are higher than the state average, the size of holdings are on the average considerably less than the average of 2.1 hectare for the state. The opposite is true in the remaining three districts, which are much drier and much larger in area. The mix of topographic and agro-climatic features among these

districts clearly indicates agronomic possibilities for a variety of food and commercial crops. As has been observed earlier, the majority of crops tend to be those suitable for cultivation in relatively dry tracts. However, since rice constitutes the staple food for a large part of the population, the state has a long tradition of paddy cultivation in canal irrigated, heavy rainfall or tank-command areas. In much of the command areas developed as part of medium and large irrigation projects in the Kaveri, Tungabhadra, Krishna and other river valleys, cultivation of paddy has often been a preferred option. A little bit of paddy cultivation even in dug-well or bore-well irrigated tracts in dry districts also is not uncommon. However, where such a choice is not open, utilization of land for ragi, jowar, wheat, bajra, or other millets and pulses is very considerable. Thus for these districts, as for the state as a whole, the larger part of net area sown is devoted to the cultivation of food crops of various kinds.

This does not, of course, mean that agriculture in the state is primarily oriented towards subsistence-farming. The broad category of "food crops" includes not only foodgrains and pulses but also fruits and vegetables and nuts of different kinds, all of which have their "final use" as food articles. But many of these are essentially "commercial" crops in the sense that they

are cultivated principally for sale on the market. Indeed, with the advent of high yielding varieties of paddy, ragi, wheat, maize, and jowar, even these partake of the nature of commercial crops, to the extent their cultivation is also influenced by the market situation. But in their case, there is the distinct possibility of a portion of the output from the farmer's own land being kept back for family consumption. Hence it is in respect of crops of this kind that the question arises whether a shift away from them has in any significant measure affected the household's food security.

It is against this setting that the field enquiry of this project has been undertaken in the six districts. For a fully reliable assessment of both the extent of substitution of commercial to food crops in response to changing production and market conditions, it would have been necessary to follow the cropping pattern adopted by properly selected households over a time-period. Since this was not possible within the confines of the ICAR proposal, we have covered the selected households in two rounds, spread over two agricultural seasons. We then have a mass of observations for 550 households in the state, made up of six sub-samples of 88 to 93 households in the six selected districts. The analysis of these data is taken up in the following chapters.

## CHAPTER IV

### SURVEY DATA & FINDINGS - I HOUSEHOLD

#### DETAILS AND EFFECT OF CROP SHIFTS ON FARM INCOMES

The 550 households surveyed in two villages of a taluk in each of the six districts are all farm households, that is to say households owning some land, however small, and engaged directly in cultivation. They include marginal and small farmers as well as those owning large sized holdings. Since in each village the households have been picked at random from the total of land-owning households, the distribution of households according to size of land owned varies from district to district. The pattern of distribution is influenced, among others, by the agro-climatic zone in which the district lies. Since the main purpose of the study is to examine the effect of shifts in cropping decisions on food security, nutrition and health status of households, we have focussed mainly on the category of marginal and small farmers and members of their households. The terms "marginal" and "small" refer to those owning less than 2.5 acres (or 1 hectare), and between 2.51 and 5 acres (1 to 2 hectares) respectively, as is the practice in Karnataka.

Because only households owning land have been covered in the sample, the findings of the inquiry relate to a part of the village population and not the whole of it.

However, farm-owning households constitute the majority in each of the villages surveyed, and hence they may be considered as representative of the economic life of the village concerned.

The exclusion of non-farm households from the sample means that the survey results are not applicable to that section. This prevents any cross-category comparison of the effect of changes in cropping patterns and agricultural practices, which is obviously somewhat unsatisfactory. However, since the entire thrust of this study is to assess the consequences of a shift from "food" crops to "commercial crops", it is only appropriate that the focus should be on farm households, which are directly and critically affected by such shifts. Attempts to include other categories would have complicated immensely the hypothesis underlying the design of the survey, and hence the survey itself. This is because the effect of shifts in cropping patterns on non-farm households would be derived from the effect on farm-households - either because of changes in the demand for farm inputs, or the supply of farm outputs due to changes in the farm household's consumption or investment patterns. Moreover they would also be materially influenced directly by some of the other environmental factors like changes in transport, marketing and credit facilities available, establishment of new industries in the area etc. All these would,

besides complicating the conceptual and measurement problems, have detracted considerably from the central question, viz, how have shifts from "food" to "commercial" crops affected the income, food security, health and nutrition of those who have taken such decisions, viz farm households?

#### General Characteristic of Sample Households

Some of the general characteristics of the sample households are shown in Table 4.1 below, arranged districtwise. A good part of the households belonged to persons in the Scheduled Castes/Scheduled Tribes categories, except in the Kolar and Dakshina Kannada samples. The emphasis here is not on caste differentiation but on the fact that they also owned

Table 4.1

#### Household Size and Related Characteristics: District-wise Comparison

| DISTRICTS   | Total House holds surveyed (number) | Average House hold size (persons) | Average land owned (acres) | SC/ST house holds (% to total) | % of literates among head of household |
|-------------|-------------------------------------|-----------------------------------|----------------------------|--------------------------------|--|
| CHITRADURGA | 93                                  | 6.40                              | 8.73                       | 47.31                          | 49.46                                  |
| D. KANNADA  | 92                                  | 6.82                              | 3.31                       | 9.78                           | 83.70                                  |
| DHARWAD     | 88                                  | 7.16                              | 5.91                       | 22.73                          | 53.41                                  |
| KOLAR       | 93                                  | 7.38                              | 4.22                       | 6.45                           | 70.97                                  |
| MANDYA      | 91                                  | 7.18                              | 2.91                       | 19.78                          | 38.46                                  |
| RAICHUR     | 93                                  | 7.40                              | 7.91                       | 27.96                          | 51.61                                  |



land, no matter how small. Other households belonged to the traditional farming communities in the area, such as vokkaligas and "other backward castes". We have not undertaken any specific analysis of farming operations on the basis of caste or community differences; however, we revert to this aspect when discussing access to common facilities, such as drinking water or para-medical staff.

On the average, population per household for the sample is higher than the State average of 5.8 in 1981, ranging from 6.40 per households for the Chitradurga sample to 7.40 per household in the Raichur sample. There are, in all of the district sub-samples, households of a smaller size; but they constitute a relatively small proportion of the total. (Table 4.2) Just about 21% of the 550 households had 4 or less members; while, at the other extreme, a little over 34% consisted of 8 or more members. As between the district sub-samples, the proportion of households with 4 or less members varied from a low of about 13% in Kolar to a high of 27% in Chitradurga.

It is obviously hazardous to read too much into such broad inter-district variations, especially when the focus of the survey is not demographic. Even so it is interesting that the proportion of "small" families is least in precisely those district samples in which the ratio of literates among heads of households is very

Table 4.2

Size-distribution of Sample Households

| SAMPLE DISTRICTS | Household size |               |               |               | TOTAL          |
|------------------|----------------|---------------|---------------|---------------|----------------|
|                  | Below 2        | 2 to 4        | 5 to 7        | 8 & Above     |                |
| CHITRADURGA      | 0<br>(0.00)    | 25<br>(26.88) | 46<br>(49.46) | 22<br>(23.66) | 93<br>(100.00) |
| D. KANNADA       | 0<br>(0.00)    | 18<br>(19.56) | 41<br>(44.57) | 33<br>(35.87) | 92<br>(100.00) |
| DHARWAD          | 0<br>(0.00)    | 20<br>(22.73) | 37<br>(42.04) | 31<br>(35.23) | 88<br>(100.00) |
| KOLAR            | 1<br>(1.07)    | 11<br>(11.83) | 45<br>(48.39) | 36<br>(38.71) | 93<br>(100.00) |
| MANDYA           | 1<br>(1.10)    | 16<br>(17.58) | 39<br>(42.86) | 35<br>(38.46) | 91<br>(100.00) |
| RAICHUR          | 0<br>(0.00)    | 21<br>(22.58) | 40<br>(43.01) | 32<br>(34.41) | 93<br>(100.00) |
| Total            | 2              | 111           | 248           | 189           | 550            |

Note: Figures in brackets are row percentage

much higher than in the others. If we were to use the literacy level of the heads of the household as proxy for the literacy level of the sample population, it might appear that general literacy has no effect on restricting family size. (Whether, and to what extent, female literacy has influenced pregnancies and births are examined in Chapter VI below). But when we juxtapose this with the proportions of men, women and children below 14 years in the sample households (Table 4.3), it becomes clear that the larger family-size in some districts is often due more to the prevalence of "joint" or "extended" families, than to an abundance of child-births. A scrutiny of Table 4.3 reveals the

**Table No 4.3**

**Household composition Male & Female Adults and Children**

| (1)         | (2)   | (3) (*)  | (4) (*)  | (5)   |
|-------------|---|--|--|---|
| DISTRICTS   | Total Popula-<br>tion of sample<br>Households | Male Adults<br>(% to total<br>household<br>population) | Female adults<br>(% to total<br>household<br>Population) | Children<br>Below 14 yrs<br>of age (%<br>to total<br>household<br>population) |
| CHITRADURGA | 595   | 37.65  | 33.78  | 28.57 *   |
| D. KANNADA  | 627   | 41.63  | 38.44  | 19.94   |
| DHARWAD     | 630   | 33.17  | 29.21  | 37.62   |
| KOLAR       | 686   | 36.73  | 30.90  | 32.36   |
| MANDYA      | 653   | 39.20  | 36.29  | 24.50   |
| RAICHUR     | 688   | 30.96  | 28.05  | 40.99   |
| TOTAL       | 3879  | 36.48  | 32.69  | 30.83   |

Foot note : (\*) All those 14 years & above of age,  
i.e excluding 'Children' as in column (5)

following: except in the case of Dakshina Kannada, in which a high proportion of literate heads of households and a low proportion of small families and a low ratio of children to total household population co-exist, the combinations vary from sub-sample to sub-sample. Thus, though Kolar has a low proportion of small families, and a high ratio of literate heads of households, the proportion of children is much higher than in Mandya, for which the other two ratios are divergent. At the other end, the Chitradurga sample, which ranks second lowest under the literacy index, comes off better than Kolar in respect of family size and proportion of

children.

In sum, from the data on the general characteristics of households obtained from the sample survey, no major or definitive inferences can be drawn about the reasons why the average family size in all sub-samples is higher than the average for the State. But we may note that in Karnataka's rural society, nuclear families seem less common than joint families or loose forms of common habitation, which could be subsumed under the category of extended families. This affects on the one hand the potential supply of "family labour" for farming or allied occupations; and on the other, it raises the minimum level of income required for food security and satisfaction of basic per capita nutritional requirements. In other words, it has implications for the minimum size of the holding required for satisfying these requirements, under given environmental conditions and cropping choices open to the household.

#### Land Ownership

We turn now to issues relating to the ownership and use of land by the sample households. Data relating to these matters have been collected for two reference periods, viz "before shift" and "after shift", with a view to focussing later on the change wrought by a 'shift' to commercial farming on the income, consumption

and nutrition standards of households.

It may be recalled from the discussion in Chapters I & II on survey design and field surveys that there were two field visits, one during the period 20.8.1990 to 4.1.1991 and other from 31.12.1991 to 6.2.1992. Data processed under the heading "before shift" were collected in the first round. Since by that time many households had already 'shifted' to a variety of commercial crops, each household was asked when in the past such a decision was taken, and what as far as they remember was the position before such a decision was taken. Thus the responses from households recorded under the heading "before shift" refer to the position as it was some time in the past, and not as it existed at the time of the first field visit. Furthermore, since "before shift" data are based on what the main respondent of the household (usually the head of the household) remembered, they vary from household to household and do not refer to any common date for all households even in the same sample village. As against this, data on "after shift" collected during both the field visits denote the position as at the time of the visit. Such data have been collected twice over, since the second visit was essentially to obtain a second reading of the "after shift" measures gathered in the first round. This has enabled us to eliminate some of the inconsistencies in the responses provided by

households in the first visit - though it by no means provides a complete correction of all such discrepancies. Overall, however, we have the impression that "after shift" data are less subject to response error than "before shift" data. This may be borne in mind in assessing both the extent and the implications of change that could be attributed to the "shift".

The majority of sample households belong to the category of marginal and small farmers owning less than 5 acres or 2 hectares. Their position varied from a high of 88 to 87 per cent in Dakshina Kannada and Mandya to 66 to 67 per cent in the relatively dry districts of Chitradurga and Raichur. This was the position "before shift" (Table 4.4.1) that is to say the dates around which, according to the heads of the households interviewed, major decisions regarding crop shifts were taken. However, comparable figures as of the date of the survey, that is to say "after shift" are only marginally different and by and large, the predominance of marginal and small farmers continues.

Within this category, the ratio of marginal (1 hectare or 2.5 acres and less) farmers to total varies in accordance with the facilities available for irrigated cultivation. Thus in Chitradurga and Dharwad in which dry farming predominates, the small farmers (owning 2.51 to 5 acres or 2 hectares), together with households

**Table No. 4.4.1**  
**District-wise Distribution of Households by Size of Land Owned**  
**(Before Shift)**

| DISTRICTS    | Total land owned (in acres) |                              |                              |                              | Total                        |
|--------------|-----------------------------|------------------------------|------------------------------|------------------------------|------------------------------|
|              | <1 acre                     | 1-2.5 acres                  | 2.51-5 acres                 | >5 acres                     |                              |
| CHITRADURGA  | 0<br>(0.00)                 | 12<br>(12.90)                | 47<br>(50.54)                | 34<br>(36.56)                | 93<br>(100.0)                |
| D. KANNADA   | 10<br>(10.87)               | 55<br>(59.78)                | 16<br>(17.39)                | 11<br>(11.96)                | 92<br>(100.0)                |
| DHARWAD      | 1<br>(1.14)                 | 24<br>(27.27)                | 37<br>(42.05)                | 26<br>(29.55)                | 88<br>(100.0)                |
| KOLAR        | 5<br>(5.38)                 | 37<br>(39.78)                | 29<br>(31.18)                | 22<br>(23.66)                | 93<br>(100.0)                |
| MANDYA       | 20<br>(21.98)               | 41<br>(45.05)                | 18<br>(19.78)                | 12<br>(13.19)                | 91<br>(100.0)                |
| RAICHUR      | 0<br>(0.00)                 | 33<br>(35.48)                | 29<br>(31.18)                | 31<br>(33.33)                | 93<br>(100.0)                |
| <b>Total</b> | <b>36</b><br><b>(6.54)</b>  | <b>202</b><br><b>(36.73)</b> | <b>176</b><br><b>(32.00)</b> | <b>136</b><br><b>(24.73)</b> | <b>550</b><br><b>(100.0)</b> |

\* Figures in brackets are row percentages.

**Table No.4.4.2 (After Shift)**

| DISTRICTS    | Total land owned (in acres) |                              |                              |                              | Total                        |
|--------------|-----------------------------|------------------------------|------------------------------|------------------------------|------------------------------|
|              | <1 acre                     | 1-2.5 acres                  | 2.51-5 acres                 | >5 acres                     |                              |
| CHITRADURGA  | 0<br>(0.00)                 | 13<br>(13.98)                | 48<br>(51.61)                | 32<br>(34.41)                | 93<br>(100.0)                |
| D. KANNADA   | 11<br>(11.96)               | 50<br>(54.35)                | 17<br>(18.48)                | 14<br>(15.22)                | 92<br>(100.0)                |
| DHARWAD      | 1<br>(1.14)                 | 24<br>(27.27)                | 37<br>(42.05)                | 26<br>(29.25)                | 88<br>(100.0)                |
| KOLAR        | 5<br>(5.38)                 | 38<br>(40.86)                | 28<br>(30.11)                | 22<br>(23.66)                | 93<br>(100.0)                |
| MANDYA       | 20<br>(21.98)               | 44<br>(48.35)                | 17<br>(18.68)                | 10<br>(10.99)                | 91<br>(100.0)                |
| RAICHUR      | 0<br>(0.00)                 | 33<br>(35.48)                | 28<br>(30.11)                | 32<br>(34.41)                | 93<br>(100.0)                |
| <b>Total</b> | <b>37</b><br><b>(6.37)</b>  | <b>202</b><br><b>(36.73)</b> | <b>175</b><br><b>(31.82)</b> | <b>136</b><br><b>(24.73)</b> | <b>550</b><br><b>(100.0)</b> |

Figures in brackets are row percentages.

owning more than 5 acres ( or 2 hectares) exceed the marginal farmers. In Dakshina Kannada and Mandya, on the other hand the marginal farmers far exceed those in other categories. The remaining two districts, Kolar and Raichur present a somewhat mixed picture. Though the sub-samples for these two districts contain more marginal farmer households than those of small farmers, the proportion of "medium and large" farmers owning more than 5 acres is considerably higher than in Mandya or Dakshina Kannada.

These features evident in Tables 4.4.1 and 4.4.2 are not unusual. They merely reflect the well-known fact that the average size of holdings tends to be generally higher in the dry zones, for the simple reason that land-values are lower than in irrigated or water-rich areas, and a larger holding is often necessary to derive a given amount of income from farming operations. Where in such tracts, relatively small-sized holdings are found, they generally indicate the effects of fragmentation in the process of inheritance, rather than any practice of intensive cultivation.

However, recourse to tube well irrigation or extension of canal irrigation to hitherto dry tracts would alter this picture somewhat. This is what has happened in Kolar & Raichur. In Kolar district, Malur Taluk where the sample households have been surveyed, has witnessed in the recent past a good deal of bore-well



construction, and cultivation of vegetables and fruits for sale in the Bangalore metropolitan area. This has radically changed the economics of small-farming, (as we shall explain later in this chapter) and hence households with holdings of even 1 hectare have thrived. A similar change has occurred in Raichur with the extension of the Tungabhadra canal systems to several taluks. But in both Kolar and Raichur, there are still substantial areas in which dependence of farmers on rainfall is great, and relatively large-sized holdings are necessary even for subsistence incomes.

A scrutiny of the land composition of holdings of different sizes in the six sample districts shows that the proportion of wet land to total land owned is more than 25% for the majority of households in all three categories of marginal, small, and medium - to - large holdings in the Mandya and Raichur samples which are canal irrigated. This is true also of Dakshina Kannada in respect of marginal and small farmer households. The position is otherwise in the dry districts of Chitradurga, Dharwad and Kolar - that is to say only a small proportion of households in each category have more than 25% of their holdings as "wet" land. This picture does not vary in any significant measure from 'before shift' to 'after shift' as Tables 4.5.1 and 4.5.2 show, except in respect of Dakshina Kannada, and to some extent, Kolar. As has been mentioned earlier,

the change in Kolar is attributable to the spread of bore-well irrigation. The increase in Dakshina Kannada is attributable to a wider adoption of lift irrigation (based on power driven pumps) on holdings abutting rivers and tanks. Even when the family holding is large, extensive irrigation by such means involves heavy investment and hence beyond the means of small and marginal farmers. This has generally been the response of the households in the dry districts also, when asked about the reasons for the limited proportion of wet land in their holdings. By contrast, in both Mandya and Raichur, the proportion of wet land is in excess of 50% for the majority of holdings in all size-categories, since access to canal irrigation is less capital intensive.

Table No : 4.5.1 (Before Shift)

Proportion of Wet Land Owned to Total Land Owned

| DISTRICTS   | Proportion of wet land owned to total land owned |          |              |              |                | Total |
|-------------|--|----------|--------------|--------------|----------------|-------|
|             | No wet land                                      | Upto 25% | 25.1% to 50% | 50.1% to 75% | 75.1% to 100 % |       |
| CHITRADURGA | 65   | 10       | 13           | 1            | 4              | 93    |
| D. KANNADA  | 28   | 8        | 17           | 11           | 28             | 92    |
| DHARWAD     | 67   | 1        | 11           | 6            | 3              | 88    |
| KOLAR       | 44   | 10       | 17           | 8            | 14             | 93    |
| MANDYA      | 1  | 0        | 8            | 7            | 75             | 91    |
| RAICHUR     | 18   | 1        | 15           | 10           | 49             | 93    |
| TOTAL       | 223  | 30       | 81           | 43           | 173            | 550   |

Table No : 4.5.2 (After Shift)

| DISTRICTS   | Proportion of wet land owned to total land owned |          |              |              |                | Total |
|-------------|--|----------|--------------|--------------|----------------|-------|
|             | No wet land                                      | Upto 25% | 25.1% to 50% | 50.1% to 75% | 75.1% to 100 % |       |
| CHITRADURGA | 64   | 9        | 14           | 1            | 5              | 93    |
| D. KANNADA  | 1  | 8        | 29           | 19           | 35             | 92    |
| DHARWAD     | 67   | 1        | 11           | 6            | 3              | 88    |
| KOLAR       | 35   | 11       | 21           | 9            | 17             | 93    |
| MANDYA      | 1  | 0        | 8            | 6            | 76             | 91    |
| RAICHUR     | 16   | 1        | 16           | 10           | 50             | 93    |
| TOTAL       | 184  | 30       | 99           | 51           | 186            | 550   |

Before we turn to the distribution of owned land between food crops and commercial crops, there is the important issue of distinguishing between "owned" and "cultivated" holdings - a distinction which is relevant for any evaluation of the economic status and standard of living of farm households. Survey data of the sample households seem to indicate that, as of now at any rate, there is very little recourse by farmers to leasing in or leasing out of land. These data have been put together for the total sample of 550 households, both before the households shifted land from food crops to commercial crops and after such shifts. In both cases, as will be seen from Table 4.6.1 & 4.6.2, the variations between "owned" and "cultivated" land are minor, both before and after shift. However, compared to the position before shift, there appears to be a little more interest among farmers of all categories to "lease in" some land.

Table No. 4.6.1 (Before Shift)

Owned and Cultivated Land Holdings

(Acres)

| Size of Land Holding (In Acres) | Total land owned (In acres) | Total cultivated (In acres) |
|---------------------------------|-----------------------------|-----------------------------|
| Below 1 Acre                    | 20.93                       | 20.93                       |
| 1 to 2.5 Acres                  | 355.03                      | 354.81                      |
| 2.51 to 5 Acres                 | 676.43                      | 662.53                      |
| Above 5 Acres                   | 2073.65                     | 1907.09                     |
| Total                           | 3126.04                     | 2945.36                     |

Table No 4.6.2 (After Shift)

(Acres)

| Size of Land Holding (In Acres) | Total Land Owned (In acres) | Total cultivated Land (In acres) |
|---------------------------------|-----------------------------|----------------------------------|
| Below 1 Acre                    | 21.83                       | 32.04                            |
| 1 to 2.5 Acres                  | 356.26                      | 363.28                           |
| 2.51 to 5 Acres                 | 673.89                      | 663.28                           |
| Above 5 Acres                   | 1975.60                     | 1747.76                          |
| Total                           | 3027.58                     | 2809.64                          |

Allocation of Land to Crop Varieties

In Karnataka, as in the rest of the country, growth of the agricultural sector has been accompanied by two striking features. Firstly, farmers have become far more conscious of the "marketability" of all agricultural products, as a result of changes in farming techniques as well as in market conditions. This has led to the second consequence, viz., a widening of the cropping options open to the farmers. Admittedly, the extent to

which these changes have influenced farmers in different parts of the State, or in different economic or social strata, varies. But there are now very few farming households which even approximate the classic definition of a "subsistence" farming household.

Given this condition, our inquiry into the allocation of land among different crop categories by the farmers had to be somewhat detailed. In the questionnaire canvassed during the interview, we have tried to collect information on the specific crops cultivated, rather than on broad categories like "food crops" or "commercial crops". The more important common varieties grown customarily or promoted deliberately through State policy have been classified as follows:

1. Food Crops: paddy, ragi, jowar, wheat, bajra & maize
2. Commercial Crops: Field Crops groundnut, sunflower, safflower, sesamum, castor seed, sugarcane.
3. Commercial crops: Tree Crops: eucalyptus, mulberry, cotton, rubber, cocoa, cashewnut, pepper.
4. Other Crops: vegetables, fruits, flowers, coconut, pulses and other minor crops.

This is obviously an operational decision, taken to facilitate interviews, and process and present data in an easily recognisable form. A distinction has been made here between 'field crops' and 'tree crops' in the broader grouping of commercial crops, since the cultivation of mulberry, eucalyptus, cashew, pepper,

etc., is said to have led recently to the shifting of considerable areas of land from other crops to these. We have, likewise, sought specific data on land used for cultivation of fruits, flowers, and vegetables because of their growing commercial importance. However, we have not included plantation crops like coffee, arecanut or cardamom since these are restricted to the hilly tracts and much of the land used for these purposes are either not suitable for any other purpose, or have traditionally been devoted to such cultivation.

One other point before we take up the survey data. In the last two decades, farmers in Karnataka have taken to the use of high-yielding varieties of seeds and more intensive application of chemical fertilizers. Among food crops, this has been particularly noticeable in respect of paddy, wheat, maize and to some extent ragi and jowar. Cultivation of HYV food crops is no longer wholly, or even mainly, for "own consumption", but for sale on the market. This has, of course, long been true of pulses, fruits and vegetables; and the availability of improved strains has strengthened this tendency. Hence any categorisation which gives the impression that food crops are 'non-commercial' would be misleading. In this report, there is no explicit or implicit assumption of that kind. We are using this distinction more or less in a generic or botanical sense. Hence, when the farmer grows "food crops", it is still open to him to

decide how much to use directly, and how much to sell on the market. Such a choice either is not open, or is of only a peripheral nature, in respect of "commercial crops", whether of the field variety or the tree variety.

In reality, as in logic, it is not necessary for households to utilise their land for the cultivation of only food crops or only commercial crops. If agro-climatic conditions permit, and for any further reason the farmer so wishes, land owned by the household could be sown partly to food and partly to commercial crops. Such combinations are possible when (a) the holding is large (b) multiple cropping is possible and/or (c) more than one variety can be simultaneously sown on the same piece of land. (Tree crops, for instance, are often raised concurrently with field crops on certain types of land) In other words, "mixed cropping" is an entirely feasible proposition for all types of farming households - with the choices being wider for those with medium - or large-sized holdings.

As a first step towards an analysis of the nature, extent and consequences of a shift in cropping choice in the recent past, we present below Tables 4.7.0, 4.7.1 to 4.7.3 showing the distribution of sample households in accordance with the allocation of land owned by them among three categories "food crops", "commercial crops" or "mixed crops". The pattern of such distribution



"before shift" is compared with that 'after shift". This is followed by a brief review of similar differences between the district samples, in respect of marginal, small and medium-to-large farmers.

Table 4.7.0 gives a summary picture of the "after shift" distribution of marginal, small and medium-to-large farm households according to crop categories chosen. Households which have devoted all their land to the cultivation of one or more varieties of "food crops"\* or "commercial crops" (both field and tree crops) are shown separately. The column "mixed crops" indicates households which have put their land partly under food crops and partly under commercial crops.

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\* Essentially cereals and millets. Pulses are not included in this group because they are grown mostly for sale rather than substantial retention for home consumption. See p.72 above.

Table 4.7.0

Allocation of owned land among crop categories;  
Household distribution: After shift (AS)

| Sl. No. | Category of Households (size of holdings)      | All land under food crops | All land under commercial crops | Mixed crops | Total |
|---------|--|---------------------------|---------------------------------|-------------|-------|
| 1.      | <u>Marginal farmer</u><br>( $\leq 2.50$ acres) | 3                         | 111                             | 125         | 239   |
| 2.      | Small farmer<br>(2.51 to 5.00 acres)           | 4                         | 36                              | 135         | 175   |
| 3.      | Medium to large<br>( $> 5.00$ acres)           | 0                         | 23                              | 113         | 136   |
| Total   |  | 7                         | 170                             | 373         | 550   |

The negligible proportion of households devoting all their land to the cultivation of food crops after shift is striking. Of these 7 households, 6 belonged to the Raichur sample, and one to Mandya, both of which are areas which have benefited from canal irrigation and grow improved varieties of paddy, ragi or jowar. In the case of these households, it is possible that with the arrival of high-yielding varieties of seeds, irrigation facility and fertilizers, cultivation of only food crops on even small holdings is a viable activity. We shall however, revert to a closer examination of this aspect later in this chapter.

However, the paucity of such households is in vivid contrast to those which considered the shift of all or part of their land to commercial crops of one kind or another beneficial. It is noteworthy that relatively

more of the marginal farmers opted for a total shift to commercial crops than did the farmers in the other two categories. Households with holdings in excess of 2.50 acres generally preferred mixed cropping to a complete shift to commercial crops.

Table No. 4.7.1

Allocation of Total Land Owned among Crop Categories By Marginal Farmer Households. (Holdings upto 2.5 Acres)

| DISTRICTS   | Food Crops only |     | Commercial Crops Only |     | Mixed Crops |     | TOTAL |     |
|-------------|-----------------|-----|-----------------------|-----|-------------|-----|-------|-----|
|             | B.S             | A.S | B.S                   | A.S | B.S         | A.S | B.S   | A.S |
| CHITRADURGA | 9               | 0   | 0                     | 6   | 3           | 7   | 12    | 13  |
| D. KANNADA  | 25              | 0   | 13                    | 42  | 27          | 19  | 65    | 61  |
| DHARWAD     | 23              | 0   | 0                     | 11  | 2           | 14  | 25    | 25  |
| KOLAR       | 33              | 0   | 2                     | 22  | 7           | 21  | 42    | 43  |
| MANDYA      | 58              | 1   | 0                     | 14  | 3           | 49  | 61    | 64  |
| RAICHUR     | 24              | 2   | 3                     | 16  | 6           | 15  | 33    | 33  |
| TOTAL       | 172             | 3   | 18                    | 111 | 48          | 125 | 238   | 239 |

Table No. 4.7.2

Allocation of Total Land Owned among Crop Categories By Small Farmer Households (Holdings 2.51 to 5.00 Acres)

| DISTRICTS   | Food Crops only |     | Commercial Crops Only |     | Mixed Crops |     | TOTAL |     |
|-------------|-----------------|-----|-----------------------|-----|-------------|-----|-------|-----|
|             | B.S             | A.S | B.S                   | A.S | B.S         | A.S | B.S   | A.S |
| CHITRADURGA | 26              | 0   | 3                     | 16  | 18          | 32  | 47    | 48  |
| D. KANNADA  | 7               | 0   | 2                     | 6   | 7           | 11  | 16    | 17  |
| DHARWAD     | 33              | 0   | 0                     | 4   | 4           | 33  | 37    | 37  |
| KOLAR       | 25              | 0   | 0                     | 6   | 4           | 22  | 29    | 28  |
| MANDYA      | 15              | 0   | 0                     | 1   | 3           | 16  | 18    | 17  |
| RAICHUR     | 15              | 4   | 3                     | 3   | 11          | 21  | 29    | 28  |
| TOTAL       | 121             | 4   | 8                     | 36  | 47          | 135 | 176   | 175 |

Table No. 4.7.3

Allocation of Total Land Owned among Crop Categories By Medium and Large Farmer Households (Holdings >5 Acres)

| DISTRICTS   | Food Crops only |     | Commercial Crops only |     | Mixed Crops |     | TOTAL |     |
|-------------|-----------------|-----|-----------------------|-----|-------------|-----|-------|-----|
|             | B.S             | A.S | B.S                   | A.S | B.S         | A.S | B.S   | A.S |
| CHITRADURGA | 16              | 0   | 1                     | 9   | 17          | 23  | 34    | 32  |
| D.KANNADA   | 2               | 0   | 1                     | 9   | 8           | 5   | 11    | 14  |
| DHARWAD     | 18              | 0   | 0                     | 0   | 8           | 26  | 26    | 26  |
| KOLAR       | 17              | 0   | 0                     | 3   | 5           | 19  | 22    | 22  |
| MANDYA      | 9               | 0   | 0                     | 0   | 3           | 10  | 12    | 10  |
| RAICHUR     | 13              | 0   | 2                     | 2   | 16          | 30  | 31    | 32  |
| TOTAL       | 75              | 0   | 4                     | 23  | 57          | 113 | 136   | 136 |

A scrutiny of tables 4.7.1, 4.7.2 and 4.7.3 shows that the position "before shift" was distinctly different for all three classes of farmers, and in all districts. The majority of holdings for all the three categories was under "food crops only", followed by "mixed crops" and "commercial crops" in that order. It is possible that some of this feature derives from the fact that the date for "before shift" is part of the household's "remembered" response, and the data of shift differs from household to household. Subject to that limitation, the comparative position for the total sample of 550 households was as follows:

|              | Food crops only | Commercial crops only | Mixed crops | Total |
|--------------|-----------------|-----------------------|-------------|-------|
| Before shift | 368             | 32                    | 150         | 550   |
| After shift  | 7               | 170                   | 373         | 550   |

The decline in the case of "food crops only" is striking. However, amongst the three categories of farmers, there are some significant variations.

In the case of marginal farmers, the larger part of the shift is to the cultivation of only commercial crops rather than mixed crops. This is particularly pronounced in the samples from Chitradurga, D.Kannada, Kolar and Raichur. Indeed, for D.Kannada, there seems to be a shift of marginal farmers from both food crops and mixed crops cultivation to the cultivation of only commercial crops. With the limited area of their holdings, the choices open to such farmers in D.Kannada for mixed cropping is patently limited, except when commercially attractive tree crops can be combined with paddy the staple food crop of the region. Contrarily, when the market price of the suitable commercial crop is higher, or when special facilities are given by government for growing tree crops like mulberry and eucalyptus, marginal farmers may find the prospect of a sizeable increase in money income sufficiently attractive to change their cropping decision. How this affects of their food security is an issue which we shall consider in Chapter-V.

In the case of small as well as medium and large farmers, the preferred choice has distinctly been "mixed crops" There are, however, some noticeable inter-district differences. For small farmers, the Chitradurga

and D.Kannada samples reveal that a good proportion of them substituted commercial crops wholly for the food crops. In D.Kannada, amongst the medium and large farmers, these were some who moved from "mixed crops" to only commercial crops.

All other district samples reveal a clear preference for mixed crops by both these classes of farmers. As mentioned earlier, data relating to "before shift" are not all for the same year. Also, the shift from the original position or "before shift" to "after shift" could well have been in stages, with each household having tried and discarded some single or mixed cropping decisions. But what is important is that as of now, the shift away from food crops has been so complete and pervasive.

The general ambience in the state encouraging farmers to shift more of their land to commercial crops of one kind or another is thus fully reflected in the samples selected for this study. The Table 4.7.1 to 4.7.3 also indicate a trend worth noticing: the option of "mixed crops" becomes more attractive (and, as we shall see later, viable) the larger the size of the holding. This should also be instinctively acceptable, since exceptional conditions are required to make the parcelling out of a small holding among different crops more efficient than devoting all of it to one crop.

Moreover, with a large holding, even the cultivation of "food crops" (i.e. cereals) may be such as to leave a marketable surplus after retention for home consumption. Since such decisions hinge on the expectations of a higher income and the probability of its realisation in practice, the final test has obviously to be whether, consequent upon the shift, the household is better-off or worse-off in terms of net farm income. But before we take up this vital issue, it is necessary to have a closer look at the households using their land for mixed cropping, since the 'mixture' often consists of both commercial and food crops.

For a proper appreciation of this feature, it would have been ideal if we could have obtained precise data on the acreage devoted by each household separately to growing food crops and commercial crops. But the information provided by households on acreage under each crop is neither comprehensive nor consistent with the figures on land owned or cultivated by them. We could, however, get from each household a list of different types of food or commercial crops grown by them on their holdings both before and after shift. Concentrating on the principal food crops (listed at the beginning of this section) we have tabulated the data for two groups of households, viz those holding less than 5 acres (i.e. marginal and small farmers together) and those with more than 5 acres, in Tables 4.8.1 and 4.8.2. In these

Raichur, there are 6 households under food crops only in tables 4.7.1 to 4.7.3; this goes up to 106 altogether in Tables 4.8.1 and 4.8.2 (after shift), for households growing one or more food crops on their land. The implication again is that many of the 66 households in the 'mixed crop' category shown in Tables 4.7.1 to 4.7.3 cultivated one or more food crops. Much the same is true of other district samples, and for "before shift" data also.



tables, each household figures once under each crop grown. That is to say, if the household grows only paddy, it figures only once; if it grows two crops, it is shown once under each crop or twice altogether, and so on. Consequently, each household is apt to be counted more than once and the total of households shown as growing food crops is more than those shown in Tables 4.7.1, 4.7.2 and 4.7.3. This applies to households growing "food crops only", as well as those cultivating "mixed crops".

Some of the discrepancy between the two totals thus arises from multiple counting of households devoting all their land to growing more than one food crop. But when the discrepancy between the two aggregates is substantial, it clearly implies the cultivation of one or more food crops by households shown under "mixed crops" in the earlier tables.

A couple of concrete instances will make this clear. In the case of the Chitradurga for example, there are no households cultivating only food crops after shift in all three categories of farmers; and a total of 62 households under "mixed crops" in Tables 4.7.1 to 4.7.3. But in Tables 4.8.1 and 4.8.2 there are altogether 92 households shown as cultivating one or more food crops after shift. Obviously all these households belong to the 'mixed crops' group, with some of them combining multiple food crops with other crops. Similarly for

Table 4.8.1

**Households Cultivating Food grains:Marginal & Small  
Farmers (upto 5 acres)**

(Before Shift)

(No. of Households)

| District       | Paddy | Ragi | Jowar | Bajra | Maize | Total |
|----------------|-------|------|-------|-------|-------|-------|
| 1. Chitradurga | 12    | 18   | 20    | 55    | 5     | 110   |
| 2. D.Kannada   | 73    | 0    | 0     | 0     | 0     | 73    |
| 3. Dharwad     | 64    | 1    | 21    | 0     | 0     | 86    |
| 4. Kolar       | 20    | 14   | 1     | 0     | 0     | 85    |
| 5. Mandya      | 83    | 54   | 1     | 0     | 0     | 138   |
| 6. Raichur     | 16    | 1    | 36    | 18    | 0     | 71    |
| Total          | 268   | 138  | 79    | 73    | 5     | 563   |

After Shift

| District       | Paddy | Ragi | Jowar | Bajra | Maize | Total |
|----------------|-------|------|-------|-------|-------|-------|
| 1. Chitradurga | 20    | 16   | 12    | 37    | 03    | 88    |
| 2. D.Kannada   | 35    | 0    | 0     | 0     | 0     | 35    |
| 3. Dharwad     | 58    | 0    | 25    | 0     | 0     | 83    |
| 4. Kolar       | 9     | 57   | 1     | 0     | 0     | 67    |
| 5. Mandya      | 73    | 31   | 0     | 0     | 0     | 104   |
| 6. Raichur     | 48    | 2    | 30    | 7     | 0     | 87    |
| Total          | 243   | 106  | 68    | 44    | 3     | 464   |

Table 4.8.2

Medium & Large Farmers (above 5 acres)

(Before Shift)

|                |       | (No. of Household) |       |       |       |       |
|----------------|-------|--------------------|-------|-------|-------|-------|
| District       | Paddy | Ragi               | Jowar | Bajra | Maize | Total |
| 1. Chitradurga | 3     | 2                  | 5     | 7     | 0     | 17    |
| 2. D.Kannada   | 3     | 0                  | 0     | 0     | 0     | 3     |
| 3. Dharwad     | 17    | 0                  | 3     | 0     | 0     | 20    |
| 4. Kolar       | 2     | 21                 | 0     | 0     | 0     | 23    |
| 5. Mandya      | 6     | 2                  | 0     | 0     | 0     | 8     |
| 6. Raichur     | 22    | 0                  | 29    | 2     | 0     | 53    |
| Total          | 53    | 25                 | 37    | 9     | 0     | 124   |

(After Shift)

| District       | Paddy | Ragi | Jowar | Bajra | Maize | Total |
|----------------|-------|------|-------|-------|-------|-------|
| 1. Chitradurga | 2     | 0    | 1     | 1     | 0     | 4     |
| 2. D.Kannada   | 0     | 0    | 0     | 0     | 0     | 0     |
| 3. Dharwad     | 10    | 0    | 0     | 0     | 0     | 10    |
| 4. Kolar       | 0     | 2    | 0     | 0     | 0     | 2     |
| 5. Mandya      | 0     | 0    | 0     | 0     | 0     | 0     |
| 6. Raichur     | 12    | 0    | 7     | 0     | 0     | 19    |
| Total          | 24    | 2    | 8     | 1     | 0     | 35    |

Apart from this general feature, a close scrutiny of Tables 4.8.1 and 4.8.2 also reveals the following:

- (i) In all the six districts the number of households cultivating food crops declined after shift. This was more pronounced in the case of jowar, bajra and maize than of paddy and ragi (see, however (iii) below).
- (ii) The shift away from food crops was sharper for the medium and large farmers than for the marginal and small farmers.
- (iii) However, there were some interesting differences as between districts. The decline from "before shift" to "after shift" was least for Dharwad, and highest for D.Kannada. As between crops, farmers in both Chitradurga and Raichur shifted into paddy, particularly the marginal and small farmers. And in Dharwad, they shifted into jowar. These preferences are clearly linked to their food habits.
- (iv) The divergence in the case of D.Kannada and Raichur may also be due to some extraneous factors - e.g., the availability of more non-farm incomes to households in D.Kannada, and the extension of irrigation in Raichur, enabling the substitution of paddy for other food grains (see below).

### Reasons for Shift in Cropping Pattern

Responses of households to questions on the reasons for shift in cropping patterns do not disclose any particular policy factor or factors having a decisive impact in all districts or for all classes of farmers - though some of them apparently influenced the decisions of medium and large farmers. Not unexpectedly, the main reason given by all households was the expectation of a higher income after shift. As we discuss later, all households have benefitted in terms of gross farm income to a greater or less degree by shifting to commercial crops or mixed cropping. However, on the specific inquiries on why they expected to secure a higher income, the replies did not fall into any clear pattern.

Amongst the environmental factors, the most important seem to be (a) the availability of additional water sources (b) successful adoption of new crops by other farmers in the area and (c) growth of and better access to markets in the vicinity. Other factors like soil testing for suitability to new crops, availability of new inputs, special incentives provided by government, better access to institutional credit etc. influenced farmers largely through an osmotic process. When some farmers influenced by these factors adopted a new commercial crop or a new variety of food crop and prospered, others followed suit over a period.

Consequently, the effect of these factors on crop decisions by farmers is subsumed under the blanket reply of "other farmers successfully shifting to new crops".

Table No:4.9

Reasons for Change in Cropping Pattern

| Reasons                            | Chitradurga |    | D.Kannada |    | Dharwad |    | Kolar |    | Handya |    | Raichur |    | Total |     |
|------------------------------------|-------------|----|-----------|----|---------|----|-------|----|--------|----|---------|----|-------|-----|
|                                    | A           | B  | A         | B  | A       | B  | A     | B  | A      | B  | A       | B  | A     | B   |
| 0) No reasons                      | 0           | 68 | 0         | 42 | 0       | 39 | 0     | 73 | 0      | 57 | 0       | 41 | 0     | 320 |
| 1) Anticipating more cash income   | 84          | 1  | 75        | 0  | 82      | 4  | 87    | 3  | 82     | 2  | 89      | 4  | 499   | 14  |
| 2) Availability of Irrigation      | 4           | 0  | 1         | 5  | 2       | 2  | 0     | 1  | 3      | 10 | 2       | 18 | 12    | 36  |
| 3) Influence of other farmers      | 1           | 4  | 4         | 1  | 1       | 4  | 2     | 4  | 2      | 7  | 1       | 5  | 11    | 25  |
| 4) Incentives provided by Govt.    | 1           | 0  | 0         | 0  | 0       | 0  | 0     | 0  | 0      | 1  | 0       | 2  | 1     | 3   |
| 5) Availability of market facility | 1           | 1  | 0         | 7  | 0       | 0  | 0     | 0  | 2      | 4  | 0       | 1  | 3     | 13  |
| 6) Knowledge of new inputs         | 0           | 0  | 0         | 0  | 0       | 0  | 0     | 2  | 0      | 1  | 0       | 1  | 0     | 4   |
| 7) Others                          | 2           | 19 | 12        | 37 | 3       | 39 | 4     | 10 | 2      | 9  | 1       | 21 | 24    | 135 |
| Total                              | 93          | 93 | 92        | 92 | 88      | 88 | 93    | 93 | 91     | 91 | 93      | 93 | 550   | 550 |

Note : A: Primary Reasons  
B: Secondary Reasons

Apparently, these examples of successful shift could even be from other villages or taluks.

There are, however, two macro-economic features which have to be kept in mind in this context. The last few decades have witnessed both a general upward shift in agricultural prices, and periodic changes in price-parities between agricultural inputs and outputs, as well as between different crops. Some of the changes in parity were policy-oriented - as for instance in procurement prices or minimum prices announced from time to time by the Central and State Governments. But over and above this, and indeed necessitating periodic adjustment in policy - oriented parities, there has been a secular rise in agricultural prices, and this in itself could well have led to changes in cropping decisions. Shifts to sugarcane in canal-irrigated tracts of Mandya and Raichur, to various tree crops in D.Kannada and eucalyptus and tomato in Kolar are all due to this underlying trend, buttressed in some cases by the announcement of minimum prices by Government.

Altogether, it is not possible to derive any definitive conclusion about the relative effectiveness of policy measures undertaken by governments to promote particular cropping patterns. Over a period, many if not all of them have obviously influenced cropping decisions in the State to a certain extent. If any of these are to be

singled out for special mention, they would be the availability of additional irrigation and better access to markets, given the generally upward trend in agricultural prices.\* But much more important is the fact that for many of the major non-price measures taken by Government to benefit the farmers, the effects cumulate only after a considerable period. At least this has been so in the past; with better communications and greater literacy, they may perhaps influence farming decisions better and more speedily in the future.

#### Gross Farm Incomes: Definition

Since the shift in cropping pattern was largely associated with an expectation of improvement in the households "farm income", the question arises whether these expectations were in fact fulfilled. In pursuance of this, we have tried to compare for each of the households in the sample the relative change in farm income from "before shift" to "after shift". There have been a few conceptual or measurement problems associated with this exercise, which we note below:

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\* This inquiry did not cover questions of land reform; hence it is not possible to say anything on the issue.



(i) First, it has not been possible to reconcile the "gross" and "net" measures of farm income, especially for the period before the shift. This is because (a) income and expenditure data for the past given by households were both incomplete and imprecise; (b) even for the after shift data, expenses incurred on animals, repair of agricultural machinery and farm structures etc. were unavailable or inadequate; and (c) there was virtually no data on depreciation of farm assets. Hence we have used, throughout this report only the data on "gross farm income".

(ii) In calculating "gross farm income", we have taken into account both the value of agricultural outputs sold by the household, and the value of such outputs retained for home consumption. Strictly, the former has to be evaluated at the price actually realised by each household, and the latter at "farm side" prices which may have varied from case to case. We have however, evaluated the quantities of agricultural products sold by the households at a common price, viz the "local market" price at harvest time. We have used the same price multiplier for the retained portion of the output as well. This probably understates "gross farm income" for all categories, with the understatement varying directly with the

household's capacity to hold stocks for later sale. Together with the inherent tendency amongst households to understate incomes (and overstate expenditures), it is possible that gross farm incomes were in reality higher than reported here, before shift as well as afterwards. Hence the extent of change between the two situations is an approximation rather than a precise measurement.

(iii) Virtually all households had "other income" besides gross farm income - by way of wages earned elsewhere, rents from lease of property or bullock carts or agricultural equipment, profits from animal husbandry etc, remittances from outside the village, and occasional gifts by employers or tenants. To the extent possible all these have been taken into account in the more inclusive concept of "gross household income" (=gross farm income+other income during the year). Both "gross household income" and "gross farm income" have been computed for the year as a whole. However, information provided by households on "other incomes" before shift has been quite inadequate, and it has not been possible to compare the "before shift" and "after shift" positions in respect of "gross household income".

(iv) Finally, comparisons of gross farm incomes after shift with those before shift have largely been in money terms. This does not obviously reflect "real" change, given the price variations between the two situations. For a precise measure of "real" change in the gross farm income of each household, the money values of such income have to be corrected by price-changes applicable to that household. This again was not a feasible proposition, since the recollections of households of unit-prices secured for different types and varieties of crops were unsatisfactory. As a rough approximation, we have tried to get some appreciation of "real" change in farm income by revaluing the outputs "before shift" by the average local prices of different varieties of agriculture products as they applied to the period after shift. Since this is only partly satisfactory, we have by and large concentrated on comparisons of proportions rather than of absolute magnitudes. However, where direct comparisons of absolute levels of gross farm incomes have been attempted, we have tempered our judgments with cross-checks against the position of corresponding "real" values derived as above.

### Income Effects of Shift by Categories of Farmers

Subject to these reservations the effect of the shift in cropping pattern on the gross farm income (annual) of the sample households in the three categories of farmers is summarised in Table 4.10, according to income ranges. District-wise changes according to marginal, small and medium-to-large farmer households are shown in Tables 4.11.1 to 4.11.3. From Table 4.10, the following features emerge:

Table No: 4.10

#### Gross Farm Income by Income Range: Household Distribution by Categories of Households

| Income ranges<br>(In Rs.) | Before Shift |       |       | After Shift |       |       |
|---------------------------|--------------|-------|-------|-------------|-------|-------|
|                           | Marginal     | Small | Large | Marginal    | Small | Large |
| Below 1000                | 74           | 51    | 6     | 12          | 0     | 0     |
| 1000-5000                 | 126          | 76    | 57    | 56          | 27    | 2     |
| 5001-10000                | 26           | 31    | 24    | 64          | 43    | 8     |
| 10001-15000               | 9            | 7     | 8     | 49          | 29    | 19    |
| 15001-25000               | 2            | 7     | 17    | 30          | 36    | 22    |
| 25001-50000               | 2            | 1     | 13    | 26          | 29    | 36    |
| 50001-100000              | 0            | 2     | 8     | 2           | 10    | 25    |
| Above 100000              | 0            | 0     | 3     | 0           | 1     | 24    |
| TOTAL                     | 239          | 175   | 136   | 239         | 175   | 136   |

- (i) Save for 12 marginal farmer households in the lowest bracket, very many households in all brackets have apparently achieved higher gross farm

incomes after shift. Even the 12 marginal farmer households may have benefitted somewhat, but not sufficiently to secure gross farm incomes in excess of Rs.1000.

(ii) Before the shift, gross farm income for the majority of households in all the three categories of farmers was less than Rs.15,000 per year. But after the shift 76% of marginal farmers and 57% of small farmers still had gross farm incomes below Rs.15,000; whereas 79% of medium and large farmers had moved into income ranges over Rs.15,000. The differential impact of price changes that might have occurred in the meanwhile on farmer households in the three categories is, however, subsumed in this.

(iii) Turning to households with gross farm incomes above Rs.25,000 per year, there were only 29 households in this income range (2 marginal, 3 small and 24 medium and large) before shift. This increased after shift to 153, distributed as follows: 28 marginal, 40 small and 85 medium and large farmer households. In other words, for the bulk of medium and large farmer households the shift in cropping pattern was distinctly more beneficial than to households in the other two categories. This is not unexpected, since those with larger holdings

have, in general, more options to choose from and better access to available facilities.

The aggregate picture presented in Table 4.10 has been decomposed district-wise and according to the size of holding owned by the households. This yields the 'before shift' and 'after shift' position for marginal farmers (upto 2.5 acres), small farmers (2.51 to 5 acres) and medium to large farmers (above 5 acres), which are shown in Tables 4.11.1 to 4.11.3. An examination of these tables further confirms that the extent of benefit derived by households from the shift in cropping pattern tended to increase with the size of farm owned by the household. Thus, though marginal farmers in all districts had somewhat higher gross farm incomes after shift, annual income for the large majority of them still remained below Rs.15,000. In the dry districts of Chitradurga and Dharwad, this was true of all such farmers; and even in D.Kannada and Mandya, where they had better access to water resources, more than two-thirds of marginal farmer households had gross farm incomes below Rs.15,000 per annum after shift.

Table No: 4.11.1

Distribution of Households By Gross Farm Income  
(Marginal Farmer Households)  
(Before shift)

| Farm income of the household (In Rs) | Chitr-adurga | D.Kan-nada | Dha-rwad  | Kolar     | Man-dya   | Rai-chur  | Total      |
|--------------------------------------|--------------|------------|-----------|-----------|-----------|-----------|------------|
| Below 1000                           | 9            | 6          | 13        | 27        | 4         | 15        | 74         |
| 1000-5000                            | 4            | 32         | 12        | 13        | 50        | 15        | 126        |
| 5001-10000                           | 0            | 14         | 0         | 1         | 9         | 2         | 26         |
| 10001-15000                          | 0            | 8          | 0         | 0         | 0         | 1         | 9          |
| 15001-25000                          | 0            | 1          | 0         | 1         | 0         | 0         | 2          |
| 25001-50000                          | 0            | 0          | 0         | 1         | 1         | 0         | 2          |
| 50001-100000                         | 0            | 0          | 0         | 0         | 0         | 0         | 0          |
| Above 100000                         | 0            | 0          | 0         | 0         | 0         | 0         | 0          |
| <b>TOTAL</b>                         | <b>13</b>    | <b>61</b>  | <b>25</b> | <b>43</b> | <b>64</b> | <b>33</b> | <b>239</b> |

(After Shift)

| Farm income of the household (In Rs) | Chitr-adurga | D.Kan-nada | Dha-rwad  | Kolar     | Man-dya   | Rai-chur  | Total      |
|--------------------------------------|--------------|------------|-----------|-----------|-----------|-----------|------------|
| Below 1000                           | 0            | 4          | 4         | 1         | 0         | 3         | 12         |
| 1000-5000                            | 9            | 8          | 17        | 11        | 4         | 7         | 56         |
| 5001-10000                           | 4            | 15         | 4         | 14        | 16        | 11        | 64         |
| 10001-15000                          | 0            | 13         | 0         | 5         | 25        | 6         | 49         |
| 15001-25000                          | 0            | 9          | 0         | 7         | 12        | 2         | 30         |
| 25001-50000                          | 0            | 10         | 0         | 5         | 7         | 4         | 26         |
| 50001-100000                         | 0            | 2          | 0         | 0         | 0         | 0         | 2          |
| Above 100000                         | 0            | 0          | 0         | 0         | 0         | 0         | 0          |
| <b>TOTAL</b>                         | <b>13</b>    | <b>61</b>  | <b>25</b> | <b>43</b> | <b>64</b> | <b>33</b> | <b>239</b> |

Table No: 4.11.2

**Distribution of Households By Gross Farm Income  
(Small Farmer Households)  
(Before shift)**

| Farm income of the household (In Rs) | Chitradurga | D.Kannada | Dharmawad | Kolar     | Mandya    | Raichur   | Total      |
|--------------------------------------|-------------|-----------|-----------|-----------|-----------|-----------|------------|
| Below 1000                           | 32          | 0         | 5         | 6         | 0         | 8         | 51         |
| 1000-5000                            | 12          | 8         | 20        | 17        | 5         | 14        | 76         |
| 5001-10000                           | 3           | 4         | 9         | 4         | 8         | 3         | 31         |
| 10001-15000                          | 0           | 1         | 2         | 1         | 2         | 1         | 7          |
| 15001-25000                          | 1           | 2         | 1         | 0         | 1         | 2         | 7          |
| 25001-50000                          | 0           | 0         | 0         | 0         | 1         | 0         | 1          |
| 50001-100000                         | 0           | 2         | 0         | 0         | 0         | 0         | 2          |
| Above 100000                         | 0           | 0         | 0         | 0         | 0         | 0         | 0          |
| <b>TOTAL</b>                         | <b>48</b>   | <b>17</b> | <b>37</b> | <b>28</b> | <b>17</b> | <b>28</b> | <b>175</b> |

**(After Shift)**

| Farm income of the household (In Rs) | Chitradurga | D.Kannada | Dharmawad | Kolar     | Mandya    | Raichur   | Total      |
|--------------------------------------|-------------|-----------|-----------|-----------|-----------|-----------|------------|
| Below 1000                           | 0           | 0         | 0         | 0         | 0         | 0         | 0          |
| 1000-5000                            | 15          | 0         | 8         | 4         | 0         | 0         | 27         |
| 5001-10000                           | 9           | 0         | 24        | 4         | 1         | 5         | 43         |
| 10001-15000                          | 9           | 2         | 2         | 2         | 1         | 13        | 29         |
| 15001-25000                          | 12          | 5         | 2         | 9         | 3         | 5         | 36         |
| 25001-50000                          | 1           | 7         | 0         | 8         | 9         | 4         | 29         |
| 50001-100000                         | 2           | 2         | 1         | 1         | 3         | 1         | 10         |
| Above 100000                         | 0           | 1         | 0         | 0         | 0         | 0         | 1          |
| <b>TOTAL</b>                         | <b>48</b>   | <b>17</b> | <b>37</b> | <b>28</b> | <b>17</b> | <b>28</b> | <b>175</b> |



Table No: 4.11.3

**Distribution of Households By Gross Farm Income  
(Medium to Large Farmer Households)  
(Before shift)**

| Farm income of the household (In Rs) | Chitradurga | D.Kan-nada | Dha-rwad  | Kolar     | Man-dya   | Rai-chur  | Total      |
|--------------------------------------|-------------|------------|-----------|-----------|-----------|-----------|------------|
| Below 1000                           | 3           | 0          | 0         | 3         | 0         | 0         | 6          |
| 1000-5000                            | 15          | 4          | 11        | 13        | 2         | 12        | 57         |
| 5001-10000                           | 4           | 4          | 4         | 2         | 2         | 8         | 24         |
| 10001-15000                          | 1           | 1          | 3         | 0         | 0         | 3         | 8          |
| 15001-25000                          | 1           | 1          | 4         | 2         | 4         | 5         | 17         |
| 25001-50000                          | 4           | 2          | 2         | 2         | 2         | 1         | 13         |
| 50001-100000                         | 3           | 2          | 2         | 0         | 0         | 1         | 8          |
| Above 100000                         | 1           | 0          | 0         | 0         | 0         | 2         | 3          |
| <b>TOTAL</b>                         | <b>32</b>   | <b>14</b>  | <b>26</b> | <b>22</b> | <b>10</b> | <b>32</b> | <b>136</b> |

**(After Shift)**

| Farm income of the household (In Rs) | Chitradurga | D.Kan-nada | Dha-rwad  | Kolar     | Man-dya   | Rai-chur  | Total      |
|--------------------------------------|-------------|------------|-----------|-----------|-----------|-----------|------------|
| Below 1000                           | 0           | 0          | 0         | 0         | 0         | 0         | 0          |
| 1000-5000                            | 0           | 0          | 2         | 0         | 0         | 0         | 2          |
| 5001-10000                           | 3           | 1          | 4         | 0         | 0         | 0         | 8          |
| 10001-15000                          | 6           | 1          | 6         | 2         | 0         | 4         | 19         |
| 15001-25000                          | 6           | 0          | 6         | 3         | 0         | 7         | 22         |
| 25001-50000                          | 5           | 6          | 6         | 6         | 3         | 10        | 36         |
| 50001-100000                         | 7           | 2          | 1         | 5         | 3         | 7         | 25         |
| Above 100000                         | 5           | 4          | 1         | 6         | 4         | 4         | 24         |
| <b>TOTAL</b>                         | <b>32</b>   | <b>14</b>  | <b>26</b> | <b>22</b> | <b>10</b> | <b>32</b> | <b>136</b> |

Compared to marginal farmer households, the small farmers fared distinctly better. In D.Kannada, Mandya and Kolar districts, the majority of such farmers moved into income ranges above Rs.15,000 per year. Even in Raichur and Chitradurga districts, more than 30% of such households improved their position significantly. But in Dharwad, small farmers fared only slightly better than the marginal farmer households; a mere 3% of such households secured incomes ranging from Rs.15,000 to Rs.25,000 after shift.

As against these, medium to large farmers, most of whom had gross farm incomes below Rs.15,000 before shift in all districts except Mandya, experienced a sea-change. After the crop-shift, the majority of such households had annual incomes in excess of Rs.15,000 even in Dharwad. Indeed, in all the other districts, their annual farm incomes exceeded Rs.25,000, with several of them topping Rs.50,000 and even Rs.1,00,000.

While in absolute terms post-shift incomes appear to have varied directly with the size of the households' land-holding, the picture in terms of relative increase is somewhat mixed. As may be seen from Table 4.12 below, marginal farmers have not on the average done any worse than small farmers (except in Kolar and Chitradurga) in terms of percentage increase. However, the base level for marginal farmers is so much lower than that for the other two categories that, despite apparently impressive proportionate increases, the

average level of gross farm incomes for this category of farmers remains even after shift less than Rs.15,000 in all districts except D.Kannada. When we revalue annual farm incomes before shift by agricultural commodity prices prevailing after shift (Table 4.12), the percentage increases are generally lower; but the overall, inter-district differences remain unaltered, except in the case of marginal farmers in Raichur who have benefitted from the shift.

**Table 4.12 Average Gross Farm Incomes Before & After Shift : District-wise (In Current Prices)**

| Districts   | Marginal Farmers |             |              | Small Farmers |             |              | Large Farmers |             |              |
|-------------|------------------|-------------|--------------|---------------|-------------|--------------|---------------|-------------|--------------|
|             | BS<br>(Rs.)      | AS<br>(Rs.) | Incr.<br>(%) | BS<br>(Rs.)   | AS<br>(Rs.) | Incr.<br>(%) | BS<br>(Rs.)   | AS<br>(Rs.) | Incr.<br>(%) |
| Chitradurga | 799              | 4254        | 432          | 1564          | 12528       | 701          | 25145         | 88120       | 250          |
| D.Kannada   | 5028             | 15450       | 207          | 14145         | 36990       | 162          | 19487         | 93385       | 379          |
| Dharwad     | 1261             | 2917        | 131          | 4527          | 8171        | 80           | 15059         | 25567       | 70           |
| Kolar       | 2148             | 12052       | 461          | 2721          | 21246       | 681          | 7760          | 73504       | 847          |
| Mandya      | 3393             | 14121       | 316          | 8591          | 32878       | 283          | 14832         | 88325       | 498          |
| Raichur     | 1886             | 10523       | 458          | 3868          | 17935       | 364          | 18516         | 59198       | 220          |

(In Constant "AS" Prices)

| Districts   | Marginal Farmers |             |              | Small Farmers |             |              | Large Farmers |             |              |
|-------------|------------------|-------------|--------------|---------------|-------------|--------------|---------------|-------------|--------------|
|             | BS<br>(Rs.)      | AS<br>(Rs.) | Incr.<br>(%) | BS<br>(Rs.)   | AS<br>(Rs.) | Incr.<br>(%) | BS<br>(Rs.)   | AS<br>(Rs.) | Incr.<br>(%) |
| Chitradurga | 1048             | 4254        | 306          | 2570          | 12528       | 387          | 40724         | 88120       | 116          |
| D.Kannada   | 5996             | 15450       | 158          | 16912         | 36990       | 119          | 20102         | 93385       | 365          |
| Dharwad     | 1392             | 2828        | 103          | 5389          | 8171        | 52           | 18170         | 25567       | 41           |
| Kolar       | 2244             | 12052       | 437          | 2685          | 21246       | 691          | 7969          | 73505       | 822          |
| Mandya      | 4300             | 14121       | 228          | 11448         | 32878       | 187          | 20650         | 88625       | 329          |
| Raichur     | 1559             | 10523       | 575          | 5418          | 17935       | 231          | 17562         | 59198       | 237          |

### Income Effects of Shift in Crop Varieties

From the inter-district variations in these tables, it is also seen that increased benefits from crop-shifts are associated with water availability as well as the type of commercial (or food) crop chosen by the farmers. In D.Kannada, for instance, heavy rainfall and the type of terrain has facilitated even marginal farmers to enhance their incomes by opting for cultivation of tree crops like mulberry, areca, etc. Households in Mandya and Raichur have benefitted from shifting to HYV paddy or ragi as well as sugarcane, given the secure irrigation. In Kolar, while tube-well irrigation has facilitated the cultivation of fruits and vegetables, and hybrid ragi in some areas, bigger farmers - especially the medium to large ones - have added to their incomes by planting eucalyptus and mulberry. Some of the irrigation benefits are also observable in the Chitradurga and Raichur samples. Considering all this, it would appear that larger holdings together with better water resources significantly enlarge the scope for adding to farm incomes through a better choice of crops. The relationship between these differences as well as in cropping pattern and gross farm incomes therefore merits further scrutiny.

In a sample of 550 households, only 7 remained in food crops as against 368 before shift, the remaining 361 had moved either wholly into commercial crops (140) or into

a combination of food and commercial crops (221). The distribution of households among these three cropping patterns thus changed into one in which the cultivation of commercial crops predominated. Besides the shift of acreage from food to commercial crops, there were also changes in the type of food crop or commercial crop grown.

The effect of these shifts in cropping decisions on gross farm incomes before and after shift are shown in Table 4.13, in both current and "constant after shift (AS) prices". The distribution according to ranges of gross farm incomes under each of the crop patterns remained virtually unaffected by the change in the price assumption. It clearly improved in all categories after the shift, though this was much less impressive under food crops. Using, for instance, the same gross farm income of Rs.10,000 per annum as a threshold, the comparative position before and after shift of households above this level was as follows:

| Crop Pattern     | Gross Farm Income Before Shift | Gross Farm Income Rs.10,000 After Shift | Increase or decrease (-) |
|------------------|--------------------------------|---|--------------------------|
| Food crops only  | 30                             | 7                                       | (-) 23                   |
| Commercial crops | 3                              | 85                                      | 82                       |
| Mixed crops      | 37                             | 246                                     | 209                      |

Table No: 4.13

Gross Farm Income By Income Ranges : Household Distribution by Type  
Crop Grown (For All Districts) (In Current Prices)

| Farm income<br>(In Current<br>Prices) | Before Shift  |                       |                | After Shift   |                       |                |
|---------------------------------------|---------------|-----------------------|----------------|---------------|-----------------------|----------------|
|                                       | Food<br>Crops | Commerc-<br>ial Crops | Mixed<br>Crops | Food<br>Crops | Commerc-<br>ial Crops | Mixed<br>Crops |
| Below 1000                            | 111           | 6                     | 14             | 0             | 10                    | 2              |
| 1000-5000                             | 187           | 16                    | 55             | 0             | 39                    | 46             |
| 5001-10000                            | 40            | 5                     | 36             | 0             | 36                    | 79             |
| 10001-15000                           | 8             | 1                     | 15             | 2             | 36                    | 59             |
| 15001-25000                           | 14            | 0                     | 12             | 3             | 18                    | 67             |
| 25001-50000                           | 4             | 0                     | 13             | 2             | 23                    | 66             |
| 50001-100000                          | 3             | 2                     | 5              | 0             | 6                     | 31             |
| Above 100000                          | 1             | 0                     | 2              | 0             | 2                     | 23             |
| <b>TOTAL</b>                          | <b>368</b>    | <b>30</b>             | <b>152</b>     | <b>7</b>      | <b>170</b>            | <b>373</b>     |

(In Constant "AS" Prices)

| Farm Income<br>(In Constant<br>"AS" Prices) | Before Shift  |                     |                | After Shift   |                     |                |
|---|---------------|---------------------|----------------|---------------|---------------------|----------------|
|   | Food<br>Crops | Commercial<br>Crops | Mixed<br>Crops | Food<br>Crops | Commercial<br>Crops | Mixed<br>Crops |
| Below 1000                                  | 114           | 7                   | 15             | 0             | 10                  | 2              |
| 1000-5000                                   | 157           | 13                  | 50             | 0             | 39                  | 46             |
| 5001-10000                                  | 64            | 5                   | 33             | 0             | 36                  | 79             |
| 10001-15000                                 | 7             | 2                   | 20             | 2             | 36                  | 59             |
| 15001-25000                                 | 13            | 1                   | 6              | 3             | 18                  | 67             |
| 25001-50000                                 | 9             | 0                   | 18             | 2             | 23                  | 66             |
| 50001-100000                                | 4             | 2                   | 7              | 0             | 6                   | 31             |
| Above 100000                                | 0             | 0                   | 3              | 0             | 2                   | 23             |
| <b>TOTAL</b>                                | <b>368</b>    | <b>30</b>           | <b>152</b>     | <b>7</b>      | <b>170</b>          | <b>373</b>     |

In other words, of the 301 households which had shifted to commercial crops to a greater or less extent, 291 or about 81 per cent had moved into income ranges above Rs. 10,000. Since 23 households cultivating only food crops which earlier had gross farm incomes above Rs. 10,000 had also chosen to change their crop pattern, the presumption is that their incomes moved further upward.

The price adjustment made in Table 4.13 suffers from the disadvantage that it imposes the "after shift" price-parities to the "before shift" position of incomes. Over the years, these parities have also changed and influenced relative incomes in some measure. This has to be borne in mind in assessing any variation over time of gross farm incomes.

The significant impact of the shift of land from food crops to commercial crops in income from commercial crops is evident from a comparison of household distribution by the proportionate changes in both of them shown in Table 4.14 below. In this table, the rows show the proportionate increase in income from commercial crops for a given change in the area under commercial crops. The columns, on the other hand, represent the acreage changes corresponding to each particular change in income from commercial crops.

Table 4.14  
Distribution of Households according to Proportionate  
Change in Land under Commercial Crops and  
in Income from Commercial Crops:

| Land \ Income changes | Decline | Income upto 20% | 20.1% to 50% | 50.1% to 75% | Above 75% | Total HHs. |
|-----------------------|---------|-----------------|--------------|--------------|-----------|------------|
| Decrease              | 6       | 3               | 9            | 4            | 8         | 30         |
| No change             | 0       | 1               | 5            | 9            | 35        | 50         |
| Increase upto 20%     | 0       | 4               | 9            | 6            | 30        | 49         |
| 20.1% to 50%          | 0       | 0               | 4            | 2            | 189       | 195        |
| Above 50%             | 0       | 0               | 0            | 0            | 226       | 226        |
| Total Households      | 6       | 8               | 27           | 21           | 488       | 550        |

It will be seen from this table that at every percentage change in land under commercial crops, the majority of households in that bracket have had more than proportionate increase in income from commercial crops. If we take the number of households in each box for which both acreage and income increase are equal, the total adds up to only 14 (6+0+4+4+0); the remaining 536 households all had income benefits which were more than proportionate. Besidea this general feature, the following details may be noted:

- a) Of the 509 (or 92%) households whose incomes from commercial crops had risen by more than 50%, only 226 (or 41%) households had added more than 50% to the area under commercial crops.
- b) There were 80 households which had eiber reduced the acreage under commercial crops or kept it



constant. Save for 6 households which had suffered a decline in their commercial crop income due to the fall in acreage, all others had benefited to a greater or less extent. Clearly, these relative increases in income were the result of change in price-parities, shift to new commercial crop varieties, or higher productivity due to better farm technology - or a combination of all these.

- c) Some of these changes probably contributed to the higher income realisations by households which had added to the area under commercial crops. These effects cannot, however, be evaluated separately except through a regression exercise - which we consider at the end of this chapter.

While Table 4.14 brings out the relationship between area under commercial crops and income from commercial crops, it does not reflect in any conclusive manner the aggregate benefit in terms of gross farm income. Obviously, those who have gained in commercial crop income by shifting land have in the process lost some of their income from food crops. This apart, a given percentage increase in land under commercial crops will have different implications for marginal farmers as compared to medium-to-large farmers - since the latter category will have a larger area to allocate and may

have only shifted from one pattern of 'mixed crops' to another pattern. But marginal or small farmers with their much smaller holdings are often able to add substantially to the area under commercial crops only by moving totally out of food crops. In their case, the question whether the additional money income secured by shifting to commercial crops affects their food security beneficially or adversely becomes a matter of importance.

Coming back to the question of the change in gross farm income, the sample data show that for the majority of households in all three categories of farmers, income from commercial crops constituted over 50 per cent of gross farm income after shift. However, not all of these had shifted an equal proportion of their land to the cultivation of commercial crops. There were indeed many farmers who had actually made no change or even reduced the acreage under such crops; in their case, the proportion of commercial crop income to gross farm income was always above 50%, and this had varied both ways. If, however, we consider only those households which had increased the acreage under commercial crops by 50% or more, and for which commercial crop income after shift constituted the major part of gross farm income (i.e. >50%), there were 326 households of which 163 were marginal farmers, 99 small farmers and 64 medium-to-large farmers. [In all three categories, the

allocation of land before shift was preparaderantly in favour of food crops. Households which had committed all their land to commercial crops were very few; and even amongst those which had opted for "mixed crops", the emphasis was generally on foodgrains cultivation. (See Tables 4.7.1 to 4.7.3)] If we compare these figures with households which had moved out of the "food crops only" group in Tables 4.7.1 to 4.7.3, there were 361 households, consisting of 170 marginal, 117 small and 74 medium-to-large farmers. The very close correspondence between these two sets of figures are set out in tabulation form below:

|   | Marginal<br>Farmers | Small<br>Farmers | Large<br>Farmers | Total |
|---|---------------------|------------------|------------------|-------|
| (a) Households moving fully out of "Food Crops only"  | 170                 | 117              | 74               | 361   |
| (b) Households with Ratio of Commercial Crop income to gross farm income <u>over 50%</u> <u>after shift</u> | 163                 | 99               | 64               | 326   |

The close correspondence between the two tends to confirm the view that in all three categories, the majority of farmers had to shift the major part of their land to commercial crops to improve the relative share of commercial crop income to gross farm income. As we have already observed, there was a general upgard shift in the gross farm income of households, consequent upon

the shift from food to commercial crops. And in several cases, especially in respect of medium-to-large farmers, this upward shift was very substantial. Altogether, there is reason to believe that in so far as gross farm incomes are concerned, farmer's expectations of realising higher money incomes by moving into the cultivation of commercial crops seems to have been generally fulfilled.

#### Paid-out Farm Expenses as Ratio of Gross Farm Income

We have so far looked at variations in gross farm incomes. Admittedly, these do not reflect the real change in the net position, as shifts in crops as well as farming techniques would inevitably affect the farm expenditure on different types of land, as well as for different categories of farmers. However, we had three main problems which came in the way of any meaningful analysis of this relationship. First, data provided by households for the period "before shift" were rarely comprehensive enough, even in respect of the paying-out expenses of cultivation. Secondly, even the available information on these could not be broken down according to the crops cultivated. And finally, through some information on time allocation of members of the farmer's households had been canvassed, it was not sufficient to be reduced to standard mandays of labour and converted into money-equivalents. Similarly, cost

of seeds used and water charges incurred are also not available on a comparable basis for all households. Consequently the farm expenditure data that we have been able to gather consists principally of wages of hired labour, charges paid for hired farm machinery and expenditure on fertilizers, pesticides and organic manures. Obviously, deduction of these from gross farm income does not reflect the true net position. However, the ratio of such farm expenditure to gross farm expenditure gives some indication of the "margin" available to the household for other purposes. This is shown in Table 4.15, for the total sample of households, classified according to the size of owned holding.

Table 4.15

Proportion of Paid-out Farm Expenditure to Farm Income:  
Distribution of Households - All Districts

|             | Below<br>10% | 10% to<br>20% | 20.1%-<br>30% | 30.1%-<br>40% | 40.1%-<br>50% | 50.1%-<br>75% | 75.1%-<br>100% | Above<br>100% |
|-------------|--------------|---------------|---------------|---------------|---------------|---------------|----------------|---------------|
| 1 Acre      | 16           | 3             | 4             | 4             | 3             | 2             | 2              | 3             |
| -2.5 Acres  | 64           | 46            | 29            | 21            | 12            | 16            | 2              | 12            |
| .51-5 Acres | 48           | 54            | 37            | 16            | 7             | 9             | 2              | 2             |
| 5 Acres     | 30           | 11            | 32            | 16            | 5             | 9             | 2              | 1             |
| TOTAL       | 158          | 144           | 102           | 57            | 27            | 36            | 8              | 18            |

It will be seen that such paid-out farm expenses were less than 40% of gross farm income after shift for over 83% of all households. In the case of marginal farmers, this proportion was somewhat less at about 78%. However, of 62 households with such expenditures in excess of 50% of gross farm income, the majority (60%) consisted of marginal farmers. With minor differences, this was true of each of the six districts surveyed. While no firm conclusions about the relative gains or losses of farmers in terms of net incomes can be drawn from these proportions, they indicate that (a) for most households in all the three categories, the larger proportion of gross farm income was available for household consumption as well as other purposes, and (b) amongst the much smaller number for which this was not true, the major proportion consisted of marginal farmers.

#### "Margins" as Proxy for Net Farm Income

As already mentioned, the "margin" as defined above does not provide for all farm expenses. Consequently, its absolute value (in current prices) will generally be higher than the "net farm income" of the household - that is to say, that part of gross farm income which is wholly available to the household for consumption or new investment. However, when the absolute value of this margin is itself low, it implies that the household's

"net income" is even lower and may in reality be inadequate to meet the needs of the household. Some broad impressions of this kind may be gathered from Table 4.16 below, which sets out the average value of the "margin" after shift, for different categories of farmers in the six districts surveyed. Since the numbers given in this table are averages for households in each category, there will obviously be some with "margins" even lower than the amounts shown. What then is the picture that emerges from a quick comparison of these margins for different districts and categories of farmers?

Table 4.16

**Average Excess of Gross Farm Income over Paid-out Farm Expenditures:**  
**After Shift :By Categories of Farmer Households**  
 (Current Prices)

| District                     | Marginal Farmers<br>upto 2.5 acres<br>Rs. | Small Farmers<br>2.51-5.0<br>acres<br>Rs. | Medium-to-large<br>Farmers<br>over 5 acres<br>Rs. | Average<br>for all<br>Households<br>Rs. |
|------------------------------|---|---|---|---|
| 1. Chitradurga               | 3,221<br>(13)                             | 9,900<br>(48)                             | 74,297<br>(32)                                    | 31,124<br>(93)                          |
| 2. D. Kannada                | 12,148<br>(61)                            | 30,296<br>(17)                            | 82,103<br>(14)                                    | 26,147<br>(92)                          |
| 3. Dharwad                   | 1,718<br>(25)                             | 6,379<br>(37)                             | 21,376<br>(26)                                    | 9,485<br>(88)                           |
| 4. Kolar                     | 6,578<br>(43)                             | 16,241<br>(28)                            | 54,766<br>(22)                                    | 20,887<br>(93)                          |
| 5. Mandya                    | 10,641<br>(64)                            | 24,800<br>(17)                            | 68,795<br>(10)                                    | 19,657<br>(91)                          |
| 6. Raichur                   | 3,587<br>(33)                             | 14,423<br>(28)                            | 44,268<br>(32)                                    | 20,847<br>(93)                          |
| All Districts<br>Households) | 7,984<br>(239)                            | 14,323<br>(175)                           | 54,354<br>(136)                                   | 21,467<br>(550)                         |

(Figures in brackets show number of households)

First, the margins available to medium and large farmers in different districts (varying from a low of Rs.21,376 in Dharwad to a high of Rs.82,103 in D.Kannada) appear prima facie substantial enough to provide for "net farm incomes" adequate to meet the consumption requirements of households. Whether, over and above this, the households have enough resources to improve their net asset position, or to provide sufficiently for extraordinary expenditures of one kind or another is a different matter. In the present context, except perhaps in Dharwad, households in this category can in general be considered as having no food security problem - unless the family is very large and debt repayments high.

The position is not so clearcut in respect of small farmers, ie those with holdings from 2.51 acres to 5 acres. The majority of farmers in the relatively dry districts of Chitradurga and Dharwad belong to this category, and the average margin in their case is much smaller than for those in other districts. Hence the net farm income of a sizeable number of such households in these two districts would be considerably below average, and thus closer to those of marginal farmers. What of the marginal farmers themselves? Except in the water-rich districts of D.Kannada and Mandya, households in this category have average margins which are so low that their net farm incomes and consequently their food



security seem quite fragile, given the average family size (see Table 4.1) and the trend increase in food articles prices. This is specially so in Dharwad, Chitradurga and Raichur districts. For a large number of small and marginal farmers, therefore, there is no clear evidence that their food security has improved substantially after the shift.

Secondly, the bigger farmers have been able to secure larger "margins" - and hence larger net farm incomes - for the additional reason that many of them had shifted to mixed crops. (See Tables 4.7.2 and 4.7.3). With more land to utilise, the options they had for mixing commercial crops of different kinds with some food crops of the more marketable variety were wider and they have obviously taken advantage of the opportunity. It will also be seen from a district-wise comparison in Table 4.16 that the averages for the medium-to-large farmers in Chitradurga, D.Kannada, Kolar and Mandya are considerably larger than those for Dharwad and Raichur. This very likely arises from the fact that in these districts, the preferred commercial crops are, respectively, groundnut; areca or mulberry; mulberry or vegetables; and sunflower - which have all been high value crops. Even marginal farmers in D.Kannada and Mandya have secured relatively high margins when they have shifted to such high value commercial crops. Thus,

along with land the recourse to commercial crops of high value has apparently added materially to the bigger farmers' net farm incomes after shift.

Finally, the weighted average of margins for all households is more than twice the average for Dharwad. This is also true individually of the other districts - including Chitradurga. Part of this is explained by inter-district differences in the distribution of total households among the three categories of farmers, and the divergences in crop prices. But some of the difference is due probably to the difference in access to water-supply. While D.Kannada has the climatic advantage of plentiful rainfall, Mandya and Raichur - and to some extent Chitradurga - have benefitted from irrigation facilities available under the Kaveri and Tungabhadra river systems. Kolar, as has often been mentioned, has secured considerable irrigation from bore-wells for cultivation of tomato and other vegetables, mulberry and eucalyptus. None of these water sources is available in an equal measure to the farmers of Dharwad; and this probably accounts for their "margins" being smaller all along the line.

In sum, the field data indicate that the level of net farm incomes - as inferred from the proxy of "margins" between gross farm incomes and a limited measure of paid-out farm expenses - varies with the size of the

holding, the cropping pattern adopted, and the access to irrigation. The last two have an effect on the farm technology used by households, which in its turn will be reflected in farm expenses. That is to say, a change in farm technology is apt to be accompanied by changes in the quality and type of seeds, fertilizers, and farm equipments used, as well as in labour and water charges incurred. Taking all these together, it seems appropriate to visualise gross farm income of each household as a variable dependent on the size of its holding, the cropping pattern adopted by it, the extent of irrigation it utilises, the farm expenses incurred by it and local prices secured for different crops. The corresponding net farm income is obtained by transposing the farm expenses to the left side of the functional relationship.

### Regression Exercises

On this hypothesis, we have attempted two sets of regressions to evaluate the dependence of gross farm income of households after shift on each of these variables. These regressions are on a cross-section basis, since time series data for one or more of fixed households were not available. This perhaps weakens the regression somewhat; nevertheless, we have attempted this exercise to sort out approximately the more robust linkages from the weaker ones.

In these computations, gross farm income is the sales proceeds of farm outputs sold plus the value at local market prices of such outputs retained for home consumption. As regards explanatory variables, (i) Total land owned by the household is taken as equivalent to land cultivated. This is admittedly not satisfactory; but corrections in terms of unused land and net land leased in or leased out on a case to case basis has not been possible, for reasons mentioned earlier in this chapter. We have taken (ii) the proportion of land under commercial crops as proxy for cropping pattern; (iii) proportion of income from commercial crops to total income as proxy for local price-parity of crops, when taken alongwith (ii); (iv) paid-out farm expenses as defined earlier as proxy for total farm expenditure by the household; and (v) proportion of fertilizer expenditure to farm expenses as proxy for change in technology when taken in conjunction with (ii) and (iv) above. All these values are for the "after shift" situation, in respect of the full sample of 550 households, as well as for smaller samples of the three categories of farmer households.

The symbols used in the Regression equations are as follows:

FIN = Gross Farm Income (dependent variable)

C = Constant

(i) TLO = Total Land Owned

(ii) LUC = Land Used for Commercial Crops: Proportion of TLO

(iii) COMIN = Income from Commercial Crops: Proportion of FIN

(iv) PFE = Paid Out Farm Expenses

(v) FTE = Fertilizer Expenditure: Proportion of PFE

$a_1$  to  $a_5$  = Co-efficients of (i) to (v)

The first equation contains all the explanatory variables from (i) to (v). The second equation omits TLO as a variable. Regression coefficients as well as coefficients for the individual variables are tabulated below.

$$\text{Regression I: } \text{FIN} = C + a_1 \text{TLO} + a_2 \text{LUC} + a_3 \text{COMIN} + a_4 \text{PFE} + a_5 \text{FTE}$$

| Explanatory Variables | Values of Coefficients for |                      |                      |                      |               |
|-----------------------|----------------------------|----------------------|----------------------|----------------------|---------------|
|                       | All Households             | Marginal Farmers     | Small Farmers        | Med-to-large farmers | Co-efficients |
| TLO                   | 3751.2465<br>(17.026)      | 3285.9840<br>(3.129) | 1272.8871<br>(0.979) | 3359.9965<br>(6.435) | $a_1$         |
| LUC                   | 166.0628<br>(3.562)        | 9.1435<br>(0.443)    | 31.0632<br>(1.103)   | 369.7784<br>(1.622)  | $a_2$         |
| COMIN                 | 47.4542<br>(1.605)         | -3.3210<br>(-3.355)  | 60.7411<br>(1.960)   | 336.2161<br>(1.670)  | $a_3$         |
| PFE                   | 1.8448<br>(12.038)         | 0.1984<br>(3.005)    | 2.6110<br>(9.683)    | 2.9367<br>(7.818)    | $a_4$         |
| FTE                   | 66.0255<br>(1.451)         | 17.3353<br>(0.929)   | 53.9907<br>(1.720)   | 146.6404<br>(0.915)  | $a_5$         |
| C                     | -21473.4130                | 4350.7630            | -4502.4140           | -68341.2771          | C             |
| $R^2$                 | 0.63472                    | 0.08176              | 0.38257              | 0.67830              | $R^2$         |
| $R^{-2}$              | 0.63136                    | 0.06206              | 0.36430              | 0.66592              | $R^{-2}$      |
| D-W Test              | 1.7312                     | 1.4404               | 1.6835               | 1.5453               | D-W           |
| Total Cases           | 550                        | 239                  | 175                  | 136                  | Total Cases   |

(Figures in brackets are T-values)

$$\text{Regression II: } \text{FIN} = C + a_2 \text{ LUC} + a_3 \text{ COMIN} + a_4 \text{ PFE} + a_5 \text{ FTE}$$

| Explanatory Variables | Values of Coefficients for |                     |                    |                      | Co-efficient    |
|-----------------------|----------------------------|---------------------|--------------------|----------------------|-----------------|
|                       | All House-holds            | Marginal Farmers    | Small Farmers      | Med-to-large farmers |                 |
| LUC                   | 68.3751<br>(1.195)         | -1.0268<br>(-0.050) | 27.9112<br>(0.998) | 190.2396<br>(0.735)  | a <sub>2</sub>  |
| COMIN                 | 19.9049<br>(0.545)         | -1.2434<br>(-0.131) | 63.9092<br>(2.074) | 256.6316<br>(1.117)  | a <sub>3</sub>  |
| PFE                   | 3.2771<br>(20.684)         | 0.2131<br>(3.178)   | 2.6355<br>(9.817)  | 4.4142<br>(12.981)   | a <sub>4</sub>  |
| FTE                   | 143.1729<br>(2.556)        | 17.3761<br>(0.914)  | 50.1410<br>(1.611) | 242.1675<br>(1.327)  | a <sub>5</sub>  |
| C                     | -2750.9511                 | 10118.6111          | 430.9954           | -23899.7244          | C               |
| R <sup>2</sup>        | 0.44007                    | 0.04317             | 0.36446            | 0.56286              | R <sup>2</sup>  |
| R <sup>-2</sup>       | 0.43597                    | 0.02681             | 0.36446            | 0.56286              | R <sup>-2</sup> |
| D-W Test              | 1.75024                    | 1.4912              | 1.6893             | 1.6376               | D-W             |
| Total Cases           | 550                        | 239                 | 175                | 136                  | Total Cases     |

(Figures in brackets are T-values)

Given the fact that these regressions are based on cross-section data, the co-efficients as well as t-statistics appear reasonable. However, considerable care has to be exercised in interpreting these data because of possible interactions between some of the explanatory variables. For instance, when land is shifted to commercial crops, it could imply an increase in fertilizer expenditure because of changes in both

quantity and kind of fertilizers used. Hence the effect of our increase in FTE could be implicit in some measure in the coefficient for LUC. Subject to this caution, these results indicate the following:

- i) The dominant factor influencing Gross Farm Income is clearly the extent of land used (TLO). This is true of all categories of farmers as evident from Regression I.
- ii) In both exercises the coefficients for LUC and COMIN are much larger and the t-values better for categories other than marginal farmers. In other words, small farmers and larger farmers have benefited more from shifting to commercial crops and adopting fertilizer-based technology. (This is evident also from the parallel change in the coefficients for FTE). They have also benefited relatively more from better prices, as is evident from the coefficients of COMIN.
- iii) For PFE also, the difference between marginal farmers and others is evident. However, not much weight can be put on these values, given the incomplete coverage of paid-out farm expenses.
- iv) The R-co-efficients become stronger as we move from marginal to small to large farmers. Together with the differences in respect of other co-efficients,



both regressions indicate the vulnerability of marginal farmers. They have gained least from the general trend towards substitution of commercial crops for food crops.

Though not robust, these regressions generally lead to the same conclusions as we have reached earlier. Though they may not add much to the strength of the earlier conclusions, they indicate little that weakens them.

## Chapter - V

### Survey Data and Findings - 2:

#### Gross Household Incomes and Expenditures

In the previous chapter, we concentrated on "gross farm income", since it is directly affected by shifts in cropping pattern. However, virtually all sample households also reported incomes obtained from activities other than farming. Many of them benefited from grants and subsidies paid by government or private agencies, gifts and remittances by members of the household settled outside the village. Members of some households also earned incomes from non-farm activities. Together with gross farm income they constituted the aggregate of resources currently available to households for consumption and other expenditures. These aggregates of "gross household income" and "total household expenditure" are examined in this chapter. Subsequently, these expenditure data are analysed with a view to arriving at a judgment on the consumption of food articles by the household.

"Gross household income (GRIN)" is defined in this report as the sum of gross farm income (FIN) and "other current incomes (OIN)" earned or accruing to family members resident in the household during the year. As may be observed from the Questionnaire (Appendix -II ),

OIN includes the following: (i) wages earned from agricultural or non-agricultural employment by any resident member of the family; (ii) earning from self-employment as artisan or in other business; (iii) gross income from animal husbandry; (iv) wages from construction labour; (v) rents earned from land or other fixed assets; (vi) charges for tractors, bullocks etc. hired out; (vii) interest receipts, if any; and (viii) other household receipts by way of remittances, gifts, subventions etc. While all items except (viii) have been calculated from responses recorded in Blocks II, III, VI, and XXII of the Questionnaire, information relating to item (viii) has been separately recorded by the field investigators in the notes prepared by them after interviewing members of the household. All these incomes have been taken for the year as a whole.

However, imputed or casual incomes have not been included in GRIN except for the value of retained output which is part of FIN. For instance, occasional income in cash or kind secured by children of the household (i.e those below 14 years of age), gifts in kind received during festivals, rituals etc, and family labour on own farm have not been evaluated and included in OIN. Finally, amounts received through sale of assets which amount to disinvestment do not form part of GRIN.

As in the case of farm income, GRIN has also been considered in gross magnitudes, because part of the household expenditure debited to it consists of some outlays incurred by the household for securing incomes from farm or other activities. Correspondingly, "total household expenditure" includes besides "consumption expenditure" some other current expenditures also, which are variegated. It is only when GRIN exceeds "total household expenditure" in this all-inclusive sense that there is "saving". Data on household saving in Blocks XXI and XXII of the Questionnaire have been obtained directly and do not always tally with the income-expenditure difference observed here. We have not pursued this part of the inquiry since our main concerns are consumption of food articles and the resultant effects on nutrition and health of members of the household.

The usual caveat on the quality of "remembrance" applies to the data used in this chapter also. Even more than farm income, the households' recollections of OIN for the period before shift were vague and scattered; likewise for past expenditures also. The magnitudes for both Gross Household Income and Gross Household Expenditure used here are therefore best viewed as likely levels rather than precise values attained at a particular point of time. In this situation, the

difference between these magnitudes "before shift" and "after shift" will be subject to much wider margins of error than the aggregates themselves (even if we correct them for price variations).

There is one other point, that should be set down here for the record. Unlike in the case of gross farm income, it is not possible either to identify the 'principal' determinants of OIN, or link changes in it to changes in the cropping-pattern. Obviously, when there are major shifts in cropping pattern, both the opportunities and the magnitudes of other non-farm incomes will be affected beneficially or adversely. Hence the likely net effect cannot be pre-determined or precisely estimated. Considering all these, we have limited the discussion in the rest of this chapter to Gross Household Income (GRIN) after shift, and to the relative position of marginal and small farmers in this regard.

#### Relative share of other income (OIN)

"Other Income" accruing to the aggregate of 550 sample households amounted on an average to about 24 percent or less than a quarter of Gross Household Income. However, inter-district variations around this average were quite sizeable - varying from a high of 40.2% in Dharwad to 16.6% in Raichur (Table 5.1). While the low percentage

in Raichur is a reflection of the low absolute value of OIN, its relative share in Dharwad appears high because of the low level of average farm income in that district.

(Table 5.1)  
District-wise Average Land Owned & Average Incomes: (Rs.)

| DISTRICTS   | Land owned<br>(Acres)<br>(Average) | Annual Gross<br>Income<br>(Average) | Gross Farm<br>Income<br>(Average) | Other Incom<br>(Average) |
|-------------|------------------------------------|-------------------------------------|-----------------------------------|--------------------------|
| CHITRADURGA | 8.73                               | 45574                               | 36239                             | 8193                     |
| D. KANNADA  | 3.31                               | 40712                               | 29128                             | 9901                     |
| DHARWAD     | 5.91                               | 18918                               | 11598                             | 7611                     |
| KOLAR       | 4.22                               | 42536                               | 29277                             | 13186                    |
| MANDYA      | 2.91                               | 31846                               | 25746                             | 6050                     |
| RAICHUR     | 7.91                               | 33781                               | 28491                             | 5591                     |
| TOTAL       | 5.51                               | 35717                               | 26883                             | 8435                     |

When we look at these components of Gross Income for different categories of farmers, the importance of OIN for the marginal farmers becomes clear. For the total sample, the average absolute value of OIN does not vary much among the three categories, as may be seen from Table 5.2; however, in relative terms, the ratio of OIN to Gross Income (GRIN) varies from 39.4% for marginal farmers and 29.3% for small farmers to only 14.4% for the medium to large farmers.

(Table 5.2)

Average Land Owned & Average Incomes: All Districts (Rs.)

| Land holding categories (in Acres) | Land owned (Acres) (Average) | Annual Gross Income (Average) | Gross Farm Income (Average) | Other Income (Average) |
|------------------------------------|------------------------------|-------------------------------|-----------------------------|------------------------|
| <2.5 Acres                         | 1.59                         | 19286                         | 11254                       | 7603                   |
| 2.5-5 Acres                        | 3.85                         | 25092                         | 17397                       | 7355                   |
| Above 5 Acres                      | 14.53                        | 78292                         | 66556                       | 11287                  |
| TOTAL                              | 5.51                         | 35717                         | 26883                       | 8435                   |

This again is a reflection of the much higher farm incomes accruing to the bigger farmers. It is also indicative of the greater need that marginal and small farmers have to supplement their farm incomes to meet minimal household expenditures. The bigger farmers are not, in general, similarly pressed.

The decline in the proportion of OIN to GRIN as farm size increases is also apparent in all the district samples. However, it is much sharper in Chitradurga, D.Kannada, Mandya and Raichur than in Dharwad and Kolar. (Table 5.3). That the relative share of farm income in GRIN should increase (or that of OIN decrease) in D.Kannada, Mandya and Raichur is understandable; they all have better facilities for wet farming of both food and commercial crops. But the case of Chitradurga is somewhat intriguing, given the generally dry agro-climatic conditions, except in the taluks benefitting from the Thungabhadra river flow. Apart from the better access to these waters that some bigger farmers might

have, the major explanation seems to be the better market access for the principal commercial crop, viz. oil seeds, that these farmers have. Another, of course, is the common explanation of fewer non-farm businesses in rural areas.

Table 5.3  
Proportion of Other Income (OIN) to Gross Income (GRIN)  
by Farmer Categories: Districtwise  
(Per cent)

| DISTRICT    | Marginal<br>Farmers<br>( <2.5<br>Acres) | Small<br>Farmers<br>(2.5-5.0<br>Acres) | Med.to large<br>Farmers<br>(over 5.1<br>Acres) | Average<br>( All<br>Farmers) |
|-------------|---|--|--|------------------------------|
| CHITRADURGA | 62.0                                    | 31.0                                   | 12.5   | 20.5                         |
| D. KANNADA  | 40.7                                    | 25.9                                   | 5.3  | 24.3                         |
| DHARWAD     | 68.7                                    | 50.8                                   | 27.0   | 40.2                         |
| KOLAR       | 41.1                                    | 33.4                                   | 25.9   | 31.0                         |
| MANDYA      | 30.6                                    | 14.1                                   | 6.5  | 19.0                         |
| RAICHUR     | 35.9                                    | 23.3                                   | 9.3  | 16.5                         |
| TOTAL       | 39.4                                    | 29.3                                   | 14.4   | 23.6                         |

The high proportion of OIN to GRIN of bigger farmers in Dharwad and Kolar arise from different causes. Farm incomes are generally at a low level in the Dharwad district, as was observed in Chapter IV, and farmers of all categories have an incentive to seek additional incomes elsewhere. Much of this is obtained through wage-labour of one kind or another - for which apparently there are opportunities. Kolar is different in the sense that the level of farm incomes is much



higher than in Dharwad; but levels of OIN are also higher - which enhances their relative share - because of its proximity to the Bangalore metropolitan area; Kolar benefits from more non-farm business activities as well as a higher level of wages.

Besides being of interest in themselves, these inter-district variations bring out two common features: first, marginal and small farmers depend to a considerable extent on supplements to farm income. Secondly, the existence or development of non-farm activities providing additional opportunities for gainful employment is a necessity for this need to be fulfilled. We revert to these issues later in this Chapter. At this stage, the main point to be noted is that for marginal and small farmers, "other incomes" are vital to maintain their household expenditure at a level commensurate with "reasonable" standards of consumption. This may be seen in Table 5.4, in which using annual income of Rs.15,000 as a norm for attaining the "reasonable" standard of consumption, the distribution of marginal farmer households below and above this norm in terms of Gross Farm Income (FIN) is compared with a similar distribution in terms of Gross Household Income (GRIN).

Table 5.4

Marginal Farmers: Household Distribution - Gross Farm Income (FIN and Gross Household Income (GRIN): Comparative Position

| DISTRICTS   | Upto Rs.15,000<br>per annum |      | > Rs.15,000<br>per annum |      | Total<br>House-<br>holds |
|-------------|-----------------------------|------|--------------------------|------|--------------------------|
|             | FIN                         | GRIN | FIN                      | GRIN |                          |
| CHITRADURGA | 13                          | 11   | 0                        | 2    | 13                       |
| D. KANNADA  | 40                          | 17   | 21                       | 44   | 61                       |
| DHARWAD     | 25                          | 24   | 0                        | 1    | 25                       |
| KOLAR       | 31                          | 18   | 12                       | 25   | 43                       |
| MANDYA      | 45                          | 18   | 19                       | 46   | 64                       |
| RAICHUR     | 27                          | 20   | 6                        | 13   | 33                       |
| TOTAL       | 181                         | 108  | 58                       | 131  | 239                      |

Notes: FIN - Gross Farm Income. Household distribution derived from Table 4.11.1 (After Shift)  
GRIN - Gross Household Income

Because of "other incomes", 73 or over 30 percent of such families cross the norm. In addition, many families below the norm also have moved up into higher brackets. This is evident from Table 5.5 below, which shows the change in frequency distribution of households of marginal and small farmers by income ranges, when Gross Household Income (GRIN) is compared with Gross Farm Income (FIN). Given this situation, GRIN is clearly the income-concept that is relevant for any judgment on the level and ramifications of household expenditures.

Table 5.5

Frequency Distribution of Households by Income Ranges:  
Total Sample of Marginal Farmers and Small Farmers - GRIN & FIN  
 (Households)

| Income Ranges | <u>Marginal Farmers</u> |            | <u>Small Farmers</u> |            |
|---------------|-------------------------|------------|----------------------|------------|
|               | <u>GRIN</u>             | <u>FIN</u> | <u>GRIN</u>          | <u>FIN</u> |
| <1000         | 0                       | 12         | 0                    | 0          |
| 1000-5000     | 8                       | 56         | 2                    | 27         |
| 5001-10000    | 45                      | 64         | 26                   | 43         |
| 10001-15000   | 55                      | 49         | 33                   | 29         |
| 15000-25000   | 70                      | 30         | 52                   | 36         |
| 25001-50000   | 55                      | 26         | 45                   | 29         |
| 50001-100000  | 6                       | 2          | 14                   | 10         |
| >100000       | 0                       | 0          | 3                    | 0          |
| <b>TOTAL</b>  | <b>239</b>              | <b>239</b> | <b>175</b>           | <b>175</b> |

## Household Expenditure

We turn now to an analysis of Household Expenditures (HHE). As stated earlier, this is inclusive of some expenditures incurred by households in the process of production on the farm or in other activities, and hence exceeds 'consumption expenditure' proper. However, these sundry production expenses generally constitute a small part of HHE and the level of HHE is broadly indicative of the level of consumption expenditure of the household. The 'saving' component becomes relevant only at higher levels of GRIN, say beyond Rs.25,000 per annum, unless the size of the household and consequently HHE is very large.

For the sample households, HHE ranged from Rs.5000 per annum to over Rs.100,000 in a few cases. None of the households in any category of farmers or in any of the sample districts had HHE less than Rs.5000 per annum; and for 70 percent of households it ranged between Rs.10,000 and Rs.25,000 per year, as may be seen from Table 5.6. This concentration was true at the district level also.

Table 5.6  
Distribution of Households according to Household Expenditure (HHE)

| District    | Upto-<br>5000 | 5001-<br>10000 | 10001<br>15000 | 15001<br>25000 | 25001<br>50000 | 50001-<br>100000 | >100000 | Total<br>Hhs |
|-------------|---------------|----------------|----------------|----------------|----------------|------------------|---------|--------------|
| Chitradurga | 0             | 14             | 29             | 34             | 13             | 1                | 2       | 93           |
| D.Kannada   | 0             | 4              | 10             | 48             | 28             | 2                | 0       | 92           |
| Dharwad     | 0             | 4              | 27             | 45             | 9              | 3                | 0       | 88           |
| Kolar       | 0             | 6              | 23             | 39             | 23             | 2                | 0       | 93           |
| Mandya      | 0             | 5              | 27             | 37             | 17             | 4                | 1       | 91           |
| Raichur     | 0             | 5              | 24             | 43             | 14             | 5                | 2       | 93           |
| Total Hhs   | 0             | 38             | 140            | 246            | 104            | 17               | 5       | 550          |
| %           | (0.0)         | (6.9)          | (25.5)         | (44.7)         | (18.9)         | (3.1)            | (0.9)   | (100.0)      |

When this pattern of HHE distribution is compared with the pattern of Gross Income (GRIN) distribution, some households in every income-bracket seem to spend more than they currently earn. The proportion of such overspenders to the total is relatively small in the upper income ranges; but for income brackets upto Rs.15,000 per year, such proportions are quite high. For all households with Gross Income upto Rs.5000 per year, the ratio of HHE to GRIN exceeded 100%; and this was true also of 72% of households in the income bracket Rs.10,000 to Rs.15,000. Table 5.7 sets out these proportions in full array for the 550 households in the total sample, and the decline in the proportion of HHE as GRIN increases is clearly seen. It should however, be

**Table 5.7**  
**Proportion of HHE to GRIN by Income Ranges**

| Income Ranges-> | 1000-<br>5000 | 5001-<br>10000 | 10001<br>15000 | 15001<br>25000 | 25001<br>50000 | 50001-<br>100000 | >100-<br>000 | Total<br>HHS |
|-----------------|---------------|----------------|----------------|----------------|----------------|------------------|--------------|--------------|
| Below 10%       | 0             | 0              | 0              | 0              | 0              | 0                | 2            | 2            |
| 10% - 20%       | 0             | 0              | 0              | 0              | 0              | 1                | 10           | 11           |
| 20.1% - 30%     | 0             | 0              | 0              | 0              | 2              | 6                | 10           | 18           |
| 30.1% - 40%     | 0             | 0              | 0              | 0              | 12             | 10               | 9            | 31           |
| 40.1% - 50%     | 0             | 0              | 0              | 5              | 18             | 9                | 2            | 34           |
| 50.1% - 75%     | 0             | 0              | 11             | 29             | 64             | 9                | 2            | 115          |
| 75.1% - 100%    | 0             | 9              | 17             | 62             | 28             | 3                | 2            | 121          |
| Above 100%      | 10            | 62             | 72             | 50             | 20             | 4                | 0            | 218          |
| <b>Total</b>    | <b>10</b>     | <b>71</b>      | <b>100</b>     | <b>146</b>     | <b>144</b>     | <b>42</b>        | <b>37</b>    | <b>550</b>   |

Note : HHE = Food expenditure + other expenditure  
GRIN = Gross Income

added that there is considerable inter-district variation in these proportions - the reasons for which have perhaps to be sought in the size of households and or non-recurring consumption expenditures excluded in the HHE of some households. We shall revert to this later in this chapter. The main point to be noted is the inadequacy of lower level Gross Incomes to meet HHE, as reported by households:

Income inadequacy is essentially a problem of marginal, and to some extent small, farmer households. Of 218 households for which HHE exceeded GRIN, 118 or 54% were marginal farmers and 71 or 33% small farmers. (Table 5.8)

There were, doubtless, 29 households of medium to large farmers also in this category; the bulk of these (or 25 households) consisted of medium farmers in the dry districts of Chitradurga (4), Dharwad (11) and Raichur (10). Their economic condition was often little different from that of marginal or small farmers in the canal or well-irrigated villages of Mandya and Kolar owning less than 5 acres. As was observed in Chapter IV, many of these farmers in the dry regions could not also benefit much from shifting to commercial crops, due to their low capacity for investment or poor market access.

**Table 5.8**

**Proportion of HHE to GRIN: by Categories of Households**

|              | <u>Marginal<br/>Farmers</u><br>< 2.5<br>Acres | <u>Small<br/>Farmers</u><br>2.5 - 5<br>Acres | <u>Med. to large<br/>Farmers</u><br>Above 5<br>Acres | Total<br>House-<br>holds |
|--------------|---|--|--|--------------------------|
| Below 10%    | 0   | 0  | 2  | 2                        |
| 10% - 20%    | 0   | 1  | 10   | 11                       |
| 20.1% - 30%  | 1   | 5  | 12   | 18                       |
| 30.1% - 40%  | 8   | 7  | 16   | 31                       |
| 40.1% - 50%  | 11  | 12   | 11   | 34                       |
| 50.1% - 75%  | 50  | 38   | 27   | 115                      |
| 75.1% - 100% | 51  | 41   | 29   | 121                      |
| Above 100%   | 118   | 71   | 29   | 218                      |
| <b>TOTAL</b> | <b>239</b>                                    | <b>175</b>                                   | <b>136</b>   | <b>550</b>               |

Note: HHE = Household Expenditure  
GRIN = Gross Income

It may also be noticed from Table 5.8 that HHE accounted for more than 50% of Gross Household Income in the case of majority of households among all three categories of farmers. Checking back on Table 5.7, this feature is observable upto the income-bracket Rs.25,001-Rs.50,000. That is to say, even large farmers with cropping patterns yielding less than Rs.50,000 per annum are prone to end up by utilising the better part of GRIN for Household Expenditure, thus limiting their capacity to save any substantial amounts, or provide for unpredictable large expenditures of one kind or another.

Some of the households which reported HHE in excess of Gross Household Income were obviously cases in which either GRIN is understated or HHE overstated, or both to some extent. However, there are households in the marginal and small farmers categories at any rate, for which excess expenditure would in fact be true. This deficit may be covered for a while by borrowing, or through private or public charity. But this is not sustainable for long, and excess spending has inevitably to lead to reduced HHE, or sale of assets and/or change of occupation. In any event, it is patent that consumption standards of such households, including perhaps their food security, are in jeopardy unless things change. Keeping these extreme cases aside, the principal question is whether the majority of marginal and small farmer households have gross expenditures



sustainable by their current gross incomes and providing "reasonable" levels of consumption.

There is no generally accepted norm of "reasonable" consumption expenditure and it is necessary to give some definition to this concept. The Expert Group on Estimation of Proportion and Number of the Poor, (1993) appointed by the Planning Commission has worked out for 1987-88 "poverty line" expenditures anchored on per capita daily intake of 2400 calories for rural areas at Rs.112.83 per month,\* or Rs.1355 (approx.) for the year. For a family of 6.8,++ this comes to Rs.9140 at 1987-88 prices. Between 1987-88 and 1991-92 (when the field survey was done), the Consumer Price Index for Agricultural Labourers in Karnataka went up from 618 to 1010.§ Correcting for this increase in consumer prices, the "poverty line" expenditure for rural Karnataka amounts to Rs.14,937 per family or, say Rs.14,950 in 1991-92. Adding another Rs.5000 per year to cover other essential household expenses such as education, medical services, festivals, weddings, funerals, travel etc - annual consumption expenditure of Rs.20,000 per family seems a "reasonable" level at current prices.

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\* See "Poverty Levels in India: Norms, Estimates and Trends" in Economic & Political Weekly, August 21, 1993. Esp.pp 1752 and 1763.

++ This is the average family size for the sample of 550 households.

§ Reserve Bank of India. Report on Currency & Finance: 1989-90 (Statement 28) and same Report. 1991-92 (Statement 29)

Data from the sample households indicate that for marginal farmers in all districts as well as in the total sample, average HHE was considerably less than Rs.20,000 per year. This is inclusive of some production - related expenses in certain cases. In Chitradurga, Dh arwad and Raichur, even average Gross Income of such households was below this level. This was true of small farmer households also in Chitradurga and Dharwad; in Raichur their GRIN was only slightly above Rs.20,000.

**Table 5.9**

**Average Gross Income & Expenditures by Categories of Farmers**  
(Rs.)

| DISTRICTS        | Marginal Farmers<br>(Upto 2.5 Acres) |                | Small Farmers<br>(2.5-5 Acres) |                | Medium-to-large farmers<br>(Above 5 Acres) |                | All farmers    |                |
|------------------|--------------------------------------|----------------|--------------------------------|----------------|--|----------------|----------------|----------------|
|                  | GRIN                                 | HHE            | GRIN                           | HHE            | GRIN                                       | HHE            | GRIN           | HHE            |
| Chitrad-<br>urga | 11207<br>(13)                        | 12853<br>(13)  | 18153<br>(48)                  | 14325<br>(48)  | 100669<br>(32)                             | 37165<br>(32)  | 45574<br>(91)  | 21978<br>(91)  |
| D.Kannada        | 24853<br>(61)                        | 19945<br>(61)  | 49936<br>(17)                  | 31049<br>(17)  | 98614<br>(14)                              | 30336<br>(14)  | 40712<br>(92)  | 23578<br>(92)  |
| Dharwad          | 9051<br>(25)                         | 14145<br>(25)  | 14261<br>(37)                  | 17048<br>(37)  | 35032<br>(26)                              | 27984<br>(26)  | 18918<br>(88)  | 19454<br>(88)  |
| Kolar            | 20462<br>(43)                        | 17867<br>(43)  | 31877<br>(28)                  | 22705<br>(28)  | 99245<br>(22)                              | 30033<br>(22)  | 42536<br>(93)  | 22201<br>(93)  |
| Mandya           | 20311<br>(64)                        | 17025<br>(64)  | 38269<br>(17)                  | 27932<br>(17)  | 94750<br>(10)                              | 48087<br>(10)  | 31846<br>(91)  | 22617<br>(91)  |
| Raichur          | 16411<br>(33)                        | 16938<br>(33)  | 21433<br>(28)                  | 18113<br>(28)  | 62499<br>(32)                              | 35705<br>(32)  | 33781<br>(93)  | 23750<br>(93)  |
| TOTAL            | 19286<br>(239)                       | 17435<br>(239) | 25092<br>(175)                 | 19794<br>(175) | 78262<br>(136)                             | 34013<br>(136) | 35717<br>(550) | 22285<br>(550) |

Note: Figures in the bracket indicate the number of households  
GRIN= Gross income of the household  
HHE= Household Expenditure

Small farmers in D.Kannada, Kolar and Mandya were more comfortably placed, with average HHE noticeably above the "reasonable" norm, and average GRIN very much above the average expenditure levels. Clearly, heavy rainfall or irrigation facilities have been used by small farmers in these districts with considerable benefit.

Figures in Table 5.9 are averages and in both the marginal and small farmer categories, there were obviously households with incomes and expenditures below these averages. For most marginal and small farmer households with incomes below the average, HHE invariably exceeded GRIN. Such instances were particularly noticeable in the dry zone districts of Chitradurga, Dharwad and Raichur. 58% of marginal and 44% small farmers in Chitradurga, 96% marginal and 73% of small farmers in Dharwad, and 73% of marginal and 32% of small farmers in the Raichur samples belonged to this excess expenditure group. The proportion of such cases was lower in the wet or irrigated tracts of D.Kannada, Mandya and Kolar - accounting for 38% and 12%, 33% and 35% and 42% and 21% respectively for marginal and small farmers. Altogether, there is evidence that for the majority of marginal farmers in dry zones, and for a fair proportion of such farmers in the wet zones, maintaining a "reasonable" level of consumption expenditure of around Rs.20,000 per year was not possible at 'after shift' levels of Gross Household

Income. An implication of this is that a substantial number of households - including a good proportion of those in the income bracket Rs.15,001 - Rs.25,000 would be unable to sustain this level of annual consumption expenditure. Of the 550 households surveyed, 327 had GRIN upto Rs.25,000 per annum; and among these, 291 household were those of marginal and small farmers. In the income bracket Rs.15,001 - Rs.25,000, the majority of those with annual Gross Income less than or not much above Rs.20,000 belonged to this category of marginal and small farmers. Their problems of sustaining consumption expenditure levels of Rs.20,000 per annum were, therefore, quite severe.

#### Food Expenditure levels

Turning to food expenditure, data collected from sample households consists of their estimates of quantities used per month by the household, how much of it is grown on their holdings and how much purchased from the market. These are converted into money values for all households at the prices locally prevailing. Such data have been canvassed in the two rounds for 'before' and 'after' shift situations and monthly expenditures annualised for purposes of this Report.

As in the case of Gross Income and Gross Household Expenditure data, food expenditure (FEX) data "after

"shift" have been taken for analysis in this chapter for the same reason, namely that after shift purchases being more recent are better recollected by households. Also, with FEX for the after shift situation, comparison with HHE (which are also after shift data) is easier. However, in working out the likely effect of income and expenditure shifts on the nutrition and health status of families in Chapter VI, we have utilised the available field data for 'before shift' situation also.

Table 5.10 sets out the distribution of sample households district-wise, according to the level of annual food expenditure (FEX) after shift. In the aggregate sample of 550 households, for 413 or 75 percent of households FEX did not exceed Rs.15,000

Table 5.10

Distribution of Households by levels of Annual Food Expenditures:  
District-wise (Rs.)

| District   | <1000 | 1000-5000 | 5001-10000 | 10001-15000 | 15001-25000 | 25001-50000 | 50001-100000 | >100000 | Total HHs |
|------------|-------|-----------|------------|-------------|-------------|-------------|--------------|---------|-----------|
| Mitradurga | 0     | 3         | 40         | 31          | 12          | 6           | 1            | 0       | 93        |
| Kannada    | 0     | 0         | 19         | 38          | 32          | 3           | 0            | 0       | 92        |
| Marwad     | 0     | 1         | 30         | 39          | 14          | 3           | 1            | 0       | 88        |
| Polar      | 0     | 2         | 39         | 35          | 14          | 2           | 1            | 0       | 93        |
| Handya     | 0     | 3         | 35         | 38          | 13          | 1           | 1            | 0       | 91        |
| Maichur    | 0     | 0         | 24         | 36          | 26          | 7           | 0            | 0       | 93        |
| Total HHs  | 0     | 9         | 187        | 217         | 111         | 22          | 4            | 0       | 550       |

per year. For all households except one each in Chitradurga, Dharwad, Kolar and Mandya districts, such expenditure was in any event less than Rs.50,000 per year - irrespective of the size or income of the family. There is, of course, nothing unusual about this. It is a widely observed phenomenon that while food expenditure rises virtually pari passu with income in the initial stages, it tends to flatten out later and becomes a smaller proportion of household income in the higher income brackets. This process may be stretched out a bit when the size of household rises along with income. But the tendency to flatten out later is, nevertheless, quite common and the sample households surveyed here are no exception.

As will be seen from Table 5.7, for nearly 62 percent of the 550 households Gross Household Expenditure (HHE) exceeded 75% of Gross Income. The majority of such households (83%) had Gross Income (GRIN) not exceeding Rs.25,000. For a large proportion of such households, food expenditure accounted for over 50% of HHE. In fact, in the total sample of 550 households, there were only 72 households for which the ratio of FEX to HHE was below 50 percent and only 27 of these households had annual Gross Income upto Rs.25,000. Table 5.11 sets out in detail the proportion of food expenditure to Gross household expenditure according to gross income ranges.

Table 5.11

Distribution of Households according to Proportion  
of FEX to HHE by Gross Income  
(Rs.)

| FEX/HHE %    | Gross Income | 1000-5000 | 5001-10000 | 10001-15000 | 15001-25000 | 25001-50000 | 50001-100000 | >100000 | Total HHs |
|--------------|--------------|-----------|------------|-------------|-------------|-------------|--------------|---------|-----------|
| 10% - 20%    |              | 0         | 0          | 1           | 1           | 1           | 0            | 0       | 3         |
| 20.1% - 30%  |              | 0         | 0          | 0           | 1           | 1           | 3            | 3       | 8         |
| 30.1% - 40%  |              | 0         | 0          | 1           | 1           | 11          | 1            | 2       | 16        |
| 40.1% - 50%  |              | 1         | 4          | 4           | 13          | 13          | 4            | 6       | 45        |
| 50.1% - 75%  |              | 8         | 50         | 81          | 105         | 101         | 28           | 24      | 397       |
| 75.1% - 100% |              | 1         | 17         | 13          | 25          | 17          | 6            | 2       | 81        |
| Total        |              | 10        | 71         | 100         | 146         | 144         | 42           | 37      | 550       |

FEX= Food Expenditure

HHE= Gross Household Expenditure

It will also be observed from this table that in respect of households with Gross Income above Rs.25000 also the majority show the FEX/HHE ratio in excess of 50%. This seems somewhat odd, in the light of the generally observed phenomenon on the declining proportion of food expenditure to gross income mentioned earlier. But when Table 5.11 is read along with Table 5.7, it is seen that (a) as we move up the income - ranges (from left to right) the proportion of Gross Household Expenditure (HHE) to Gross Income diminishes; and consequently (b) the same FEX/HHE proportion constitutes a smaller ratio of FEX to Gross Income (GRIN). In other words, for the majority of household with Gross Income above Rs.50001, the HHE/GRIN ratio is less than 40%. (Table 5.7); hence the FEX/HHE ratio of 50% to 75% shown in Table 5.11 for

such households really represents a FEX/GRIN ratio of 20% to 30% at the most. Similarly in the case of households with GRIN upto Rs.15,000, the FEX/GRIN ratio works out to over 50% in the majority of cases.

The position in respect of the Rs.15,001 to Rs.25,000 income bracket is, however, a little puzzling. For the majority of households in this income bracket, both HHE/GRIN and FEX/HHE are above 50% - and in some instances considerably above. Some of the households had incurred extra-ordinary expenditures of one kind or another during the survey year - such as marriage or funeral - which augmented both HHE and FEX beyond their usual levels. But this kind of non-recurring expenditure apart, gross household expenditure (HHE) and food expenditure (FEX) have both been high in a number of households because of the large size of 'joint' or 'extended' families, subsisting on limited GRIN. However, when large-sized families had much higher incomes for one reason or another, even large HHE and FEX constituted relatively small proportions of GRIN. The linkage between food expenditure and the size of the household is seen clearly in Table 5.12 below. The



Table 5.12

Distribution of Households:  
Proportion of FEX to HHE by Household Size

| FEX/HHE      | Size of Household |     |     |         | TOTAL |
|--------------|-------------------|-----|-----|---------|-------|
|              | Upto 2            | 3-4 | 5-7 | Above 8 |       |
| 10% - 20%    | 0                 | 0   | 1   | 2       | 3     |
| 20.1% - 30%  | 0                 | 0   | 2   | 6       | 8     |
| 30.1% - 40%  | 0                 | 5   | 8   | 3       | 16    |
| 40.1% - 50%  | 0                 | 8   | 20  | 17      | 45    |
| 50.1% - 75%  | 14                | 68  | 180 | 135     | 397   |
| 75.1% - 100% | 7                 | 11  | 37  | 26      | 81    |
| TOTAL        | 21                | 92  | 248 | 189     | 550   |

largest number of households were in size groups 5-7 and above 8; and in these size-groups, the majority of households had FEX/HHE ratios above 50%. Obviously, within the income bracket Rs.15,001 - Rs.25,000, there were a substantial number of such households - which explains the seeming divergence of the FEX/GRIN ratio from the general trend in the case of this bracket.

Food Expenditure of Marginal and Small Farmers

The tendency for food expenditure to level of around Rs.25,000 is also observable when households are categorised by the size of land owned. This is seen in Table 5.13, in which the distribution of households according to food expenditure is shown separately for

Table 5.13

Distribution of Households according to Food Expenditure by Categories of Households

| FEX/Rs.      | Categ. of Households | Marginal Farmers (<2.5 acres) | Small Farmers (2.5-5 acres) | Medium-to-large Farmers (>5 acres) | TOTAL Households |
|--------------|----------------------|-------------------------------|-----------------------------|------------------------------------|------------------|
| 1000-5000    |                      | 8                             | 1                           | 0                                  | 9                |
| 5001-10000   |                      | 109                           | 65                          | 13                                 | 187              |
| 10001-15000  |                      | 93                            | 78                          | 46                                 | 217              |
| 15000-25000  |                      | 27                            | 29                          | 55                                 | 111              |
| 25001-50000  |                      | 1                             | 2                           | 19                                 | 22               |
| 50001-100000 |                      | 1                             | 0                           | 3                                  | 4                |
| TOTAL        |                      | 239                           | 175                         | 136                                | 550              |

marginal, small and medium - to - large farmers. In all cases, the majority of households spent less than Rs.25000 on food. This was true for virtually all marginal and small farmer households, and for 84 percent of medium-to-large households. However, the modal value rises from the Rs.5001-10000 bracket for marginal farmers to the next higher brackets successively for the small and medium-to-large households. It has not gone beyond the Rs.15001-25000 bracket for the last category, because of the relatively low incomes of several medium-sized farmers owning more than 5 acres in the dry districts of Chitradurga, Dharwad, Kolar and Raichur. Of the 55 medium-to-large farmers households spending between Rs.15,000 and Rs.25,000 on food, as many as 43 belonged to these four dry districts. Reverting to

marginal and small farmers, it will be observed that as many as 345 out of 404 households had food expenditures between Rs.5000 and Rs.15000 per annum. Average food expenditures for each of these categories varied from district to district, but in no instance was it more than Rs.12500 (as evident from Table 5.14) for marginal farmers, and more than Rs.17100 for small farmers. Even these maxima observed for D.Kannada are significantly higher than the averages for the other district samples.

**Table 5.14**  
**Average Gross Income & Average Food Expenditure Districtwise:**  
**Categories of Households** (Rs.)

| DISTRICTS   | Marginal farmers<br>(Upto 2.5 Acres) |                | Small farmers<br>(2.5-5 Acres) |                | Medium-to-large farmers<br>(Above 5 Acres) |                | All farmers    |               |
|-------------|--------------------------------------|----------------|--------------------------------|----------------|--|----------------|----------------|---------------|
|             | GRIN                                 | FEX            | GRIN                           | FEX            | GRIN                                       | FEX            | GRIN           | FEX           |
| Chitradurga | 11207<br>(13)                        | 8748<br>(13)   | 18153<br>(48)                  | 9332<br>(48)   | 100669<br>(32)                             | 19074<br>(32)  | 45574<br>(93)  | 12602<br>(93) |
| D.Kannada   | 24853<br>(61)                        | 12433<br>(61)  | 49936<br>(17)                  | 17015<br>(17)  | 98614<br>(14)                              | 19073<br>(14)  | 40712<br>(92)  | 14290<br>(92) |
| Dharwad     | 9051<br>(25)                         | 9945<br>(25)   | 14261<br>(37)                  | 11501<br>(37)  | 35032<br>(26)                              | 18366<br>(26)  | 18918<br>(88)  | 13078<br>(88) |
| Kolar       | 20462<br>(43)                        | 10676<br>(43)  | 31877<br>(28)                  | 11569<br>(28)  | 99245<br>(22)                              | 16471<br>(22)  | 42536<br>(93)  | 12315<br>(93) |
| Mandya      | 20311<br>(64)                        | 10005<br>(64)  | 38269<br>(17)                  | 13118<br>(17)  | 94750<br>(10)                              | 20878<br>(10)  | 31846<br>(91)  | 11781<br>(91) |
| Raichur     | 16411<br>(33)                        | 11968<br>(33)  | 21433<br>(28)                  | 12299<br>(28)  | 62499<br>(32)                              | 20157<br>(32)  | 33781<br>(93)  | 14885<br>(93) |
| TOTAL       | 19286<br>(239)                       | 10942<br>(239) | 25092<br>(175)                 | 11737<br>(175) | 78262<br>(136)                             | 18899<br>(136) | 35717<br>(550) | 1316<br>(550) |

GRIN = Gross Income

FEX = Food Expenditure

(Figures in brackets indicate No. of Households)

These levels raise a major question about poverty among marginal and small farmers. The "poverty line" expenditure in rural areas estimated for 1987-88 by the Expert Group on Estimation of Proportion and Number of the Poor (1993) is based on a daily intake of 2400 calories per adult. Leaving aside the question of the adequacy of this norm, we derived above the "poverty line" expenditure in Karnataka at 1991-92 prices of about Rs.14,950 per rural family. In comparison with this estimate, average food expenditure levels are much lower in all cases, except the small farmers of D.Kannada. It may be recalled that these expenditure levels are 'after shift'; that is to say, after the households have secured the benefits from cultivation of commercial crops.

As mentioned earlier, food expenditure constitutes more than 75 percent of Gross Household Expenditure for the majority of marginal and small farmers households. In the many poverty studies based on NSS data, it was generally found that rural houses at poverty level spent about 80 percent of total expenditure on food articles and the remaining 20 percent on non-food items in 1977-78. This has come down only slightly since then and is estimated presently to be around 76 percent.\*

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\* See "Poverty Levels in India: Norms, Estimates and Trends": EPW Research Foundation. Economic & Political Weekly, August 21, 1993 (pp 1748 & 1753).

The marginal and small farmers of Karnataka thus seem to belong very much to the poverty class - at any rate from the viewpoint of food consumption. If we add to this the question of adequacy of the residual expenditure for other essential non-food items, the issue of poverty becomes even more moot.

#### Food Expenditure and Household Size

The majority of households in the sample consisted of more than five members, counting each adult or child as one. Altogether, 437 or 79 per cent of households had 5 or more members, with as many as 189 or 34 percent having 8 or more persons in the "family". Expectedly, total food expenditure tended to be higher for the larger sized families, as may be seen in Table 5.15. While the modal value of food expenditure for households of up to 4 members did not exceed Rs.10,000 per year, it was in the Rs.10,000-Rs.15,000 range for 5 to 7 member households, and over Rs.15,000 for the bigger families. Since households with less than 5 members constituted a small proportion in all of the districts, annual food expenditure for the aggregate sample was characteristically, more than Rs.10,000 for the majority of households.

Table 5.15

Distribution of Households by Total  
Food Expenditure and Household Size: All Districts

| Food Exp.<br>Rs. | Size of Household | Upto 2    | 2 to 4    | 5 to 7     | Above 8    | Total            |
|------------------|-------------------|-----------|-----------|------------|------------|------------------|
| < 1000           |                   | 0         | 0         | 0          | 0          | 0<br>(0.0)       |
| 1000-5000        |                   | 0         | 5         | 3          | 1          | 9<br>(1.6)       |
| 5001-10000       |                   | 18        | 50        | 86         | 33         | 187<br>(34.0)    |
| 100001-15000     |                   | 2         | 29        | 120        | 66         | 217<br>(39.5)    |
| 15001-25000      |                   | 1         | 8         | 33         | 69         | 111<br>(20.2)    |
| 25001-50000      |                   | 0         | 0         | 5          | 17         | 22<br>(4.0)      |
| 50001-100000     |                   | 0         | 0         | 1          | 3          | 4<br>(0.7)       |
| >100000          |                   | 0         | 0         | 0          | 0          | 0<br>(0.0)       |
| <b>TOTAL</b>     |                   | <b>21</b> | <b>92</b> | <b>248</b> | <b>189</b> | <b>550 (100)</b> |

Note: Figures in brackets are percentages

However, not all of the large-sized households belonged to the category of large farmers or had substantial farm incomes. Of the 437 households with 5 or more members, as many as 318 or 73 percent were marginal or small farmers (cf. Table 4.2 above). Further, 118 of this category of households had 8 or more members. Thus, despite their lower levels of Gross Income (cf. Table 5.5) marginal and small farmers had to sustain families which were large-sized. In some instances, the increased family-size merely meant that it was a "joint" family - continuing because of tradition or joint

ownership of the holding. Such families often had farm or other incomes adequate to cover the food bill. But in others, the larger size reflected the existence of numerous children, or older non-working adults in the family. These households had necessarily to supplement their farm incomes with other incomes in order to sustain the family's food expenditure at "poverty line" levels.

The intensity of the need for supplementary income to sustain household expenditure depends also on the type of land owned by the marginal or small farmers. The position of marginal or small farmers owning upto 5 acres of perennially irrigated land is obviously quite different from those owning 5 or even more acres of essentially rain-fed dry lands. This is evidenced in Table 5.16, which compares average and per capita food expenditures of marginal farmer households in the six sample districts, with their average Gross Income (GRIN) and average Farm Income (FIN).

Table 5.16

Average Size, Income Level and Food Expenditure of Marginal Farmer Households: District-wise

| District    | No. of HHs. | Avrg. HH size* | Avrg. Gross Inc. (Rs.) | Avrg. Farm Inc. (Rs.) | Avrg Food Exp. (Rs.) | Food Exp. Gross Income | Food Exp. Gross Farm Income | Per-capita Food Exp. (Rs.) |
|-------------|-------------|----------------|------------------------|-----------------------|----------------------|------------------------|-----------------------------|----------------------------|
| Chitradurga | 13          | 4.9            | 11207                  | 4254                  | 8748                 | 78%                    | 206%                        | 1458                       |
| D.Kannada   | 61          | 5.6            | 24853                  | 15450                 | 12433                | 50%                    | 65%                         | 1970                       |
| Dharwad     | 25          | 4.1            | 9051                   | 2917                  | 9945                 | 110%                   | 341%                        | 1973                       |
| Kolar       | 43          | 5.2            | 20462                  | 12052                 | 10676                | 52%                    | 88%                         | 1684                       |
| Mandya      | 64          | 5.7            | 20311                  | 14125                 | 10006                | 49%                    | 71%                         | 1481                       |
| Raichur     | 33          | 5.1            | 16411                  | 10523                 | 11968                | 73%                    | 114%                        | 1985                       |

\* Adult Male Equivalent

To make households with different gender and age compositions comparable, average household size in column (3) is expressed in terms of 'adult male equivalents'. This is based on a nutrition criterion; the basic nutritional needs of an adult male (sedentary worker) is taken as unity, and those of adult women and of children of both sexes as certain specified fractions of the adult male requirements.\* On this basis, average

\* See C.Gopalan, B.V.Rama Sastri & S.C. Balasubramanian: Nutritive Value of Indian Foods; National Institute of Nutrition, Hyderabad. (1980) p.27. The scale in terms of calories is used here, since most "poverty line" expenditures are linked to daily calorie requirements. But this is not adequate. See Chapter VI



size for the 239 marginal farmer households in the aggregate sample ranged from a low of 4.1 in Dharwar to 5.7 in Mandya. Altogether, in terms of adult equivalence, household size in the marginal farmer category was considerably around 5.

It will be observed from Table 5.16 that not only were marginal farmer households more numerous in D.Kannada, Kolar and Mandya but their average household size (in terms of adult male equivalence) was also higher. This implies that in these districts large-sized households were quite numerous among marginal farmers. Even so, their food expenditures constituted on the average around 50% of Gross Household Income; and more significantly, they were well within the Gross Farm Income as well. In Chitradurga and Dharwad samples, however, food expenditures far exceeded the marginal farmers' Gross Farm Incomes, and constituted upwards of 75% of even Gross Household Incomes. Much the same is true of Raichur also, except that the comparable percentages are somewhat lower. These variations again bring into focus the impact irrigation makes on the incomes and food consumption levels of even marginal farmer households.

This two-fold grouping does not, however, hold when we look at per capita food expenditures. These are much higher in D.Kannada, Dharwad and Raichur than in

Chitradurga, Kolar and Mandya. While part of this discrepancy is explained by different combinations of family size and total food expenditure, a good part is probably due to differences in the composition of the food basket as well as average quantity of food articles consumed per person. We examine this in detail in the next chapter; here it is necessary to note the fact that inter-district variations in food habits are considerable and these also cause differences in per capita food expenditure.

#### Retention of Foodgrains Output

One other issue which merits notice prior to a discussion of the nutritional aspects of food consumption is the proportion of foodgrains output retained by households for "own consumption". A principal motivation of cultivation of foodgrains is to provide for the household's food security; and the strength of this motivation is evidenced by the priority assigned to retention of foodgrains output for home consumption. The high priority assigned to this factor is characteristic of subsistence farming; and an examination of the extent to which commercialisation has affected such retention is among the objectives of this enquiry. Obviously, when farmers shift all their land to cultivation of commercial crops, there is and can be no retention of output. Even in the case of farmers who

have opted for "mixed crops", or for high yielding varieties of food crops, a good part of foodgrains output may be for sale rather than own use. This section examines the issue briefly in terms of the "after shift" situation of different categories of households. Comparison with the position before shift has not been attempted because of the difficulties mentioned earlier. However, when analysing the level and composition of food consumption of households owning land of different sizes in the next chapter, we take up this question of change in relation to the "before shift" situation.

Table 5.17 presents the summary position regarding retention by different categories of households in the aggregate sample. Of the 550 households, 181 households either did not grow any food grains, or retained no portion of their output. The majority of such households belonged to the marginal and small farmer categories - 113 of the former and 43 of the latter. Among these households, 111 marginal farmers and 36 small farmers did not grow any foodgrains on their land (See Tables 4.7.1 and 4.7.2). This was true of medium to large farmers also; of the 25 households which reported "no retention", 23 cultivated only commercial crops. The few remaining households in all categories apparently produced foodgrains which were not suitable

for their home consumption; or, foodgrains of a variety which they exchanged in the market for the variety habitually preferred by them - like ragi for paddy, or average quality rice for superior quality rice or vice-versa. Such cases apart, the majority of households - 369 out of 550 - retained some portion of foodgrains grown on their holdings for own use.

Table 5.17

Proportion of Foodgrainms Output Retained: By Categories of Household  
All Districts

| Category of Farmers               | No Retention | Below 25% | 25% to 50% | 50.01%- 75% | 75.01- 100% | Total HHs Retain- ing out- put (3+4+5+6) | Propor- tion of HHs retain- ing ove 50% of ouput (5+6) † (7) (8) |
|-----------------------------------|--------------|-----------|------------|-------------|-------------|--|--|
| (1)                               | (2)          | (3)       | (4)        | (5)         | (6)         | (7)                                      | (8)  |
| Marginal Farmers (upto 2.5 Acres) | 112          | 4         | 11         | 15          | 96          | 126                                      | 88%  |
| Small Farmers (2.5 to 5 acres)    | 43           | 8         | 24         | 18          | 82          | 132                                      | 76%  |
| Medium-to large farmers (>5)      | 26           | 30        | 35         | 15          | 31          | 111                                      | 41%  |
| Total                             | 181          | 42        | 70         | 48          | 209         | 369                                      | 70%  |

It will be observed from the Table 5.17 that of the 369 households retaining some portion of their output, those retaining over 50% of output constituted 70%. This proportion declined with the size of the holding owned by the household; from 88% for marginal farmers with less than 2.5 acres, it fell to 76% for small farmers (2.51 to 5 acres) and further steeply to 41% for the medium-to-large farmers owning over 5 acres.

This decline was, however, not equally sharp in all districts. (Table 5.18). Interestingly, it was steeper in the dry districts of Chitradurga, Dharwad and Raichur - especially from the small farmers to the larger farmer categories. These were also the districts in which some of the farmers in one or more category of households which had not shifted wholly to commercial crops did not retain any part of the output. Since we have classified land between food and non-food use on the basis of foodgrains & millets and not other food crops (pulses, vegetables etc), the implication is that the grain produced is one which was not habitually consumed in the household, but was commercially attractive. Or a situation in which the households' choice of grain for home consumption had shifted from the one which could be grown on their land to a superior variety - eg. from ragi to rice or jowar to wheat. In either case, the extent of "food security" so available to the household

became much more a function of the trend in market prices than of the size of own production.

Table 5.18

Proportion of Households Retaining over 50 percent to Total Household Retaining Any Part of Output: Districtwise & Category-wise

| District      | Marginal Farmers | Small Farmers | Medium-to large Farmers |
|---------------|------------------|---------------|-------------------------|
| Chitradurga   | 100%             | 89%           | 48%                     |
| D.Kannada     | 100%             | 100%          | 100%                    |
| Dharwad       | 100%             | 87%           | 42%                     |
| Kolar         | 100%             | 77%           | 68%                     |
| Mandya        | 92%              | 75%           | 50%                     |
| Raichur       | 35%              | 30%           | 7%                      |
| All Districts | 87%              | 76%           | 42%                     |

Two districts stand out in Table 5.18 - D.Kannada and Raichur. In the former district, households in all categories growing mixed crops (food and commercial crops) retain over 50% of own output of foodgrains for home consumption. The principal foodgrains grown in that district is rice, and rice is also the staple food consumed, alongwith fish and vegetables. It would thus appear that in D.Kannada, farmer households attach considerable importance to the needs of home consumption in allocating land to food crops - when they decide to grow both food crops and commercial crops on their holdings. The position in Raichur is quite different.

Only a minority of households in each category retains over 50% of own output of foodgrains. The principal foodgrains produced in Raichur are rice, jowar and bajra; the preferred cereals for home consumption in the rural areas are, however, jowar and bajra. In this situation, the low ratio of households retaining over 50% of own output is most likely due to the propensity of households growing rice exchanging it for jowar or bajra, with a view to enlarging the total quantity of cereals available for own use. These inter-district differences bring out the fact that the proportion of output retained for own-use is considerably influenced by the correspondence - or lack of it - between the household's preferences as consumers, and its assessment of the agricultural suitability of its holding for cultivating the foodgrain variety it prefers.

It will also be seen from Table 5.18 that except in Raichur, 92% or more marginal farmers and 75% or more small farmers retained over 50 percent of own-output. This was regardless of whether the district was dry or water-rich. Comparable ratios for Raichur in all three categories were, as already observed, much lower.

A factor which could affect this proportion is the size of the household. Of the 550 households surveyed, 437 had 5 or more members, and such households constituted over 75% of the total in each category of farmers.

Table 5.19

Relative Proportion of Households with 5 or More Members & Households Retaining over 50% of Output: By Category of Households:All Districts

| Cate-<br>gory                                 | Total<br>Number<br>of hou-<br>seholds | House-<br>holds<br>with 5<br>or more<br>members | Propor-<br>tion of<br>(3) to<br>(2) | House-<br>holds<br>retain-<br>ing ov-<br>er 50%<br>of out-<br>put | Propor-<br>tion of<br>(5) to<br>(2) | House-<br>holds<br>retain-<br>ing so-<br>me por-<br>tion of<br>output | Prop-<br>orti-<br>on of<br>(7) to<br>(2) | Prop-<br>orti-<br>on of<br>(5) to<br>(3) |
|---|---------------------------------------|---|-------------------------------------|---|-------------------------------------|---|--|--|
| (1)   | (2)                                   | (3)   | (4)                                 | (5)   | (6)                                 | (7)   | (8)                                      | (9)                                      |
| Marginal<br>Farmers<br>(upto<br>2.5<br>acres) | 239                                   | 181<br>(65)                                     | 76%                                 | 111   | 46%                                 | 127   | 53%                                      | 61%                                      |
| Small<br>Farmers<br>(2.5 to<br>5 acres)       | 175                                   | 137<br>(53)                                     | 78%                                 | 100   | 57%                                 | 132   | 75%                                      | 73%                                      |
| Medium-to<br>large<br>farmers<br>(>5.01)      | 136                                   | 119<br>(71)                                     | 87%                                 | 46  | 34%                                 | 110   | 81%                                      | 39%                                      |
| Total   | 550                                   | 437<br>(189)                                    | 79%                                 | 257   | 47%                                 | 369   | 67%                                      | 59%                                      |

Among these households, 189 had eight or more members; and as observed in Chapter IV, many of these large-sized households constituted "joint families", with a substantial proportion of adults. From table 5.19, it is seen that over one half of households in the category of medium-to-large farmers consisted of such large sized households. With their higher food requirement, they would naturally have an urge to retain more of their own output - provided the foodgrains grown are of the variety they habitually consumed.



However, this tendency is not clearly evident in the sample. When we compare total households in each category of farmers with households having 5 or more members, as well as with households retaining over 50% of own output, what emerges is the following:

- a) both the proportion of households with 5 or more members (col.4) and the proportion of households retaining some part of own output (col.8) increase continuously from marginal to small to large farmer categories.
- b) However, the propotion of households retaining over 50% of output to total households (col.6) as well as to households with 5 or more members in each category (col.9) rises significantly from marginal to small farmers but falls thereafter sharply in respect of medium-to-large farmers.
- c) The picture turns out to be somewhat different when we compare households retaining over 50% (col.5) with those retaining some portion of output (col.7). The proportion of the former to the latter declines steadily from 87% for marginal farmers to 76% for small farmers and further to 42% for medium-to-large farmers. In other words, of the marginal and small farmers households retaining some part of own output, the large majority keep back over 50% of the foodgrains they produce for own consumption.

The diverse movements in these proportions arise from several causes - of which household size is one, but not necessarily the dominant one in all cases. Among the three categories, the correspondence between household size and percentage retention seems stronger for small farmers than for the marginal ones. Apparently, for marginal farmers, with very small holdings and hence low foodgrains outputs, retention cannot exceed 100%, whatever the size of the households. In other cases, such farmers are unable to exceed a certain proportion of retention, because of their cash needs for meeting other essential expenditures, or for debt servicing. Small farmers, with holdings between 2.5 to 5 acres, are clearly in a stronger position - in terms of both output and ability to retain - to adjust the retention according to family size. The bigger farmers also have such flexibility; but with their much higher output levels, increases in the quantity of retention because of family size do not necessarily result in any significant variation in the proportions retained. Altogether, it is clearly in respect of marginal - and to some extent small-farmers that one has to examine closely if, at the levels of retention obtaining after the shift, commercial farming has adversely affected the household's food security and nutrition levels.



## Chapter VI

### Effect of Crop Shifts on Nutrition and Health of Women and Children

The differential changes in food expenditure of farmer households consequent upon crop shifts raises the question whether they have had any adverse impact on the nutrition and health of these households, especially on the women and children of the poorer families. We have noted in the earlier chapters that, by and large, households of the middle-to-large farmers have not had a serious problem in regard to food expenditure, save for some of the middle level (i.e 5 to 10 acres) farmers in the dry zones which have not benefited from any irrigation. Hence the focus of our interest in this chapter is mainly on the marginal and small farmer households. Even within this group, we have concentrated on the health problems of women and children belonging to households with annual incomes upto Rs.25,000 after shift.

As mentioned at the very outset of this Report, we have looked only at the broad features of the nutrition and health scenario. No detailed analysis has been undertaken of measures of malnutrition, deficiency in the intake of micro-nutrients or the adequacy of supplementary foods relative to the type of malnutrition prevailing in each of the sample districts. Nor has it been possible for us to assess carefully the adequacy of any remedial measures taken - or proposed to be taken -

to deal with the health problems of poor women and children in rural areas. We have not also gone into any comprehensive assessment of family planning measures or methods. Some of these issues were, in any event, outside the scope of our proposal; the others have not been taken up because the connection between them and crop shifts is very tenuous. However, even the limited analysis undertaken here throws up several issues of importance to food, health and education policies affecting the poorer farmers.

#### Pattern of Food expenditure

Since nutrition depends not only on the size of the food basket but on its contents, quantities of each of the principal food items consumed by the households have been identified for conversion into nutrient values. The proportion of expenditure on principal food articles to total food expenditure has been worked out from these quantities, using common prices for households in each village, for the six sample districts and the three categories of farmer households. This has been done for both 'before shift' and 'after shift' positions. On the basis of these calculations, the comparative position in respect of marginal, small and medium-to-large farmers has been set out in Tables 6.1.1, 6.1.2 & 6.1.3. The food groups used are: (i) cereals & millets (ii) pulses (iii) vegetables & fruits (iv) milk & milk products (v) edible oils & nuts (vi) meat, fish & eggs (vii) spices and (viii) sweets.

Table 6.1.1

Proportion of Expenditure on Food Items to Total Food Expenditure

| <u>MARGINAL FARMERS</u>       |                                       |                   |        |               |                    |                  |                  |        |        |
|-------------------------------|---------------------------------------|-------------------|--------|---------------|--------------------|------------------|------------------|--------|--------|
| <u>Before Shift (Percent)</u> |                                       |                   |        |               |                    |                  |                  |        |        |
| District                      | Average Annual Food Expenditure (Rs.) | Cereals - Millets | Pulses | Veg. & Fruits | Milk/Milk Products | Edible oils/nuts | Meat/Fish & Eggs | Spices | Sweets |
| Chitradurga                   | 5491.4                                | 35.42             | 7.71   | 6.95          | 14.04              | 11.98            | 9.93             | 8.62   | 5.35   |
| D.Kannada                     | 8527.7                                | 40.86             | 5.01   | 8.40          | 12.16              | 13.39            | 7.48             | 7.58   | 5.12   |
| Dharwad                       | 6362.9                                | 39.87             | 11.25  | 5.72          | 14.19              | 10.64            | 3.33             | 10.70  | 4.30   |
| Kolar                         | 6831.1                                | 41.80             | 9.15   | 5.55          | 11.67              | 9.99             | 10.59            | 7.29   | 3.96   |
| Mandya                        | 6879.4                                | 47.07             | 6.45   | 4.00          | 11.96              | 8.24             | 7.26             | 9.54   | 5.48   |
| Raichur                       | 7759.0                                | 43.59             | 8.46   | 6.27          | 14.62              | 9.69             | 4.59             | 8.65   | 4.12   |
| <u>After Shift (Percent)</u>  |                                       |                   |        |               |                    |                  |                  |        |        |
| District                      | Average Annual Food Expenditure (Rs.) | Cereals - Millets | Pulses | Veg. & Fruits | Milk/Milk Products | Edible oils/nuts | Meat/Fish & Eggs | Spices | Sweets |
| Chitradurga                   | 8748.0                                | 34.73             | 7.28   | 9.42          | 17.09              | 10.36            | 8.33             | 6.44   | 6.35   |
| D.Kannada                     | 12433.0                               | 43.05             | 4.63   | 8.23          | 11.09              | 13.04            | 7.46             | 7.37   | 5.09   |
| Dharwad                       | 9944.6                                | 37.12             | 11.45  | 6.19          | 16.03              | 11.11            | 3.08             | 8.90   | 6.12   |
| Kolar                         | 10675.8                               | 35.69             | 9.56   | 7.32          | 14.48              | 9.57             | 10.27            | 7.44   | 5.66   |
| Mandya                        | 10005.0                               | 42.49             | 8.48   | 4.78          | 14.81              | 8.36             | 7.66             | 7.61   | 5.82   |
| Raichur                       | 11968.0                               | 42.18             | 9.47   | 9.46          | 13.94              | 9.33             | 3.24             | 6.83   | 5.56   |

Notes: (a) "Edible Oils and Nuts" includes coconut

**Table 6.1.2**

**Proportion of Expenditure on Food Items to Total Food Expenditure**

| <b>SMALL FARMERS</b>                 |                                       |                 |        |               |                    |                  |                  |        |        |
|--------------------------------------|---------------------------------------|-----------------|--------|---------------|--------------------|------------------|------------------|--------|--------|
| <b><u>Before Shift</u> (Percent)</b> |                                       |                 |        |               |                    |                  |                  |        |        |
| District                             | Average Annual Food Expenditure (Rs.) | Cereals Millets | Pulses | Veg. & Fruits | Milk/Milk Products | Edible oils/nuts | Meat/Fish & Eggs | Spices | Sweets |
| Chitradurga                          | 5405.0                                | 41.06           | 8.67   | 6.58          | 12.64              | 10.12            | 7.76             | 7.97   | 5.21   |
| D.Kannada                            | 12158.8                               | 39.46           | 5.78   | 9.54          | 12.19              | 16.72            | 6.87             | 5.26   | 6.18   |
| Dharwad                              | 7789.0                                | 36.86           | 13.00  | 5.08          | 16.40              | 11.40            | 4.69             | 7.750  | 4.82   |
| Kolar                                | 7862.6                                | 41.99           | 10.68  | 4.86          | 12.42              | 8.37             | 9.269            | 7.23   | 5.20   |
| Mandya                               | 8353.0                                | 43.37           | 6.30   | 4.62          | 15.77              | 8.41             | 9.04             | 6.88   | 5.61   |
| Raichur                              | 7239.0                                | 42.62           | 7.71   | 6.55          | 16.17              | 9.85             | 2.32             | 8.07   | 6.72   |
| <b><u>After Shift</u> (Percent)</b>  |                                       |                 |        |               |                    |                  |                  |        |        |
| District                             | Average Annual Food Expenditure (Rs.) | Cereals Millets | Pulses | Veg. & Fruits | Milk/Milk Products | Edible oils/nuts | Meat/Fish & Eggs | Spices | Sweets |
| Chitradurga                          | 9331.5                                | 36.82           | 9.00   | 9.29          | 13.48              | 10.85            | 8.55             | 7.22   | 4.71   |
| D.Kannada                            | 17014.6                               | 40.23           | 6.69   | 6.99          | 10.92              | 14.31            | 7.98             | 5.64   | 7.24   |
| Dharwad                              | 11600.5                               | 32.65           | 13.09  | 6.31          | 18.25              | 12.62            | 3.90             | 6.47   | 5.89   |
| Kolar                                | 11568.9                               | 38.27           | 10.76  | 5.95          | 13.90              | 8.26             | 10.62            | 7.21   | 5.02   |
| Mandya                               | 13118.1                               | 37.34           | 8.18   | 5.36          | 16.15              | 9.48             | 8.98             | 8.70   | 5.81   |
| Raichur                              | 12299.1                               | 38.97           | 9.80   | 9.68          | 16.30              | 9.71             | 1.88             | 6.87   | 6.84   |

Notes: (a) "Edible Oils and Nuts" includes coconut

**Table 6.1.3**  
**Proportion of Expenditure on Food Items to Total Food Expenditure**  
**LARGE FARMERS**  
**Before Shift** (Percent)

| District         | Average Annual Food Expenditure (Rs.) | Cereals<br>Millets | Pulses | Veg. &<br>Fruits | Milk/Milk<br>Products | Edible<br>oils/nuts | Meat/Fish<br>& Eggs | Spices | Sweets |
|------------------|---------------------------------------|--------------------|--------|------------------|-----------------------|---------------------|---------------------|--------|--------|
| Chitrad-<br>urga | 10237.1                               | 33.00              | 10.72  | 5.27             | 19.08                 | 11.93               | 8.03                | 5.69   | 6.28   |
| D.Kannada        | 10474.6                               | 35.62              | 4.12   | 7.97             | 18.42                 | 12.86               | 10.19               | 5.87   | 4.96   |
| Dharwad          | 10375.9                               | 36.73              | 11.10  | 4.30             | 19.64                 | 12.55               | 3.06                | 7.47   | 5.15   |
| Kolar            | 9225.0                                | 41.09              | 10.24  | 3.44             | 16.65                 | 8.50                | 8.77                | 6.64   | 4.67   |
| Mandya           | 13014.0                               | 46.11              | 6.06   | 4.19             | 14.65                 | 8.47                | 9.54                | 6.40   | 4.58   |
| Raichur          | 10341.0                               | 40.58              | 8.57   | 6.45             | 18.43                 | 10.05               | 0.65                | 8.09   | 7.19   |

**After Shift**

(Percent)

| District         | Average Annual Food Expenditure (Rs.) | Cereals<br>Millets | Pulses | Veg. &<br>Fruits | Milk/Milk<br>Products | Edible<br>oils/nuts | Meat/Fish<br>& Egg | Spices | Sweets |
|------------------|---------------------------------------|--------------------|--------|------------------|-----------------------|---------------------|--------------------|--------|--------|
| Chitrad-<br>urga | 19074.0                               | 31.58              | 8.53   | 8.22             | 20.38 <sup>a</sup>    | 12.98               | 7.92               | 4.68   | 5.71   |
| D.Kannada        | 19073.1                               | 36.06              | 3.36   | 8.70             | 19.26                 | 11.65               | 9.81               | 5.47   | 5.70   |
| Dharwad          | 18336.0                               | 34.30              | 13.17  | 5.82             | 18.47                 | 12.65               | 2.49               | 5.91   | 7.19   |
| Kolar            | 16470.6                               | 37.41              | 8.75   | 5.04             | 18.74                 | 8.90                | 9.20               | 6.36   | 5.59   |
| Mandya           | 20877.6                               | 38.83              | 7.80   | 5.01             | 16.11                 | 10.68               | 9.87               | 6.38   | 5.33   |
| Raichur          | 20157.0                               | 38.28              | 9.88   | 9.45             | 19.19                 | 9.23                | 0.60               | 5.71   | 7.66   |

Notes: (a) "Edible Oils and Nuts" includes coconut



Expectedly, the largest proportion of outlay is on the cereals group for all three categories; however, these proportions vary considerably from district to district. Also, they are lower for the medium-to-large farmers than for the other two categories in most districts. But given the higher average food expenditure of this category, this does not necessarily indicate any decline in quantities consumed. Some of these differences between categories or between districts are also attributable to a shift in the variety of cereal consumed as the income of the household increases. Typical shifts in Karnataka are from ragi to superior quality rice, or from bajra and jowar to a mixture of these grains and wheat or rice. (Likewise, there are often changes from one type of cooking medium to another, more "refined" variety.)

What is significant is that the proportionate expenditure on cereals has declined after shift for all three categories, in all districts except D.Kannada. This decline has been compensated by the increased proportion of outlay on others: pulses in Dharwad, Kolar, Mandya and Raichur for marginal farmers, and in all districts for small farmers; meat, fish and eggs in Mandya for marginal farmers and in Chitradurga, D.Kannada and Kolar for small farmers; edible oils and nuts in Dharwad and Mandya districts for both marginal and small farmers; and milk and milk products in all

districts except for marginal farmers in D.Kannada and Raichur districts. There are also perceptible increases in the relative outlay on fruits and vegetables and on sweets in most cases. Altogether, there are fairly clear indications of the tendency among all categories of households to consume items which tend to be a little richer in proteins or vitamins after the shift in crop patterns and consequent increase in gross incomes. Some part of this change occasionally reflects a variation in the adult-children ratio of households between the two periods leading to higher consumption of milk; and some of it is due to the cultivation of new habits, such as tea or coffee-drinking. But it is also possible that as a result of education or propaganda, there has been a conscious attempt to add to the nutritive value of the food consumed by the household. To get some idea of this, we have to look at changes in per capita or per household intake of the major nutritive elements, viz. carbohydrates (in terms of energy), proteins and fats after the shift, corresponding to the patterns of food expenditure.

#### Nutritional Requirements: NIN Recommendations

The nutritive value of the food items consumed by the sample households have been derived from the "Food Composition Tables" contained in the revised (1988) edition of Nutritive Value of Indian Foods by Drs.C.Gopalan, B.V.Rama Sastri and S.C.Balasubramanian

of the National Institute of Nutrition, Hyderabad.

A crude measure of the daily nutritional intake per capita may be obtained from the monthly data on quantities purchased by the household by dividing the aggregate family intake by the number of family members, regardless of the age of each member. However, for inter-district or inter-category comparisons, the per capita values considered are usually on an 'adult equivalent' basis. This again is based on the conversion coefficients suggested for calorie requirement by Dr.C.Gopalan et al in the volume mentioned above. These coefficients are:

|                                    |            |
|------------------------------------|------------|
| adult male (sedentary worker)      | 1.0        |
| adult female ( " " )               | 0.8        |
| adolescents (12 to 21 years)       | 1.0        |
| children (Varying from 1-12 years) | 0.4 to 0.8 |

Relative to the 'adult male sedentary worker' the requirements of those classified as 'moderate workers' have a higher coefficient at 1.2; and 'heavy workers' at 1.6. This is related purely to the physical effort in the task involved. On this scale, NIN ranks 'agricultural labour' in the case of both males and females as "moderate workers". The "recommended calorie requirement" for such workers is 2700 K-cals for males and 2100 K-cals for female workers.\*.

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\*op.cit pages 9,10 and 94.

Since all those above 14 years of age are classified as adults in our Report, the "adolescents" of the NIN table have the same values as adults in our calculations. Children of different ages have been grouped together entirely for convenience. However, in respect of both women and children, necessary adjustments in nutrition requirements are made in the discussions relating to morbidity and health later in this chapter. Conversion ratios applied to protein and fat intake are broadly as in the NIN table on page 94 of the volume cited<sup>++</sup>.

The NIN volume also discusses briefly the nutritional adequacy of habitual diets in India. On the basis of pooled data from surveys conducted in 10 states over a period of years by the National Nutrition Monitoring Bureau, (NNMB) the NIN has worked out the nutrient content of the diet of several rural and urban groups. The calorie and protein contents of the diet of poor families in rural areas are estimated in these calculations at: 1994 K cal of energy and 60.5 grams of protein. Comparable figures for the urban middle income group are 2140 K-cals and 66.7 grams, and for urban slum dwellers 1825 K-cals and 57.8 grams.\*

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++ Admittedly, this is not appropriate. However, we have used this short-cut to avoid undue complication of both the tables and the narrative. For the most part, our discussion is essentially in terms of "energy" - since low calorie intake has been associated with "poverty" discussions.

\* op.cit p.35

In appreciating the nutrition status of the sample households in our survey, these estimates of the NIN may be kept in mind.

It should, however, be added that in the NIN's judgment, the calorie values in all these cases are unsatisfactory. In respect of protein, the figures for the rural poor is barely adequate, while that of the urban slum dwellers is clearly below minimal requirements. It is perhaps on the basis of these surveys that in the discussions relating to the "poverty line", the general practice has been to use a daily intake of 2400 K-cals per person as the norm to separate the poor from the non-poor. Later in this Chapter, we have treated a calorie intake of 2740 calories as the "required" intake, in classifying farmer households on the basis of nutritional adequacy; this is according to the "low-cost improved diet" for the poor suggested by the National Institute of Nutrition.

### Nutritional Status of Sample Households

The comparative analysis of nutritional status of sample households in this chapter is in terms of kilocalories (K-cals) of energy and grammes (g) of proteins and fats. Micro-nutrients have not been taken into account partly because of the cumbersomeness of handling multiple such elements but mainly because a farming household's cropping decisions are apt to affect significantly their

intake of the three principal nutrients mentioned above. Moreover, much of the debate on poverty levels and ratio in India has centred around average calorie intake, with occasional references to protein deficiency. However, in the later part of this chapter relating to the health of women and children of poor families, we have touched on the other nutrients as necessary.

Per capita intakes of energy, proteins and fat per day for different categories of farmers are shown in Table 6.2, both before shift and afterwards. For each nutrient, households have been distributed among three levels of (a) less than adequate, (b) marginal or just about adequate, and (c) more than adequate using the dietary allowances recommended for Indians in the NIN volume cited earlier (cf.p.94). We have taken the NIN's classification of 'agricultural labourer' as a 'moderate worker', requiring a daily intake of 2700 K-cals, 60 g of protein and 15 g of fat. The percapita figures in Table 6.2 are in terms of "adult male equivalents"; hence scale adjustments have to be made for comparison of daily intake of women and children.

Table 6.2

Daily Per Capita\*  
Intake of Principal Nutrients: Household Distribution,  
Farmer category wise

| Nutrients |                    | <u>(no. of households)</u> |     |               |     |                        |     |                  |     |
|-----------|--------------------|----------------------------|-----|---------------|-----|------------------------|-----|------------------|-----|
|           |                    | Marginal farmers           |     | Small farmers |     | Large & Medium farmers |     | Total households |     |
|           |                    | BS                         | AS  | BS            | AS  | BS                     | AS  | BS               | AS  |
| Energy    | a) < 2000 k cal    | 66                         | 25  | 44            | 22  | 27                     | 5   | 137              | 52  |
|           | b) 2000-3000 k cal | 82                         | 86  | 72            | 74  | 54                     | 47  | 208              | 207 |
|           | c) > 3000 k cal    | 91                         | 128 | 59            | 79  | 55                     | 84  | 205              | 291 |
| Protein   | a) < 50 gms        | 62                         | 38  | 41            | 20  | 27                     | 6   | 130              | 64  |
|           | b) 50.1 to 75gms   | 81                         | 81  | 63            | 66  | 50                     | 47  | 194              | 194 |
|           | c) > 75 gms        | 96                         | 120 | 71            | 89  | 59                     | 83  | 226              | 292 |
| Fats      | a) < 15 gms        | 107                        | 78  | 55            | 44  | 31                     | 14  | 193              | 136 |
|           | b) 15.1 to 20gms   | 38                         | 43  | 41            | 26  | 19                     | 18  | 98               | 87  |
|           | c) > 20 gms        | 94                         | 118 | 79            | 105 | 86                     | 104 | 259              | 327 |

BS: Before Shift, AS: After Shift  
 \* Adult Male Equivalent

In general, the nutritional status of households in all three categories shows improvement with the shift in cropping pattern, and the resulting increase in gross income. However, marginal farmers gained less than the others, as might be expected. In the (a) group (less than adequate intake) for instance, marginal farmers constituted about half of the total households remaining 'after shift' - i.e. 25 out of 52 with less than 2000 K-cals, 38 out of 64 with less than or equal to 50g of protein and 78 out of 136 with less than or equal to 15g of fats. More importantly, almost half of the marginal farmer households had per capita intake of not more than

3000 K-cals, of energy, 75g of proteins and 20g of fats (levels (a) & (b) together) - that is to say, just about adequate for "heavy work" under Indian conditions. At the other end of the spectrum, many medium and large farmer households had moved into the (c) group - i.e. more than adequate daily intake. However, even amongst them, medium farmers in some of the dry districts were able to secure only marginal improvement. As for small farmers, they did only slightly better than marginal farmers, with many of them remaining at standard or sub-standard levels even after the shift.

A district-wise comparison of the status of marginal and small farmers shows some interesting features. Table 6.3 presents the average intakes of energy, proteins and fats for these categories of farmer households both before and after shift. These are averages for such households covered in the district samples and are, at best, indicative of the likely position in those districts. In all probability, they overstate the position somewhat, for two reasons: first, because of the tendency of respondents to exaggerate household expenditure on food, and secondly because of the additional expenditure incurred on feeding others on special occasions like weddings, festivals or funerals. The daily per capita figures for nutrients have been derived by dividing the average daily intake per household by the number of "adult male equivalent" in



the family. For facility of inter-district comparisons, the average 'family-size' for each of the district samples (in terms of adult male equivalents in the households) is shown in brackets under "energy" for each category of farmers.

It will be seen from Table 6.3 that the average family size for small farmers is higher than that for marginal farmers in all of the district samples. This arises usually from an increase in the proportion of children to adults in the household. But sometimes, this is because there are more working or non-working adults in the family. An increase in the number of working adults could, obviously, enable the household to add to its income and hence its food expenditure - thereby benefiting nutritional intake to some extent. However, if the increase in family size is due wholly or mainly to a higher proportion of non-working dependents, e.g. children or old people, the result could be a decline in per capita nutrients received, unless the households' income from existing activities has increased.

**Table 6.3**  
**Per Capita\* Nutritional Status of Sample Households:**  
**Districtwise Averages**  
**Marginal Farmers**

| Districts            | E N E R G Y<br>(K - cal) |               | P R O T E I N<br>(gs) |        | F A T<br>(gs) |       |
|----------------------|--------------------------|---------------|-----------------------|--------|---------------|-------|
|                      | BS                       | AS            | BS                    | AS     | BS            | AS    |
| Chitradurga          | 2950<br>(4.9)            | 2640<br>(4.9) | 66.46                 | 66.28  | 23.91         | 25.71 |
| D. Kannada           | 2880<br>(5.6)            | 4100<br>(5.6) | 78.95                 | 82.18  | 17.16         | 24.25 |
| Dharwad              | 3600<br>(4.1)            | 3950<br>(4.1) | 98.33                 | 110.92 | 31.82         | 32.43 |
| Kolar                | 2880<br>(5.2)            | 2900<br>(5.2) | 72.89                 | 76.25  | 19.51         | 25.59 |
| Mandya               | 2940<br>(5.7)            | 3090<br>(5.7) | 69.44                 | 73.83  | 19.96         | 23.56 |
| Raichur              | 3940<br>(5.1)            | 3430<br>(5.1) | 102.09                | 94.98  | 29.93         | 28.40 |
| Total                | 3120<br>(5.3)            | 3420<br>(5.3) | 79.82                 | 82.79  | 22.00         | 25.82 |
| <b>Small Farmers</b> |                          |               |                       |        |               |       |
| Chitradurga          | 2800<br>(5.0)            | 2920<br>(5.0) | 72.41                 | 73.61  | 20.73         | 24.27 |
| D. Kannada           | 2820<br>(7.0)            | 4180<br>(7.0) | 73.83                 | 77.04  | 16.65         | 17.97 |
| Dharwad              | 2970<br>(5.5)            | 3050<br>(5.5) | 81.72                 | 87.812 | 29.09         | 28.13 |
| Kolar                | 2850<br>(6.0)            | 3130<br>(6.0) | 74.39                 | 83.89  | 25.11         | 27.85 |
| Mandya               | 3020<br>(6.5)            | 3490<br>(6.5) | 75.37                 | 88.89  | 22.81         | 31.16 |
| Raichur              | 3110<br>(5.8)            | 3160<br>(5.8) | 73.55                 | 87.77  | 23.03         | 25.30 |
| Total                | 2920<br>(5.8)            | 3200<br>(5.8) | 75.30                 | 82.34  | 23.37         | 25.88 |

(a) Figures in brackets are average family size in terms of adult male equivalent.

(b) Total households: Marginal Farmers=239; Small Farmers=175;  
 BS=Before Shift; AS=After Shift

Apparently, it is the latter situation that seems to prevail among small farmer households as compared to marginal farmers. Table 6.3 shows that in respect of energy and other nutrients, both small and marginal farmers improved their intakes after shift. But for the aggregate of 239 marginal farmers in the sample, the levels achieved for per capita energy and protein intakes were higher than those attained by small farmer households both before and after shift.

Districtwise, the comparative position before shift was that per capita calorie intake was higher for marginal farmers in all districts except Mandya; of proteins only in D.Kannada, Dharwad and Raichur; and of fats in districts other than Kolar and Mandya. The somewhat inferior nutrition status of small farmers in these districts is due to their larger family-size as observed earlier.

This position was, apparently, remedied in some districts by the increase in incomes secured after shift. In all districts except Dharwad and Raichur, per capita calorie intake of small farmer families was higher than that of marginal farmers. Marginal farmers in Raichur, and Chitradurga actually showed declines in calorie intake after shift. Apart from Chitradurga, Kolar and Raichur in respect of proteins, per capita intake by marginal farmers was above that of small farmers; in the other three districts, the converse was true. Over-all, both categories of farmers were better off after shift in terms of consumption of proteins and fats. The main point to note, however, is this: unlike the situation before shift, the position afterwards was that income increases in the case of small farmers were such as to off-set considerably the adverse impact of family size on per capita intake of the principal nutrients. As a result, the variance among small farmers was considerably reduced.

Mention has been made in chapter IV of farmers substituting new varieties of food crops for old ones as part of the shift. This has been accompanied by a corresponding change in some districts of food grains retained for home consumption - and hence in the composition of their food basket. Such changes, coupled with traditional differences in the food habits of different districts, also affect the relative position

of marginal and small farmers in any 'before shift - after shift' comparison. For instance, the average calorie and protein intakes in Dharwad and Raichur were much higher than those in Kolar and Mandya before the shift for marginal farmers; but these differences narrowed down considerably after shift. Besides the bigger increases in income that marginal and small farmers obtained from the shift in Kolar and Mandya, there was some substitution of rice for jowar in the northern districts, and of wheat for rice or ragi in the other two. Consumption of food articles rich in proteins and fats - such as pulses, milk and milk products, meat, fish and eggs, edible oils etc - also increased with the increase in incomes in all districts; however, their impact on the intake of nutrients is noticeable mainly in the case of large farmers. As regards marginal and small farmers, it is perhaps only in D.Kannada that they have had a marked effect. Altogether, changing food habits seem to have influenced the nutritional status of sample households significantly only in a few districts.

As mentioned earlier the average levels of per capita intake in Table 6.3 have to be adjusted downwards to get a clearer picture of the "normal" diet position. However, even with such revision, the intake levels after shift are likely to be high enough to stand

of marginal and small farmers in any 'before shift - after shift' comparison. For instance, the average calorie and protein intakes in Dharwad and Raichur were much higher than those in Kolar and Mandya before the shift for marginal farmers; but these differences narrowed down considerably after shift. Besides the bigger increases in income that marginal and small farmers obtained from the shift in Kolar and Mandya, there was some substitution of rice for jowar in the northern districts, and of wheat for rice or ragi in the other two. Consumption of food articles rich in proteins and fats - such as pulses, milk and milk products, meat, fish and eggs, edible oils etc - also increased with the increase in incomes in all districts; however, their impact on the intake of nutrients is noticeable mainly in the case of large farmers. As regards marginal and small farmers, it is perhaps only in D.Kannada that they have had a marked effect. Altogether, changing food habits seem to have influenced the nutritional status of sample households significantly only in a few districts.

As mentioned earlier the average levels of per capita intake in Table 6.3 have to be adjusted downwards to get a clearer picture of the "normal" diet position. However, even with such revision, the intake levels after shift are likely to be high enough to stand

comparison with the "norms" usually recommended for "poor" families in rural India. We shall take a closer look at this later in this chapter. Prior to that, it is necessary to recall from Table 6.2 that there were many households in our sample in which per capita intake of principal nutrients was "less than adequate" in terms of the norms suggested by NIN for agricultural workers. We have to examine whether, and if so how, the extent of this problem is linked to gross income levels or cropping patterns.

### Gross Income and Nutrition Levels

It was pointed out in Chapter V that (a) the average Gross Income after shift was around Rs.19,300 for marginal farmers and about Rs.25,100 for small farmers in the sample (Table 5.2); and (b) the approximate "poverty line" expenditure for rural families in Karnataka in 1991-92 was Rs.20,000 per annum (pp 139). On this basis, we have looked at the nutritional intake of families with annual gross income upto Rs.25,000, as constituting the poorer segment of the sample. Admittedly, the distribution of households on this basis is not identical with the breakdown according to marginal and small farmer households. But most of them fall within the lower brackets - with a substantial number of them being below the Rs.25,000 gross income level. A larger segment covering households with Gross

Household Expenditure upto Rs.25,000 which includes several medium-to-large farmers besides marginal and small farmer households, has also been examined. But whatever the household's status according to land owned, it is the assessment of the relation between income levels and nutritional adequacy that is of interest here.

Using the three-fold criteria for energy, protein and fat intake for assessing nutritional status, household distributions according to levels of Gross Income and Gross Household Expenditure after shift are presented in Table 6.4.

**Table 6.4**  
**Daily PerCapita Intake of Principal Nutrients according to Gross Income and Gross Expenditure of Household After Shift: All District**

| Nutrients                    | GROSS INCOME            |                          |                         | GROSS EXPENDITURE       |                          |                         | TOTAL |
|------------------------------|-------------------------|--------------------------|-------------------------|-------------------------|--------------------------|-------------------------|-------|
|                              | Upto<br>15,000<br>(Rs.) | 15001-<br>25000<br>(Rs.) | Above<br>25000<br>(Rs.) | Upto<br>15,000<br>(Rs.) | 15001-<br>25000<br>(Rs.) | Above<br>25000<br>(Rs.) |       |
| <b>I. ENERGY</b>             |                         |                          |                         |                         |                          |                         |       |
| a) <2000 K-cals              | 21                      | 17                       | 14                      | 17                      | 26                       | 9                       | 5     |
| b) 2000-3000 K-cals          | 72                      | 56                       | 79                      | 49                      | 92                       | 66                      | 20    |
| c) >3000 K-cals              | 88                      | 73                       | 130                     | 50                      | 118                      | 123                     | 29    |
| <b>I. PROTEIN</b>            |                         |                          |                         |                         |                          |                         |       |
| a) ≤50 g                     | 29                      | 16                       | 19                      | 24                      | 30                       | 10                      | 6     |
| b) 50.1g - 75g               | 50                      | 62                       | 82                      | 37                      | 91                       | 66                      | 19    |
| c) >75 g                     | 102                     | 68                       | 122                     | 55                      | 115                      | 122                     | 29    |
| <b>I. FAT</b>                |                         |                          |                         |                         |                          |                         |       |
| a) <15 g                     | 55                      | 35                       | 46                      | 42                      | 69                       | 25                      | 1     |
| b) 15.1g - 20g               | 30                      | 29                       | 28                      | 22                      | 36                       | 29                      | 8     |
| c) >20 g                     | 96                      | 82                       | 149                     | 52                      | 131                      | 144                     | 37    |
| Total Household <sup>§</sup> | 181                     | 146                      | 223                     | 116                     | 236                      | 198                     | 51    |

\* Row total for each level

§ Column total for each nutrient under each Income/Expenditure



It will be seen that of the 327 households with Gross Income of Rs.25,000 or less, 38 (11.6%) households had less than 2000 K-cals of daily intake per capita, and 166 (50.8%) less than 3000 K-cals per capita. If we assume that of the 128 households consuming 2000 to 3000 K-cals per head 75% would fall below the NIN norm of 2740 K-cals per day for an adult male 'moderate' worker, households with less than adequate calorie consumption would be 41% of the total. Similarly, using the NIN "norms" of 66.6g of protein and 16.9g of fat for an adult male 'moderate' worker, the adjusted number of households which are clearly deficient in nutrition would be about 37% and 35% of total respectively.\*

These percentages are, however, quite sensitive to the norms chosen. If agricultural labour is viewed as "heavy" rather than "moderate" work, the "required" levels of daily intake of calories would be significantly higher (i.e 3200 K-cals) than the norm mentioned above. This would automatically raise the proportion of those below the "required" level, to over

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\* These "norms" are as on p.36 of the NIN volume on Nutritive Value of India Foods (1988) cited earlier. They relate to a typical "least cost improved diet" for the poor. The "adjusted" percentages are derived by shifting the norm to its relative position in (b) distributing the households in (b) proportionately and adding the resulting "below the norm" households to those under (a).

50% for calories. Adjustments with regard to protein and fats would, however, be relatively minor, since AME calculations are not according to the formula used for calories.

This overall picture is modified to some extent when households with Gross Expenditure of Rs.25,000 per year are considered. Interestingly, at the intake level of (a) (i.e less than adequate) the number of households' with Gross Expenditure upto Rs.25,000 is higher as compared to those under Gross Income upto Rs.25,000.

Part of this arises from the slightly wider coverage under Gross Expenditure; but part is due probably to other factors which are associated with higher spending, such as changes in the food-basket attributable to dependence on market purchases, or a change in diet for other reasons. Leaving aside the issue of change in dietary habits, the question is: has the household' dependence on market purchase of food articles affected adversely their nutrition status?

#### Cropping Pattern Changes

Taking as a first approximation, the household distribution according to cropping choices used in earlier chapters, the relative position of households regarding calorie and protein adequacy is shown in Table 6.5. Details relating to fat intake have not been taken

into account here because most farmer households depend in any event on market purchases for edible oils; and except in D.Kannada, make relatively little use of any coconuts they may grow. The comparative situation before shift and after shift is also shown, since household distribution according to cropping pattern was available for both the positions.

**Table 6.5**  
**Daily per Capita Intake of Principal Nutrients: Household Distribution**  
**According to Cropping Pattern: Before Shift & After Shift**  
 (no. of households)

| Nutrients |                    | Food crops |    | Commercial crops |     | Mixed crops |     | Total households |     |
|-----------|--------------------|------------|----|------------------|-----|-------------|-----|------------------|-----|
|           |                    | BS         | AS | BS               | AS  | BS          | AS  | BS               | AS  |
| Energy    | a) <2000 K cal     | 91         | 0  | 11               | 19  | 35          | 33  | 137              | 52  |
|           | b) 2000-3000 k.cal | 134        | 3  | 11               | 44  | 63          | 160 | 208              | 207 |
|           | c) >3000 k.cal     | 143        | 4  | 8                | 107 | 54          | 180 | 205              | 291 |
| Protein   | a) <50g            | 85         | 0  | 12               | 25  | 33          | 39  | 130              | 64  |
|           | b) 50.1 to 75g     | 125        | 2  | 9                | 48  | 60          | 144 | 194              | 194 |
|           | c) >75g            | 158        | 5  | 9                | 97  | 59          | 190 | 226              | 292 |

BS: Before Shift    AS: After Shift

It will be seen from this table that regardless of the cropping pattern chosen after shift, the position of the households in general improved after shift, when only 7 households remained in food crops, and the others had opted wholly or partly for commercial crops. Prior to the shift, households within per capita intake of 3000 K-cals of energy and 75 g of protein accounted for over 61% under food crops, 73% or more under commercial crops and over 64% under mixed crops. But after the crop shift, these percentages changed to 43% or less under

food crops and commercial crops and 52% or less under mixed crops. While all cropping groups benefited, it would appear that households which had shifted wholly to commercial crops did relatively better than the other two.

However, if one were to concentrate on the comparative position among households with differing cropping patterns after shift, all those who stayed with food crops were in the nutritionally adequate or more than adequate level. Those whose nutritional position was inadequate before shift chose to cultivate commercial crops on all or part of their holding and some of them apparently continued to lack nutrition. It will be seen from Table 6.5 that all of the households with inadequate calorie intake (52) or protein intake (64) were among the households devoting all or part of their land to commercial crops. Moreover, a substantial proportion of households under commercial crops remained at or below 3000 K-cals (37%) and 75g of protein (43%) after shift. These proportions were even higher in the case of households which had opted for 'mixed crops'; the percentage of those at or below 3000 K-cals was 52%, and those below 75g of protein 49%. Again it would seem that farmers who preferred to shift wholly into commercial crops did better on the whole; but regardless of the extent of such shift, there remained sizeable

proportions of households whose calorie and protein intakes after shift were not entirely satisfactory. Because of the relatively small number of households which remained with food crops "after shift", no firm conclusions can be drawn from this comparative analysis. But it is clear (a) that the problem of nutritional inadequacy remains significant even after shift; and (b) this may be due to the vagaries of price-parities between food grains and the commercial crops preferred by farmers in Karnataka. This is a matter that requires to be studied separately.

Since households which have devoted all their land to commercial crops have no scope for directly improving their nutritional status through any "retention" of own output, the relative improvement mentioned above occurs because of higher income. For the other households, however, improvements in nutritional intake can in principle occur through both higher income and larger retention of output. Of the 380 households in the sample which after shift cultivated only food crops or a mixture of food crops and commercial crops, 369 households retained all or some part of their food grains output for own consumption. This included all households growing only food crops, which retained some part of their output. Thus, along with the households which cultivated only commercial crops, there

were 11 households from amongst the mixed crops group which apparently preferred to sell the food crops they produced and purchase from the market all the foodgrains they consumed.

Including households growing only commercial crops (hence with no retention) under those with less than 50% retention of own output, the breakdown in terms of principal nutrients intake for such households, and those with more than 50% retention would be as in Table 6.6.

**Table 6.6**

**Daily Per Capita Intake\* of Principal Nutrients according to Proportion of Own Output Retained: All Districts**

(no. of households)

| Nutrients               | Retention upto 50% @ |            | Retention from 50.1% to 100% |            | Total Households |            |
|-------------------------|----------------------|------------|------------------------------|------------|------------------|------------|
|                         | BS                   | AS         | BS                           | AS         | BS               | AS         |
|                         | <b>I. ENERGY</b>     |            |                              |            |                  |            |
| a) <2000 K-cals         | 44                   | 28         | 93                           | 24         | 137              | 52         |
| b) 2000-3000 K-cals     | 73                   | 95         | 135                          | 112        | 208              | 207        |
| c) >3000 K-cals         | 58                   | 170        | 147                          | 121        | 205              | 291        |
| <b>I. PROTEIN</b>       |                      |            |                              |            |                  |            |
| a) <=50 g               | 43                   | 35         | 87                           | 29         | 130              | 64         |
| b) 50.1g - 75g          | 64                   | 86         | 130                          | 108        | 194              | 194        |
| c) >75 g                | 68                   | 172        | 158                          | 120        | 226              | 292        |
| <b>I. FAT</b>           |                      |            |                              |            |                  |            |
| a) <=15 g               | 62                   | 67         | 131                          | 69         | 193              | 136        |
| b) 15.1g - 20g          | 30                   | 40         | 68                           | 47         | 98               | 87         |
| c) >20 g                | 83                   | 186        | 176                          | 141        | 259              | 327        |
| <b>Total Households</b> | <b>175</b>           | <b>293</b> | <b>375</b>                   | <b>257</b> | <b>550</b>       | <b>550</b> |

\* - For Adult Male Equivalent

@ - Includes households with "no retention".

Taking energy and protein consumption there was in both segments a marked decrease in the number of households with per capita intake of less than 2000 k-cals. of energy and less than or equal to 50 g of protein after shift. As some in this bracket before shift moved into the next two brackets, some others who were in the 2000 K-cals to 3000 K-cals bracket or 50.1 g to 75 g of protein shifted to the next higher level. Thus the overall nutritional benefit from the shift is observable in both cases.

However, the issue is whether any difference is made by retention itself. To get a better idea of this, compare for instance the shift in caloric intake of households which remained in the 'under 50% retention" with those above. \* As will be seen from Tables 4.7.1 to 4.7.3, the number of households which had moved wholly into commercial crops increased from 30 before shift to 170 after shift. As a consequence, households with less than 50% retention also went up - from 175 before shift to 293 afterwards. If we look at the distribution of these totals among the three levels of calorie intake that we have discussed so far, the position is as follows:

|                          | BS         | AS          |
|--------------------------|------------|-------------|
| (i) <2000 K-cals         | 44 (25.1%) | 28 (9.6%)   |
| (ii) 2000 to 3000 K-cals | 73 (41.7%) | 95 (32.4%)  |
| (iii) >3000 K-cals       | 58 (33.1%) | 170 (58.0%) |
|                          | -----      | -----       |
|                          | 175 (100%) | 293 (100%)  |
|                          | -----      | -----       |

Clearly, neither the increase in the number of houses with "no retention", nor its distribution among the three levels, has affected adversely the overall shift

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 \* Since "retention" applies principally to foodgrains which are the main source of calories in Indian diets, we have used this example here.



towards higher nutritional status of households. Much the same kind of shift in proportions is noticeable in respect of households retaining over 50.1% of own output - all of which would be in the "food crops only" and "mixed crops" categories. In other words, a change in the proportion of output retained does not, in itself, have any nutritional impact that enhances or neutralises the crop-shift effects, such as they are. This is not surprising, since regardless of the proportion of own output retained, the shift effects operate through changes in the households Gross Income (which includes, among others, changes in the value of retained output.)

### Regressions

Given the multiple influences bearing on the nutritional status of farmer households, we have attempted a few regression exercises, treating per capita energy consumption as a function of several variables. In these exercises, we have derived "per capita" figures not on the basis of adult male equivalents but of the actual number of family members. This prevents the results being distorted by the nutritional conversion ratios used for obtaining adult male equivalents. However, it suffers from the disadvantage of treating men and women as well as adults and children as equal sharers. This may be borne in mind.

In the first exercise, daily per capita energy consumption (PENE) is treated as a function of (i) total land owned (TLO), (ii) proportion of TLO under commercial crops (LUC) (iii) household size (HHS) and (iv) Gross Income (GRIN) of the household. The regression equation is:

$$\begin{aligned}
 \text{I } \text{PENE} &= 1.465 + 0.0664 \text{ TLO} - 0.0014 \text{ LUC} \\
 &\quad (5.659) \quad (4.599) \quad (-0.616) \\
 &\quad + 0.3779 \text{ HHS} + 0.00014 \text{ GRIN} \\
 &\quad (15.785) \quad (7.726)
 \end{aligned}$$

$$R^2=0.5681; \quad R^{-2}=0.15649; \quad \text{D.W. Test}=1.9296$$

(Figures in brackets are t-values)

The explanatory variables account for a little over 56 percent of variance, which appears only fair. However, given the obvious impact that the variable not included in the equation. viz the composition of the food basket, will have on the energy value of the basket, these regression coefficients are sufficiently significant. If in the above equation we substitute Gross Household Expenditure (HHE) for Gross Incomes (GRIN), the results become more satisfactory:

$$\begin{aligned}
 \text{II } \text{PENE} &= 1.013 + 0.0307 \text{ TLO} - 0.003 \text{ LUC} \\
 &\quad (4.344) \quad (2.463) \quad (-0.161) \\
 &\quad + 0.3266 \text{ HHS} + 0.00053 \text{ HHE} \\
 &\quad (14.711) \quad (13.764)
 \end{aligned}$$

$$R^2=0.6444; \quad R^{-2}=0.6418; \quad \text{D.W. Test}=1.9131$$

(Figures in brackets are t-values)

This relationship is somewhat more robust, with 64 per cent of the variance explained by the variables. Of the variables themselves, the point to note is that an increase in the proportion of land under commercial crops has, in itself, a negative impact on PENE. This seems contrary to what has been said above; however, this relationship only means that additions to commercial crops grown do not add to nutrition directly, but only through GRIN or HHE. The other variables - TLO, HHS and GRIN or HHE - all have positive impact; an increase in them benefits calorie intake. The positive co-efficient for household size (HHE) implies that so far as the sample households are concerned, an increase in the number of household members goes with a net incremental benefit to gross Income (and hence gross expenditure), either because of an increase in total land owned by joint families, or due to "other Income" by way of wages etc., earned outside of own farm activities. Of the remaining variables, it is clearly total land owned (TLO) which affects PENE to a greater extent than GRIN or HHE - mainly for the reason that these other variables are derivatives of TLO.

#### Nutrition and health of women in poorer families

We suggested in chapter V that when the estimate for 1987-88 poverty line expenditure of the Planning Commission Expert Group is adjusted for agricultural

labourer's cost of living in Karnataka in 1991-92, the poverty line annual expenditure for rural families works out to about Rs.15,000. With additions for other essential expenditure, Gross Income (in the sense used in this Report) of around Rs.25,000 per annum after shift was suggested as demarcating the "poor" from the non-poor households in our sample.

Of the 550 households in the sample, 327 households had gross Income equal to or less than Rs.25,000 after shift. Among these 178 were marginal farmers and 113 small farmers, together constituting about 90% of the "poor" households. As a proportion of the aggregate of 414 marginal and small farmers in the total sample, this poorer segment of 291 (178+113) households constituted over 70 per cent. Broadly, therefore, the nutrition and health status of these households could be considered as representative of the condition of marginal and small farmers as a whole. Admittedly, the situation will vary from district to district, depending on the farming environment.

From Table 6.4, it will be seen that of the 327 households with Gross Income upto Rs.25,000, 166 households (51%) had less than 3000 K-cals per day per capita, 157 (48%) less than 75 g of protein and 149 (46%) less than 20 g of fat after shift. These proportions were substantially higher than the

corresponding ratios for the aggregate sample. However, when we compare the nutrient intakes before shift\* of these households, the improvement is quite apparent: comparable percentages before shift were, 62% in respect of energy, 58% in protein and 55% in fat. (Table 6.7) In other words, the nutritional status of about half of the marginal and small farmer households remained below or on the margin of adequacy, despite the improvement of income after shift.

**Table 6.7**  
**Per Capita Intake of Principal Nutrients of Households**

| Nutrients           | Households with Gross<br>Income < Rs.25,000 |     | All Households |
|---------------------|---|-----|----------------|
|                     | BS  | AS  | AS             |
| <b>I. ENERGY</b>    |   |     |                |
| a) <2000 K-cals     | 81  | 38  | 52             |
| b) 2000-3000 K-cals | 121   | 128 | 207            |
| c) >3000 K-cals     | 125   | 161 | 291            |
| <b>I. PROTEIN</b>   |   |     |                |
| a) <=50 g           | 78  | 45  | 64             |
| b) 50.1g - 75g      | 111   | 112 | 194            |
| c) >75 g            | 138   | 170 | 292            |
| <b>I. FAT</b>       |   |     |                |
| a) <=15 g           | 122   | 90  | 136            |
| b) 15.1g - 20g      | 57  | 59  | 87             |
| c) > 20 g           | 148   | 178 | 327            |
| Total Households    | 327   | 327 | 550            |

These deficient households were, however, distributed unequally in the six districts surveyed, with the dry districts having the larger share.

\* This is on the basis of quantities of food articles purchased or retained by the household.

The Expert Group's estimate of poverty expenditure mentioned above was anchored on the assumption of a daily per capita intake of 2400 K-cals, and no corresponding norm of protein or fat. Instead of this single criterion, if we adopt the revised norms of NIN discussed earlier in this chapter (2740 K-cals, 66.6 g of protein and 16.9 g of fat), the average gross income after shift of marginal and small farmers in the sample - of about Rs.19300 and Rs.25,100 respectively (cf. Table 5.9) - seem just about adequate for minimal nourishment on a household basis. However, at these levels a higher proportion of Gross Income is devoted to food expenditure and together with the greater propensity of such farmers to retain a higher proportion of any foodgrains they produce, this prevents any serious deficiency of nutrition in terms of average levels for each category of farmers, as noted in Table 6.3 above. These averages are inclusive of the 30 percent or so of the 414 households (of marginal and small farmers) which have more than Rs.25,000 Gross Income after shift and hence maybe expected to have nutritional intakes in excess of the norms recommended by the NIN. Consequently, when allowance is made for their impact on the averages, as well as special expenditures mentioned earlier, the likely levels of nutritional intake for the remaining "poor" segment would be very near the levels which would be adequate or

barely adequate for minimal nourishment.

The averages shown in Table 6.3 are on an adult male equivalent basis, with women and children receiving a fraction of these per capita intakes. For the aggregate sample, male adults, female adults and children below 14 years of age constituted 36%, 33% and 31% of the total respectively, with some significant inter-district variations in the relative proportion of children to adults. (Table 4.3). On this reckoning, a little less than two-thirds of the household members consisting of women and children had average intakes of calories, protein and fat below the per capita figures shown in Table 6.3. This disparity in intra-family distribution of intakes is in accordance with the NIN's criteria of biological needs of adults engaged in 'agricultural labour'. It is obviously possible for judgments to differ on the intensity of women's work or of the labour of children in a farming household - especially a poor household. Besides working on land or tending animals or serving elsewhere, household chores such as obtaining drinking water, firewood or forage for cattle are also usually done by women and children in varying degrees, depending on local conditions. Altogether, apart from the adjustments needed in the case of pregnant and lactating women as well as adolescent boys and girls, the overall rural situation might need some upward adjustment in the fractions allotted to women and

children in the NIN formulation of the relative needs of men, women and children.

For women and children of the poorer households therefore, it would be appropriate to take their needs of principal nutrients - especially calories - at levels higher than is implicit in the fractions used by NIN in their recommended dietary allowance. However, data from the sample survey on average per capita intake set out in Table 6.3 show that the actual intakes per adult male of energy, protein and fat of marginal and small farmer households after shift were considerably above the revised norms recommended for 'moderate' workers by NIN. Relative to these actuals, if we work out the level of calories for women at 0.8 and of children as a group at 0.6 of adult male norm and the other nutrients at ratios implicit in the table on p.94 of the NIN volume cited earlier, and compare the resultant levels with the revised 'least cost improved diet' norms for poor households of the NIN, the position would be as follows:



**Table 6.8**

**Comparative Levels of Principal Nutrients for  
Women and Children: After Shift**

| Category of Household  | Nutrient    | Adult Male Intake (a) average from Table 6.3 | Corresponding aver. on NIN's formula (b) for Women | Children (c) | NIN's revise levels for "poor" diets (adults) (d) |
|------------------------|-------------|--|--|--------------|---|
| (1)                    | (2)         | (3)  | (4)  | (5)          | (6)   |
| Marginal Farmers (5.3) | i) Energy   | 3420 K-cals                                  | 2736 K-cals  | 2052 K-cals  | 2740 K-cal  |
|                        | ii) Protein | 82.8 g                                       | 69.0 g   | 75.9 g       | 66.6 g  |
|                        | iii) Fat    | 25.8 g                                       | 25.8 g   | 25.8 g       | 16.9 g  |
| Small Farmers (5.8)    | i) Energy   | 3200 K-cals                                  | 2560 K-cals  | 1920 K-cals  | 2740 K-cal  |
|                        | ii) Protein | 82.8 g                                       | 68.6 g   | 75.4 g       | 66.6 g  |
|                        | iii) Fat    | 25.9 g                                       | 25.9 g   | 25.9 g       | 16.9 g  |

- Notes:
- (a) For totals of marginal and small farmers
  - (b) cf. Table on p.94 of NIN's Nutritive Value of Indian Foods (1988 ed)
  - (c) For ages 5 to 7. Corresponding changes are to be made for younger and older children.
  - (d) cf. p.36 op.cit.

Figures in brackets in col (1) show average family size in Adult Male Equivalent

From column (4) of the Table 6.8, it seems that if there is any deficiency in the intake of principal nutrients by women and children of the "poorer" segment of sample households, it would mainly be of calories rather than protein or fat. Indeed, so far as fat is concerned, the average levels prevailing after shift appear to be considerably more than adequate. Even in the case of protein, the levels likely to be attained by the "poor" households in the sample are not likely to be much different from the revised norms of NIN. The lower figures relating to small farmers in Table 6.8 arise essentially from the somewhat larger family size.

District averages shown in Table 6.3 indicate, however, that what holds for the average does not necessarily apply to all districts. In fact, the average of calorie intake after shift for Chitradurga, Kolar & Mandya in the case of marginal farmers are respectively 2640 K-cals, 2900 K-cals and 3090 K-cals; and for Chitradurga, Dharwad, Kolar and Raichur in the case of small farmers 2920 K-cals, 3050 K-cals, 3130 K-cals and 3160 K-cals respectively - levels which are significantly below the average for the total sample. In these districts, at any rate, there is the distinct possibility of inadequacy of calorie intake for women and children. The levels of protein and fat intake in these districts are also lower than those for the aggregate sample. However, these latter are quite high and minor deviations from them do not suggest any serious deficiency.

The above assessment of inter-district variations is in terms of the averages shown in Table 6.3. But as has been pointed out earlier, the averages have to be adjusted downwards to eliminate the effect of additional spending on food during special occasions and obtain the normal daily position. Correspondingly, average intakes of women and children indicated in Table 6.8 may have to be revised downwards to obtain the true values. Data

thrown up by our field surveys are not detailed enough to permit any precise revision of the nutrients available on a continuing, daily basis for women and children of the poorer households. But the broad conclusion reached earlier for the poorer segment as a whole - that their daily percapita intakes would be close to levels that are inadequate or barely adequate for minimal nourishment - becomes particularly relevant in respect of women and children, bearing in mind their additional work-load as members of marginal and small farmer households.

At first blush, the main deficiency in the case of women and children of the poorer households seems to be one of calories rather than protein or fat. In reality, part of their protein and fat intake may be wasted for lack of adequate calorie intake; hence for women during their periods of pregnancy and lactation, the calorie deficiency may be accompanied by inadequacy of protein and fat. Likewise the growth needs of children may also not be fully satisfied when these nutrient intakes are revised downwards. Apart from calories, protein and fat, there is also the question whether their normal diet is rich enough in essential minerals and vitamins to ensure continuing good health and full development of all faculties. Issues of such detail cannot be resolved from relatively short visits to households and on the

basis of responses during interviews with members of the household. At best, one may speculate on nutritional inadequacy by their responses to questions relating to the sickness and health of women and children in the family. We examine these briefly below, to see if they indicate any serious health problems associated with undernourishment or malnutrition.

#### Health of Women & Children of poorer households

Since the data generated by the field study do not indicate any general situation of nutritional inadequacy, a detailed analysis of the sample population's health status in terms of overall nutritional deficiency seems somewhat redundant. Moreover, given the multiplicity of factors affecting rural health in India, isolating the specific impact of undernourishment on a class of households is complicated and apt to be biased by the norms used for measurement. Data from our field survey are, as was pointed out at the start of this Report, limited to the responses of members of the household. We have not undertaken any sustained anthropo-metric survey; nor have we been able to draw on any such record maintained by village officials. Consequently, this section is limited to some qualitative comments on the health status of women and children belonging to households with gross income less than Rs.25,000/- per annum.

Earlier in this chapter, (see Table 6.4 ff), it was surmised that in so far as calorie deficiency was concerned, the question was likely to arise in around 41% of households within this group. This was in terms of average per capita nutritional intake on an 'adult male equivalent' need of 2740 k.cals. If any persistent calorie inadequacy contributed to the incidence of morbidity of women, it would perhaps be in this segment of the poorer households. Besides the fraction of 0.8 to be applied to the norms to obtain the equivalent women's average, field investigators have also confirmed the general tendency on the part of women of the farming households in all the villages surveyed to serve food to the men and children of the household before they ate. This did not necessarily mean that they had to eat whatever little was left over; but amongst households at the lowest level of incomes, the chances of this happening were high. Women of these households probably survived on a daily intake of calories at levels considerably lower than that indicated in Table 6.8. This might also have been true in regard to protein and fat; but for any serious impact on health, their deviation from the averages shown in Table 6.8 have to be quite large. It is not possible to identify the households in which this happened on a sustained basis.

As is well-known, continued deficiency of vitamins, fibre, calcium, and other essential minerals also can cause special types of health problems in women and children. We have not attempted any analysis of the average daily intake of these micro-nutrients. However, from the pattern of food expenditure shown in Table 6.1.1 and 6.1.2, it would appear that even marginal and small farmer households spend a fair proportion of food expenditure on milk and milk products, vegetables and fruits and pulses - all of which contribute to the intake of calcium, fibre, vitamins and/or minerals, besides energy, essential amino acids and fatty acids.

Altogether, there is reason to believe that the average dietary intake after shift, of the households surveyed in such as to provide in the majority of cases the nutrients for women as 'moderate' workers. Women of the really poor segment of the marginal and small farmer households, however, are very likely to suffer from calorie and other deficiencies, severe enough to cause morbidity of various kinds. At any rate, they are serious enough to lead to reduced resistance to infection or seasonal illnesses, as well as gynaecic problems. It is this poor segment that has to be kept in view in appreciating the information on the morbidity of women and children presented below.

At the time of the field study, there were 613 adult women (i.e those above 14 years of age) in the 327 households with income less than Rs.25,000 per annum. Of these, 192 or a little over 31% were literate. In comparison, over 46% of the 655 women in the remaining 223 households were literate \*. Broadly, these features might suggest that with literacy being at a fair level, women would be aware of their as well as their children's health needs. As will be discussed later, their re-course to family planning facilities, as well as to immunisation of children, point in the same direction. Nevertheless, the data on sickness among women does not confirm this. Whether this is merely an aspect of the crudeness of household data, or of something more basic, remains a matter of doubt. However, these data seem to indicate a greater incidence of morbidity among the poorer households than amongst those in the upper income group, as shown in Table 6.9.

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\* Provisional data for 1991 show the percentage of literates to estimated population aged 7 years and above at 44.3 for women in Karnataka (cf Inter-state Economic Indicators Planning Department, Government of Karnataka. (1991). P.10

Table 6.9

## Morbidity among Adult Women of Sample Households

| Sl. No. | Particulars                           | Households with Gross income < Rs.25,000/- | Households with Gross income > Rs.25,000/- | Total | Remarks        |
|---------|---------------------------------------|--|--|-------|----------------|
| 1.      | No. of households                     | 327  | 223  | 550   |                |
| 2.      | No. of adult women (>14 years of age) | 613  | 655  | 1268  | (cf Table 4.3) |
| 3.      | Of (2), literates                     | 192  | 351  | 543   |                |
| 4.      | <u>General Health problems</u>        |  |  |       |                |
|         | a. anaemia                            | 42   | 17   | 59    |                |
|         | b. epilepsy                           | 6  | 4  | 10    |                |
|         | c. dysentery                          | -  | 2  | 2     |                |
|         | d. e.n.t.-related                     | 25   | 25   | 50    |                |
|         | e. heart diseases                     | 10   | 10   | 20    |                |
|         | f. dental problems                    | 12   | 4  | 16    |                |
|         | g. others ++                          | 88   | 57   | 145   |                |
| 5.      | <u>Gynaecological problems</u>        |  |  |       |                |
|         | a. Vaginal discharge                  | 32   | 13   | 45    |                |
|         | b. menstrual discomfort               | 24   | 18   | 42    |                |

Note ++ Includes infections, seasonal and other kinds of diseases

These figures indicate that apart from illnesses clearly attributable to infection from water or other sources, and to colds and other seasonal ailments, women of the sample households were susceptible to a variety of chronic diseases, some of which may be due to dietary inadequacies. More significantly, morbidity among women of the poorer households was relatively more. Particularly noticeable is the greater frequency of anaemia and gynaecic disorders among women of the poorer



households, as compared to those of households with higher incomes. Amongst the former group of 613 adult women, 42 (6.8%) suffered from anaemia at the time of the field study, and 32 or more from menstrual problems; as against this, there were only 17 cases of anaemia (2.6%) and about 18 cases of menstrual discomfort among women of households with more than Rs.25,000/- gross income. Admittedly, not all of these can be attributed to under-nutrition; some of these chronic diseases could well be due to maladies like malaria or amoebic dysentery. However, when these illnesses are chronic, they suggest an inability on the part of the stricken women to recover - which suggests in its turn undernourishment. Of the 47 women of the poorer segment suffering from anaemia, as many as 27 were ill for over 2 years and 21 for over 4 years.

Household data on special foods consumed by women during pregnancy or post-natal period are again inadequate to draw even suggestive information on nutritional supplements available to or consumed by women during the child bearing years. The only interesting piece of information that could be obtained was in respect of family planning - which showed a marked preference for tubectomy as against contraceptives. And re-course to tubectomy in the majority of cases was after the birth of the second or the third child. However, whether this also meant tubectomy after the second or third

conception is not clear. Nor is it possible to say whether and what extent these menstrual problems were due to weaknesses in the administration of contraceptives rather than to general health problems. Altogether, while this part of data is interesting for other reasons it is not of much help in elucidating any clearcut linkages between under-nutrition and morbidity.

### Health of Children

There were altogether 1248 children (0-14 years of age) in the 550 households surveyed; of these, children upto 5 years of age numbered 429. Much of the data on the incidence of disease and immunization related to this group of infants. Information on normal or special foods given to children was very similar in respect of the very young as well as older children. As mentioned at the outset, no attempt was made for periodic recording of height, weight, and other details of physical growth of children. Hence no specific inferences have been drawn about the relation between nutritional intake and the "growth" of children.

The general practice in the households was for infants to be breast-fed for the first 12 to 18 months. On this basic diet, any supplementary foods given to children were in accordance with the normal foods consumed in the

family. The extent of nourishment derived by the infant in the initial months depended crucially on the nutritive value of such diet, any additional pre-natal nourishment of the mother, and the post-natal supplements to her diet that the family could provide. Information obtained about these matters from the women of the household was scanty. This was largely for the reason that except for some additional intake of green-leaf vegetables and the usual cereal consumed in the household, there was little difference between the normal diet of women and those of expectant or suckling mothers. In general, fortification of the diet of expectant or nursing mothers with a view to providing additional nourishment to newborn infants was rare among the sample households - save for whatever was part of the region's "traditional wisdom".

The position was, however, somewhat different in respect of children after they were weaned. As may be seen from Table 6.10, milk and milk products, greens and pulses were utilised as protective foods for most of the children - among both households with gross income less than Rs.25,000/- and those with higher incomes.

**Table 6.10****Protective Foods given to Children\***

| Sl. No. | Food items           | Households with Gross income <Rs.25,000/- |         | Households with Gross income >Rs.25,000/- |         |
|---------|----------------------|---|---------|---|---------|
|         |                      | No. of Children                           | Percent | No. of Children                           | Percent |
| 1.      | Jowar                | 89  | 16.2    | 86  | 12.3    |
| 2.      | Maize                | 11  | 2.0     | 9   | 1.3     |
| 3.      | Wheat                | 16  | 2.9     | 50  | 7.2     |
| 4.      | Ragi                 | 48  | 8.7     | 61  | 8.7     |
| 5.      | Pulses               | 82  | 14.9    | 100                                       | 14.3    |
| 6.      | Greens               | 89  | 16.2    | 117                                       | 16.8    |
| 7.      | Nuts                 | 1   | 0.2     | 5   | 0.7     |
| 8.      | Milk & milk products | 158                                       | 28.7    | 172                                       | 24.6    |
| 9.      | Eggs                 | 14  | 2.5     | 31  | 4.4     |
| 10.     | Fish                 | 10  | 1.8     | 21  | 3.0     |
| 11.     | Chicken & Meat       | 32  | 5.8     | 46  | 6.5     |
|         | Total                | 550                                       | 100.0   | 698                                       | 100.0   |

\* Children from 0 to 5 years at the time of field enquiry

Figures in col.3 and col.5 shows children benefiting; however, some children will benefit from more than one food item and hence are counted more than once in these columns.

Children of the latter households, however, had apparently better access to eggs, fish, chicken and meat. Households with higher incomes also seemed to have preferred to feed the children wheat rather than jowar. How much difference this actually made to the development and well-being of the children is not clear, since quantitative data on the daily intake were unavailable. There was little evidence of use by even high-income households of processed baby foods on a regular basis.

Presumably these supplements were of some benefit in improving the resistance of the very young children to diseases. This is the impression one gets from the responses of members of the household to questions relating to the ailments suffered by their children in the recent past. Of the 429 children below 5 years of age, for instance, positive information on sickness related to only 86 children. The main complaint in respect of these was whooping cough, which had affected 56 kids. Children suffering from diarrhea, influenza, pneumonia and other gastric or miscellaneous diseases numbered only 22. Of the aggregate of 86 sick children, 53 belonged to households with less than Rs.25,000/- per annum, and 33 to the other households with higher incomes.

One reason for the low incidence of sickness among children is clearly the growing re-course to immunization against the familiar children's diseases. Awareness about the need for such protection of infants is quite widespread among all classes of farmers' households. Children's sickness has also been reduced by other public health measures, such as small-pox and malaria eradication and dissemination of information on mother and child care. However, we have not gathered any specific information on infant mortality, abnormal babies or other data indicative of post natal health to draw any meaningful conclusions on the effect these public health measures have had in the sample villages. But on immunization, available data are impressive enough to suggest that it has been successful in a large measure in preventing certain kinds of sickness among children and thereby contribute significantly to their well-being. Details of immunization have been set out in Table 6.11 below. In summary, it would appear that the general preventive measures, together with parental care in having infants immunized against typhoid, diphtheria, tetanus, chicken pox, polio and tuberculosis have been helpful in enabling children to benefit from the nourishment given to them, even in the

Table 6.11

Immunization of Children below 5 years of Age: All Districts

| Sl. No. Details                         | Households with Gross income <Rs.25,000/- | Households with Gross income >Rs.25,000/- | Total |
|---|---|---|-------|
| 1. No. of children below 5 years of age | 214                                       | 215                                       | 429   |
| 2. Immunized against                    |   |   |       |
| a. polio                                | 156                                       | 163                                       | 319   |
| b. Triple anti-genic                    | 147                                       | 155                                       | 302   |
| c. B C G                                | 155                                       | 161                                       | 316   |
| d. Typhoid                              | 115                                       | 142                                       | 257   |

relatively poorer households. It is, however, not possible to measure in any specific way the improvement that has occurred in their "development" as a result of the shift in the cropping pattern undertaken by the household.

## CHAPTER VII

### CONCLUSIONS AND RECOMMENDATIONS

The specific objectives of the field survey of 550 farm households undertaken in the State of Karnataka during the years 1990-92 were: (a) to examine, describe and measure the impact of the shift from food crops to commercial crops on health and nutrition status of poor families, especially on the women and children of the household; (b) to examine, describe and measure any other related changes brought about by the shift; and (c) to develop an innovative methodology for its study, documentation and analysis. The sample households were from six districts, representing different agro-economic characteristics and covering a variety of crops, agricultural practices and food habits. Upto the village level, sampling was on a selective rather than a random basis; but in each village, households were picked up at random from the village list of farm households. Each household was investigated in two rounds, covering successive agricultural seasons and using a common questionnaire. The responses provided by the members of the household were supplemented by the investigator's own observations on the environmental aspects, life-styles and such other information relating to both the household and the village.

Along with these primary data, certain basic information on the agricultural situation in Karnataka has been brought together, to provide the background to the survey result. For some years now,



there has been in Karnataka a steady shift of land from food crops to commercial crops, of both plant and tree varieties. With the progress of canal as well as tube-well irrigation, some of the districts in dry zones have also shifted to pure commercial crops like sugarcane or mulberry as well as to high-yielding varieties of food crops with commercial prospects. This trend has been re-enforced by some specific policies of encouragement of commercial crops like mulberry and eucalyptus.

Altogether, the ambience in the State is generally supportive of commercial rather than subsistence farming. The consequence has been a growing dependence of the State on supplies from outside for its food requirements. In the absence of a network of public distribution outlets in rural areas, households having to purchase all or part of their food requirements have to obtain them from the open market at ruling prices. This is the backdrop against which the results of the sample survey have been examined.

**Main conclusions: Extent of shift**

All the district samples consisted of households which were large-sized, from an average of 6.40 persons per family in Chitradurga to 7.40 persons in Raichur. The proportion of literates among heads of households also varied greatly from 38.46 per cent in Mandya to 83.70 in D.Kannada. Except in Dharwad and Raichur, where the proportion of children to adults was high, male adults were the main constituents. Overall, the household pattern was one in which the presence of more than two

working adults was common; and the number of children was considerable. These household characteristics necessarily impacted both labour-supply and the food requirements of the household.

Of the aggregate of 550 households, 75 per cent owned less than 5 acres of land - that is, belonged to the categories of "marginal" farmers owning upto 2.50 acres and "small" farmers owning between 2.51 acres and 5.0 acres; the remaining 25 percent constituted medium-to-large farmers as defined by the State. However, these proportions varied as between irrigated and dry districts; while the marginal farmers predominated in the former areas, "medium-to-large" farmers formed a considerably high proportion in the drier zones. Apart from a few tube-well or canal-irrigated areas, most agriculture in the dry zones was of the rain-fed variety and this made the owning of larger holdings both feasible and necessary. The water-rich and dry districts also differed from each other in regard to the proportion of "wet" land owned by farmers in all three categories. In the samples from the former, the majority of households in all the three household categories owned land which was more than 25% "wet", while in the dry district samples, only a small proportion was of this type. These proportions did not show much variation in the data provided by households for the "before shift" and "after shift" periods, except where the construction of tube-wells had been very rapid - as in the Malur taluk of

Kolar district.

Classifying the main foodgrains grown in the area - paddy, ragi, jowar, maize, wheat and bajra - as "food crops" and the rest as "commercial crops", the extent of "shift" from the cultivation of only food crops to the allocation of all or a good part of their land to cultivating commercial crops was quite striking - even spectacular. Of the 550 sample households, 368 farmers of all categories cultivated only food crops before the shift. Excepting 7 of these households in the marginal farmer category, all of them had shifted later wholly or partly to the cultivation of commercial crops. By and large, farmers in all categories had moved into "mixed crops" - that is to say, a combination of food crops and commercial crops. There was little difference between the water-rich and dry districts in this matter. The only noticeable variation was in the case of Raichur, in which there were two marginal and four small farmer households continuing to cultivate only food crops. Apparently, with the extension of the Tungabhadra canal system and the introduction of high-yielding varieties of paddy, some of these farmers growing jowar earlier had shifted to the more profitable cultivation of paddy and thus stayed with food grains. This decision may also have been prompted by the relatively small size of their holdings which rendered mixed-crops less attractive in all respects.

(An analysis of the sample data shows that the option of shifting

3

to "mixed crops" becomes more attractive as the size of the holding increases. This is not surprising, given the ability of large farmers to mobilize more resources for investment, as well as the scope they have for making such investment viable in respect of both food crops and commercial crops.)

Obviously, the success achieved by individual large farmers varies, depending partly on the agricultural conditions, and partly on the capability of the farmers themselves. Within the rubric of mixed crops, when the actual allocation of land between food crops and commercial crops is considered, the general tendency is for a sharper shift away from food crops in the case of the larger farmers, than in the case of marginal or small farmers. Within the food crops group, there was also a tendency on the part of marginal or small farmers to move out of one foodgrain into another, either because the latter was the staple grain for home consumption (eg. jowar in Dharwad and ragi in Kolar), or because it was commercially the most attractive (eg. paddy in Raichur and Chitradurga))

The reason for the shift from one crop to another was essentially the expectation of a higher income; this expectation was generated in its turn more by the successful adoption of new crops by some farmers in the area than on account of any specific "incentive" provided by the government. However, the success of the innovative farmers themselves was a consequence of the

extension of irrigation, growth of and better access to markets, and the availability of new inputs like HYV seeds and fertilizers and, to some extent, credit. What emerges from the field data on policy-induced development of agriculture is in sum the following: such policies essentially operate through the demonstration of success by some farmers, rather than directly. However, there is also evidence that the upward trend in market prices of agricultural commodities, due to secular factors as well as changes in minimum support prices or procurement prices have had a significant impact on farmers' expectations and promoted the shift.

#### Effect of shift on Gross Farm Income

The "gross farm incomes" of virtually all households were higher after the shift, though the extent of increase varied from category to category, as well as from district to district. This general increase was in part due to the upward trend in all agricultural prices in recent years. However, there was undoubtedly an additional impact on gross farm incomes from the shift to commercial crops.

Before the shift, gross farm income for the majority of households in all the three categories of farmers was less than Rs.15,000 per year. After the shift, 79 per cent of medium and large farmers and 43 per cent of small farmers had moved up to income ranges above Rs.15,000; but among marginal farmers only 25

per cent had participated in this benefit. The farm incomes of other marginal households still remained below Rs.15,000, though they might have moved up somewhat. Altogether, it would appear that in terms of the absolute size of farm income the shift in cropping pattern was distinctly more beneficial the larger the size of the holding.

In relative terms, however, marginal farmers have not on the average done any worse than small farmers. The proportionate increase in their farm incomes has in fact been higher than that of small farmers in four of the six districts surveyed. These districts were equally distributed between the wet and dry districts, and it would appear that availability of water resources did not have any material impact on the fortunes of marginal farmer households' income from farm activities.

However, given the low level of their farm incomes before the shift, this disparate increase in relative terms did not imply any major narrowing of the gulf between marginal and small farmers.

Much the same is true of the disparity between the small farmers and the bigger farmers. Except in the two dry districts of Chitradurga and Dharwad, small farmers' income from farm activity increased proportionately less than in respect of medium-to-large farmer households.

Gross farm incomes generally improved after the shift in cropping pattern. Of the 543 households which were wholly or partly in commercial crops after the shift, 331 (or 61%) households had gross farm incomes above Rs.10,000 per annum. This compares with 50 (or 27%) of households in this category out of 182 households before shift.

For a large number of households in all three categories of farmers, gross income from commercial crops constituted more than 50% of gross farm income after the shift. The majority of such farmers had increased the acreage under commercial crops by 50% or more; however, there were a few who had improved their commercial crop incomes by shifting to a different commercial crop or by adopting better farming techniques. Altogether, in so far as gross farm incomes are concerned, farmer's expectations of enhancing these by shifting to commercial crops seem to have been generally fulfilled.

Since full details of farm expenses were not available, the 'marginal' or excess of gross farm income over "paid-out farm expenses" has been utilized as a proxy for "net farm income" for inter se comparison of marginal, small and large farmers. An analysis of the average level of such 'margins' after shift for each category of farmers in the six sample districts shows that in the case of both small and marginal farmers, the margins and consequently net farm incomes do not seem high enough to ensure

food security, given the family size and uncertainties of output, especially in the dry zones. Since a substantial number of small and marginal farmers would have net farm incomes below the average, there is no clear evidence that their food security had benefitted adequately from the crop -shifts.

Altogether, the field data indicate that the level of net farm incomes varies significantly with the size of the holding, the cropping pattern adopted and the access to irrigation. This broad conclusion has been tested against a couple of regression exercises on cross-household data - using gross farm income as the dependent variable and total land owned, proportion of holding under commercial crops, paid-out farm expenses, proportion of fertilizer expenditure to paid-out farm expenditure and proportion of income from commercial crops to total farm income as the explanatory variables. Of these, the last three are proxies for any change in technology or price-parities that might have accompanied the crop shift. These regressions confirm the view that (a) households with larger holdings have benefitted relatively more by shifting to commercial crops and from better prices; and (b) marginal farmers have benefitted least from the trend towards substitution of commercial crops for food crops and hence remain vulnerable even after the shift.



### Household Incomes & Expenditures

Virtually all sample households had "other current incomes", additional to gross farm income. These other incomes included earned income from non-farm activities, remittances, grants and subsidies etc paid by government or private agencies. Together with gross farm incomes, they constituted the aggregate of resources available for household consumption and other expenditures.

"Other income" accruing to the aggregate of 550 sample households amounted to about 24 per cent of gross household income. Inter-district variations around this average were quite large - varying from a high of 40% in Dharwad to about 17% in Raichur. While some of this may be due to regional differences in income-earning opportunities, much of the variation was a reflection of the contrast in the level of gross farm incomes.

The proportion of other income to gross household income decreases as farm size increase. Thus the ratio declines from 39 per cent for marginal farmers to 29 per cent for small farmers and further to 14 per cent for medium to large farmers. This tendency is also apparent in all the district samples. Beside reflecting the higher farm incomes accruing to large farmers, it is indicative of the greater need of small and marginal farmers to supplement their farm incomes to cover minimal household expenditures. It also brings out the need to develop non-farm

activities providing opportunities for gainful employment of members of such farmer households. (The extent to which the household incomes of marginal and small farmers benefit from other incomes is shown in Table 5.3)

Like gross household income, household expenditure data generated by the field survey includes other expenditures besides 'consumption expenditure' proper. However, these sundry expenditures generally constitute a small part of household expenditure. Hence the level of household expenditure is treated as broadly indicative of the consumption expenditure of households.

For the sample households, household expenditures ranged from a minimum of Rs.5000/- per annum to over Rs.100,000/- in a few cases. For 70 per cent of households, it ranged between Rs.10,000/- and Rs.25,000/- per year. Household expenditure exceeded gross household income for all households with income upto to Rs.5000/- and for 72 per cent of households with incomes between Rs.10,000/- and Rs.15,000/- per year. Of the 218 households for which household expenditure exceeded gross income, 118 or 54% were marginal farmers and 71 or 31% were small farmers (Table 5.8). Most of the remaining households in this category consisted of medium to large farmers in the dry districts. Some of these cases may be due to understatement of gross income or overstatement of household expenditure. Allowing for such cases, the question still remains whether the majority of marginal and

small farmers have gross incomes adequate to provide for "reasonable" levels of consumption expenditure on a sustainable basis.

Since there is no generally accepted norm of 'reasonable' consumption expenditure we have derived, on the basis of the "poverty line" expenditure estimated at 1987-88 prices by the Expert Group on Estimation of Proportion and Number of the Poor appointed by the Planning Commission, the "reasonable" annual consumption expenditure for Karnataka's rural families at Rs.20,000/- per year at 1991-92 consumer prices. (p.139). Marginal farmers in all districts (as well as in the total sample) had average household expenditure less than Rs.20,000/- (Table 5.9). Since this was inclusive of some production-related expenses, households in this category clearly had consumption expenditures below the norm of Rs.20,000/- per year.

Manifestly, the position of marginal (or small) farmers who were below the average in the various districts was even more insecure. Such cases of below-average consumption expenditures were particularly noticeable in the dry districts of Chitradurga, Dharwad and Raichur; their proportion was lower in the wet or irrigated districts of D.kannada, Mandya and Kolar. Altogether, there is evidence that for the majority of marginal farmers in the dry districts and for a fair proportion of such farmers in the wet zones, maintaining consumption expenditure at the 'reasonable' level of around Rs.20,000/- per year was not

possible at their 'after shift' levels of gross household income. In the income bracket Rs.15,000/- Rs.25,000/- the majority of such households consisted of marginal and small farmers.

### Food Expenditure levels

For 413 or 75 per cent of the total sample households, food expenditure did not exceed Rs.15,000/- per annum. But in most cases, the proportion of food expenditure to gross household expenditure (as reported by the interviewers) exceeded 50 per cent. In fact, there were only 72 households in the entire sample for which this proportion was below 50 per cent; and of these households, only 27 had annual gross income less than or equal to Rs.25,000/- (Table 5.11)

The proportion to gross income of both gross household expenditure and food expenditure have been high in a number of households because of their being large 'joint' or 'extended' families subsisting on limited farm or other incomes. Where such family size is accompanied by an increase in land holding or other incomes, the proportions obviously tend to be low - especially in respect of food expenditure which has a tendency to level off after a certain point. However, in the income bracket Rs.15,001/- to Rs.25,000/-, a substantial number of households had 5 to 7 or more members in the family; consequently, the expenditure proportions in this group deviated somewhat from the general trend of decline with an increase in the size of income.

### Marginal and Small Farmers

Annual food expenditure of all marginal and small farmer households, and of 84 per cent of medium to large farmers was less than Rs.25,000/- per year. Within this limit, the modal value for marginal farmers was in the Rs.5001/- Rs.10,000/- bracket; it was in the successively next higher brackets for the small and medium-to-large farmer households. Most of the medium-to-large farmers in this group belonged to the dry regions of Chitradurga, Dharwad, Kolar and Raichur.

For marginal farmers, average food expenditure varied from district to district, but in no instance was it more than Rs.12,500/-. In the case of small farmers, corresponding district averages did not exceed Rs.17,100/- at after shift level of incomes. At these levels, food expenditure constituted more than 75 per cent of gross household expenditure. More importantly, except for small farmers in D.kannada, these district averages were considerably less than the estimate of Rs.14,950/- per rural family for the 'poverty line' expenditure in Karnataka at 1991-92 rural prices. Thus the marginal and small farmers of Karnataka seem to belong very much to the poverty class-considering that the food expenditure for many of their families will be below the averages cited above. These households had necessarily to supplement their farm income with other incomes in order to sustain the family's food expenditure at 'poverty line' levels. The intensity of the need for supplementary income varied with

the type of land owned by marginal and small farmers. Average farm income of these farmers in D.kannada, Mandya and Kolar samples - in which irrigation was substantial - was higher than the households' food expenditure; whereas in the samples from Chitradurga, Dharwad and Raichur in which dry holdings predominated, average food expenditure of such households far exceeded their average farm incomes. (Table 5.16) This was despite the fact that in Chitradurga and Dharwad, the average family-size for marginal farmers was lower than in the other districts; however, per capita food expenditure was much higher in Dharwad, due to differences in both the composition of the food basket and the average intake per person.

#### Retention of Foodgrains Output

One other aspect of food security is the extent to which the shift to commercial crops has affected the households' retention of any foodgrains still produced by it. Of the 550 sample households, those which cultivated only commercial crops - and hence had zero retention - increased from 32 to 170 after shift.

Eleven (11) of the other households which cultivated "mixed crops" also did not retain any foodgrains, either because they cultivated a foodgrain that they did not prefer, or cultivated only pulses or other food crops.

The remaining 369 households retaining some portion of their output consisted of 126 marginal farmers, 132 small farmers and

111 medium-to-large farmers. The majority of these households in the first two categories retained over 50% of own output of foodgrains - 88% in respect of marginal farmers, 76% for small farmers and 41% for the medium-to-large farmers. There was thus a decline in the proportion of retention, as the size of the holding increased.

When this aggregate picture was broken down to district components, it was observed that marginal farmers in Chitradurga, D.Kannada, Dharwad and Kolar retained 100% of their food output, and a little less in Mandya (92%). However, in the Raichur sample, retention by marginal farmers was only 35% - and by small and large farmers even less. Furthermore, while farmers in all categories retained all their foodgrains output in D.Kannada, the proportion of retention in all other districts fell significantly from marginal to small to large farmers. This is regardless of whether the district is dry or irrigated.

The correspondence between household size and percentage retention is stronger for small farmers than for the marginal farmers, in whose case retention cannot exceed 100%, or whatever lower proportion is adequate to meet the cash needs for debt repayment and other essential family requirements. The problem does not, in any event, arise for bigger farmers with their higher output levels. Altogether, it is in respect of marginal - and to some extent small-farmers that the questions of food

security and nutrition connected with the shift to commercial crops levels become important issues.

### Crop shifts and nutrition of poor families

Discussion in this part of the Report is limited to a review of average per capita intakes of three principal nutrients - energy, protein and fat - by the different categories of farmers in the six sample districts. Norms of requirements and conversion ratios used for this purpose are based on the criteria indicated in 1988 by the National Institute of Nutrition.

As is well-known, a household's nutrition status depends not just on the level of food expenditure but on its pattern as well. From an analysis of these patterns for the marginal, small and large farmers in the sample both before and after shift, these broad conclusions emerge:

(a) the largest proportion of outlay is on the cereals and millets groups for all three categories in both periods; however the proportion declines as the household's farm size increases.

(b) This proportion declines after shift for all categories of farmers and in all districts except D.Kannada.

(c) In compensation, the proportion spent on other food articles has gone up in all districts, though not in a uniform way. But in general, the tendency has been to consume items which tend to be richer in proteins and fats as gross income increases.



(d) While some of this tendency may arise from changes in the household's adult-children ratio or from new habits, it is possible that there has been a conscious attempt to add to the nutritive value of the food consumed by the household.

### Nutritional Status

Based on this pattern of food expenditure, per capita intakes of energy, proteins and fats have been worked out for the three categories of farmers, before and after shift (Table 6.2). In general, the nutritional status of households in all three categories shows improvement with the shift in cropping patterns and the resulting increase in gross income. However, marginal farmers gained considerably less than the others.

In the group of households with less than adequate nutritional intake, marginal farmers constituted about half (or more) after shift (p 177). Furthermore, almost half of the marginal farmer households had per capita intake of not more than 3000 K-cals of energy, 75g of proteins and 20 g of fats - or just about what, according to NIN, is adequate for "heavy work" under Indian conditions. Many of the small farmer households also remained at standard or substandard levels of per capita nutrition even after the shift. Needless to add, the large farmers had generally high levels of intake, except for a few middle-sized farmers in the very dry districts.

The above conclusions are based on annual or monthly

expenditures which have not been corrected for any over- statement of food expenditure by households, or for additional food expenditure associated with weddings, festivals of funerals. When allowance is made for these, it is more than likely that many more houses than noted above will be seen to have inadequate per capita nutrition levels. This would be particularly marked in the case of proteins and fats, since overstatement of expenditures on items rich in these nutrients (eg., milk and milk products, edible oils, fish and eggs etc) is common.

A district-wise comparison of relative changes in nutrition level shows that after the crop shift, the measure of variation from before the shift was different for different categories of farmers in the six district samples. Increases in respect of per capita intake for marginal farmers were larger than those for small farmers in some districts and less than for small farmers in others. In general, improvements in the case of small farmers were large enough to off-set the adverse impact on per capita levels of family size; additionally, the variance among small farmers was considerably reduced.

Inter-district differences arise to some extent from differences in food habits, some of which have been traditional and some consequent on crop shifts. The latter has generally been associated with a change in the foodgrain cultivated by the household. While the food habits of farmers in all categories

have changed with the shift, those of large farmers have changed in a significant measure and affected noticeably their intake of protein and fat.

While generally the improvement in the nutrition status of all families has been such as to stand comparison with the "norms" usually recommended for "poor" families in rural India, there were many households among small and marginal farmers in which per capita intake of principal nutrients was below par. Most of these households had gross income not exceeding Rs.25,000/- per annum.

Looking somewhat more closely at these households, it is found that of the 327 households with gross income equal to or less than Rs.25,000/- the nutritional position was as follows:

(a) 41% of households had per capita daily consumption of less than 2740 k-cals, or the NIN norm for an adult male 'moderate' worker:

(b) 37% of households had per capita daily consumption below the corresponding NIN norm of 66.6g of protein;

(c) 35 per cent of households had per capita fat consumption less than the NIN norm of 16.9 g of fat (p.185)

These percentages are based on the judgment (again of the NIN) that agricultural labour is viewed as 'moderate' work. If, instead, one were to consider agricultural labour as "heavy" work

(which it could well be in multiple crop areas), the NIN norms would be higher and the proportion of households with less than adequate per capita nutrition higher.

The effect of crop-shifts on nutrition expectedly varied with the effect on gross income. While the nutrition status of all groups of farmers benefitted from shifting land from one type of crop to another, households which had shifted wholly to commercial crops did better than those who stayed wholly with food crops or who opted for mixed cultivation. However, the few households who stayed with food crops suffered no nutritional inadequacy in the after shift periods; whereas among households which had moved wholly or partly into commercial crops, 52 had inadequate calorie intake and 64 inadequate protein intake. Within this category of farmers, it appears that those who preferred to shift entirely into commercial crops did better on the whole. Altogether, it is evident that even after securing some benefits from crop-shifts, there was a significant part of households at the lower levels of gross income suffering from nutritional inadequacy (Table 6.5 ff).

A check on households whose "retention" of own output had varied with the shift in the crops cultivated reveals that this did not affect the nutritional picture. Neither an increase in the number of households with "no retention", nor its distribution among the three levels (of farmers) had any effect enhancing or

diminishing the nutritional impact of the crop-shift effects, such as they are (p 193).

### Nutrition and health of women in poorer families

In the NIN formulation of daily nutritional requirements, the relative needs of women and children are taken at levels below those of an adult male worker: 80% of the male norm of calories for adult women worker and lower percentages for children depending on their age. For proteins and fats, these adjustments are not significant, except for some upward shift of protein and fat for pregnant and lactating women. However, considering the total workload of women and children of the poorer rural families, it may be appropriate to take the nutritional needs of adult women - especially of calories - at levels not much different from those of adult men.

Data from the sample survey have shown that the per capita actual intake of energy, protein and fat for adult males of marginal and small farmer households were considerably above the norms for moderate workers recommended by NIN. Consequently, even if we take the calorie requirement of adult women at 0.8 and of children as a group at 0.6 of adult male norm, and the needs of proteins and fats at corresponding ratios implicit in the NIN formula, the position is as follows: if there is any significant deficiency in the intake of principle nutrients by women and

children of "poorer" families, it would mainly be of calories. Levels of protein intake attained by this segment are not much different from NIN norms, while their consumption of fat is more than adequate. (Table 6.8 ff).

This, however, does not apply to all districts. Since the average calorie intake of adult males of marginal farmer households in Chitradurga, Kolar and Mandya and of adult males of small farmer households in Chitradurga, Dharwad, Kolar and Raichur are significantly below the average for the total sample, there is the distinct possibility of a serious deficiency in the calorie intake of women and children in many of these families. This is not equally evident in respect of proteins and fats. But given the calorie inadequacy, part of the protein and fat intake may just be wasted, without any benefit to stamina or growth. It is also not clear if their normal diet is rich enough in Vitamin and minerals to ensure continuing good health and full development of all faculties.

#### Health of Women and Children

Since the question of inadequate calorie intake by women arose in respect of only 41% of the poorer households, any morbidity associated with persistent calorie deficiency would perhaps be in this segment of households. Field investigators have confirmed the general tendency on the part of women in the sample

households to take food only after the men and children of the household have eaten. This did not necessarily mean that they were always left with insufficient food - except among households at the lowest level of gross income. Women of these households probably obtained daily intakes of calories, protein and fat which were low enough to impact seriously on their health.

From the data on the pattern of food expenditure, it seems that even marginal and small farmer households spent enough on food items contributing to the family's intake of calcium, fibre, vitamins and minerals. Here again, it is possible that women were left with less than their requirement in the low income households.

Altogether, there is reason to believe that on an average the dietary intake of the sample households was adequate to provide in the majority of cases the needed nutrients for women as 'moderate workers'. However, women of the poorer segment of marginal and small farmers who fall below these averages very likely suffered nutritional deficiencies serious enough to cause morbidity of various kinds. At any rate, they were serious enough to lead to reduced resistance to infection or seasonal illness as well as gynaecic problems.

Of the 613 adult women in the households with gross income less than Rs.25,000/- per annum, 42 or nearly 7% suffered from anaemia at the time of the field study, and 24 from persistent menstrual

problems. More than half of those suffering from anaemia were sick for over two years. In contrast, only 17 cases of anaemia and 18 of menstrual discomfort were found among the 655 adult women in households with gross income over Rs.25,000/-.

Whether the higher incidence of morbidity among poorer women is due to under-nutrition or to other causes it is difficult to say. But it seems fair to infer that the effect on health of other causes was enlarged considerably by the inadequate intake of essential nutrients. This was the situation of poorer households even after they had derived some benefit by way of increased gross income after shift.

The position regarding children was different. The general practice was for infants to be breast-fed for the first 15 to 18 months; there was also no wide-spread recourse to special diet for expectant or nursing mothers, apart from what was part of the regions' "traditional wisdom",. Immunization against typhoid, diphtheria, tetanus, polio and tuberculosis was also generally accepted by households at all levels of income. As for special foods, there is no evidence that even households with high incomes had recourse to them on a regular basis. Protective foods given to children consisted mainly of milk and milk products, greens, pulses and more of the cereal normally used by the household. How all these affected the position as compared to what it was before the shift is difficult to tell, for lack of data on infant mortality, congenital problems, statistics of



physical growth or treatment of other illnesses. Overall, the impression one gets is of improvement in the general health situation of children some of which is clearly due to increased awareness of the need for containing births and for immunization by the women of the rural households. There is also some nutritional inadequacy, particularly in the poorer households; but it does not seem serious enough to result in any significant impairment of children's health.

### Recommendations

The conclusions derived from this survey of household samples is essentially those of a case study, specifically fashioned to address a limited set of issues. They do not therefore form the basis for any firm policy formulation, either for the state of Karnataka, or for all-India. At best, they are suggestive of certain relationships and trends, which may be of some relevance to agricultural, food or poverty alleviation policies. This caveat may be borne in mind in appreciating what follows:

1. The general trend for shifting from food crops to commercial crops has already created an overall shortage of food grains supply in Karnataka. This trend is likely to be strengthened by the extension of irrigation and the shift in price-parities in favour of commercial crops, including vegetables, fruits and divers tree crops. As policy changes lead to greater marketisation of agriculture, it will be

necessary to pay special attention to ensuring adequate supplies of staple foodgrains, without an over-dependence on imports.

2. The shift to commercial crops benefits all categories of farmers, but marginal and small farmers gain relatively less. The resulting increase in rural inequality could become serious enough to exacerbate social tension in rural areas. Measures have therefore to be taken to enable the marginal and small farmer households to supplement farm incomes with other incomes of a sizeable magnitude.

3. Given the rising trend in agricultural prices, a significant proportion of marginal and small farmer households may remain below the poverty line, leading to the possibility of inadequate nutrition, especially of heavy workers, women and children. Combined with similar households among agricultural labourers and non-farm workers, the extent of poverty and under-nutrition is likely to remain high enough to need special attention, at least for the immediate future.

4. Combined with limited or inadequate health services and health and nutrition education available to rural households, poverty and under-nutrition may lead to high levels of morbidity, especially of women and children. These are

complex problems and specific inquiries and policies directed towards these issues are urgently required.

5. We have not inquired into several other related questions - such as policies relating to land tenure and fragmentation; provision of technological and market aids to farmers; the link between education and agricultural productivity; the likely impact of 'industrializing' agriculture; the scope for combining farming with other land-based activities; credit, storage and other facilities to poor farmers; and many other such issues. How these have to be adopted to maximise both private and social benefits from crop-shifts are matters which need to be separately examined.

Apart from these general issues, certain other matters, relating to the methodology of study, documentation and analysis of problems connected with change in agricultural practices and their effect on rural life merit serious attention. The recommendations that follow are based on our experience in conducting this survey, as well as the ISST's accumulated knowledge of similar enquiries.

6. Household enquiries are becoming both more expensive and more difficult to conduct from year to year. Trained investigators are hard to get, especially women investigators when they are required to spend several weeks at a stretch in the field. Travel, accommodation, printing of questionnaires etc are all much

more expensive than formerly. Consequently, without an adequate budget provision, it is no longer possible to conduct sample surveys covering several locations and a large number of households.

7. Sample selection is made difficult by the tendency of Government departments and offices to treat primary data pertaining to rural households which they may have collected for administrative or other purposes as "classified" or "secret" until they are published much later. Research studies of this kind will be greatly helped, and rendered less expensive, if all such information is fed into a "data bank" to which access is easy.

8. Basic data on household status, land holdings, farm and other incomes, farm expenses, household expenditures etc could be made available quickly and speedily if primary data thrown up by various censuses or national sample surveys are made available on a national grid, with free access to accredited research and non-governmental organisations. This is a matter that requires the urgent attention of both the Union and State Governments.

9. Specifically, the decennial Census of India, the periodic Agricultural Censuses and the National Sample Survey should be utilised to generate household data under common

definitions and rubrics, which will serve as the basis for developing reliable time series. It is possible that steps are already being taken towards this end; ICAR may wish to speed up the process.

10. It is necessary to rethink the approach to micro-surveys and case studies, once the groundwork has been laid for collection and provision of basic data on agriculture and rural households on a national scale. The new approach has to focus on (a) clarifying regional deviations around the national average or norm; (b) pursuing specific cross-section studies to establish household variances; (c) developing specific relationships in respect of which changes over time are relevant for policy formulation, and (d) collecting qualitative information needed for meaningful analysis of quantitative information available from other sources.

11. Likewise, the extent to which the questionnaire or limited interviews method should be combined with participatory observation has to be assessed before defining the scope of micro-surveys or case-studies. With the spread of education, a certain measure of self-monitoring by households may be possible; but that is unlikely to be possible in the proximate future.

12. Studies cutting across several disciplines are extremely difficult to organise. There is no uniformly applicable method useful in all disciplines; nor are investigators with multi-disciplinary training easily available. It seems, therefore, best to separate such studies into distinct parts, each to be handled by specialists in the concerned discipline and the results co-ordinated later.

13. In specific instances, net-working of case-studies may be advisable. This is an expensive proposition and should be undertaken after proper preparation, and a full understanding of the total design by all the participating organizations.

14. Finally, research studies should be published without delay, so that they can add to the fund of knowledge available to the community for policy-formulation, education or further research. Such a policy will also have a beneficial effect on the research studies themselves.

XXXXXX



### Appendix-I

This is the proposal submitted by Institute of Social Studies Trust (ISST) to the Indian Council of Agricultural Research in August 1987. However, while approving the proposal in the budget allocation was reduced by ICAR from Rs 10,06,730 to Rs.6,01,094; subsequently, an additional Rs.80,000 was sanctioned to cover cost escalation. In the process, the scope of the field survey was narrowed and part of the inquiry relating to the impact on nutrition and health was not undertaken. The original proposal is included here mainly as a matter of general interest.





"THE INCOME AND NUTRITIONAL EFFECTS OF SHIFTS FROM  
SUBSISTENCE TO CASH CROPPING-ESPECIALLY  
ON THE POOR, WOMEN AND CHILDREN"

PROPOSAL

Submitted

to

INDIAN COUNCIL OF AGRICULTURE RESEARCH  
NEW DELHI

AUGUST 1987

BY

INSTITUTE OF SOCIAL STUDIES TRUST  
BANGALORE



1. TITLE OF THE RESEARCH STUDY -

The effects of shifts from subsistence/ semi-subsistence crops to cash cropping on the incomes, health and nutritional status of the population - especially on the women and children.

2. LOCATION OF THE STUDY -

a) Name and address of Institution -

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b) Name and address of Head of Institute -

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c) Actual location where research work will be done -

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Enclosed as Annexure 1

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## 6. INTRODUCTION

Agriculture in countries like India is marked by the large number of poor peasants who are part of subsistence and semi-subsistence agriculture. These peasants usually own small plots of dry infertile land and agriculture is largely dependent on rainfall. The family labour is employed to cultivate the land (specially the women and children) and whatever the coarse grain that this kind of land is able to grow goes to feed the family. The only input that the subsistence farmer risks is the seed grain and the unpaid family labour. A poor crop reduced the output of food but does not indebt him since no capital inputs such as fertilizer, pesticides or borewell irrigation is used.

The poor peasant tries to maximise production and soil fertility by rotation of crops such as the sowing of coarse grain followed by oil seeds and some vegetables if possible. All the produce from this land goes to feed the family and does not enter the cash economy. It is the only important sources of food security for the subsistence farmer. When not working on his own land the farmer and his family seek wage labour or migrate to other areas where wage incomes may then be able to take care of some of the other needs.

The moment the subsistence farmer shifts to cash cropping he is no longer assured food security from his

land. The cash crop from his land (such as cotton, tobacco, mulberry, eucalyptus etc) has to be sold before he can buy food for the family. The poor peasant has to now depend on the market for cash returns and is subject to all the market fluctuations that take place for cash crops. Apart from this risk, in certain areas cash crop production needs capital inputs, that are made possibly by loans from individuals or institutions at high interest rates. In these cases any failure of crop can pauperise him. Attempts at modernisation of the rural sector to produce cash crops for the market, industry or for the central food grain pool is advantageous to the big farmer but appear to prove risky to the subsistence sector.

#### 7. AIMS, OBJECTS AND SCOPE OF THE RESEARCH STUDY -

Modernisation of the rural sector, including shifts from subsistence or semi-subsistence food production to the production of agricultural commodities for sale is said to be a corner stone of successful economic development in most developing countries.

Increasing farmer participation in exchange economy is said to benefit not only individual farmers and the agricultural sector but also other segments of society and may contribute to general self sustaining economic growth. But a number of studies (see below) have concluded that the impact of specific projects or

policies promoting cash cropping on food consumption by the rural malnourished and in turn on their nutritional status has been negative. From other studies it appears that potential or expected nutritional improvements have not materialised.

It is possible that the rural poor have not benefitted from the economic gain from expanded cash cropping, and since malnutrition is a sensitive indicator of poverty, and if their nutritional status does not improve, there is reason to believe that the economic situation of the poor is not improving. It is also possible that apparent economic gains may be partially or totally offset by nutritionally adverse factors such as increasing local food prices brought about by extended cash cropping - non availability of coarse grains traditionally grown on small plots, availability of fine cereals at prices beyond the reach of the poor (such as rice and wheat which may flush the markets due to the surplus production elsewhere under capitalist farming), increased availability and lower relative prices of non foods and changes in income controls within the households. The sponsors of a programme judge the success by the amounts of crop yield per acre, leaving the assumption of nutritional improvement largely unsubstantiated. It is assumed that farm households that shifts from subsistence to cash cropping will utilise the new income generated in cash and kind from



agricultural improvements to better their food security and thus improve their nutritional status. There is very little evidence to support this hypothesis. Studies on the food intake pattern of population in India do not show this expected increase in intakes of even calories and proteins.

### Food Security

Subsistence farming assures for the household availability of food grown on the small plots of land. This food security however inadequate, may assure the household some amounts of coarse cereals, pulses and vegetable during the year depending on the soil condition, rain, etc. Rotation of crops grown on land in these rainfed areas contributes to soil fertility - whereas a mono-culture of cash crops are having consequences not only on soil fertility but on incomes and prices, and inputs required to retain the fertility of soil. In addition, subsistence farming allows the family to participate in wage labour on larger farms which takes care of essentials from the markets such as salt, kerosene, clothes, etc. This very precarious balance can be upset when the shift to cash cropping brings in cash incomes determined by the market fluctuations. These cash incomes are not adequate replacements for the kinds of produce that the soil is capable of growing in subsistence farming.

Ability to acquire available food - Even if the shift from semi-subsistence farming to cash cropping brings in the expected incomes - there is no reason to believe that it is reflected in better food intakes. This is because the price a farmer pays for purchased food is generally higher than the implicit price for own production. There is generally increasing local food prices reducing real incomes and food purchases - and the most important is that while semi-subsistence farming frequently produces more or less constant flow of income in the form of food and some cash, incomes from cash crops come in large lumps. The management of this is a problem in a culture which is accustomed to semi-subsistence, resulting in drastic changes in spending pattern towards non-food items and consumer durables.

Control over incomes: There is empirical evidence to show that inspite of increased cash incomes, real benefits to the household depend on who in the household control the incomes. In a study of Kerala Kumar (Kumar Shubh 1977 - Occasional paper 95, Dept. of Agriculture Economics. Ithace - Cornell university) found evidence that the marginal propensity to consume food varied among women's incomes, men's incomes and incomes from home garden. It appears that incomes from shifts from semi-subsistence to cash production are spent with little regard for the food and nutritional health of the

family.

"Most projects have not only hurt women but have actually intensified the inequality between men and women. For the very poor women it is important to have household food security" (interview with Devaki Jain, 'Ceres', Vol.17, No.4, 1984, Page 35).

## 8. OBJECTIVES

The specific objectives of the study are as follows:

1. To examine, describe and measure the impact on health and nutrition status of families who have shifted from subsistence and semi subsistence farming to cash cropping, especially on the poor women and children.
2. To examine, describe and measure any other related changes brought about by the shift.

A N D

3. To develop an innovating methodology for its study, documentation and analysis.

## 9. REVIEW OF RESEARCH CONDUCTED AND BEING CONDUCTED ABROAD

In India, no detailed primary data-based research studies of the impact on nutrition of the shift from subsistence and semi subsistence farming to commercial agriculture specifically exist. Two secondary data based analyses are:

1. B.V.Krishnamurti, "The Deteriorating Eco-Economic Scene - A Reconnaissance View of the Southern Region of Mysore State", 1980; AND
2. L.C.Jain, "Grass Without Roots - Rural Development Under Government Auspices" 1994, a Sage Publication.

Apart from these, the study of the food-for-work programmes mentioned earlier, i.e. "Evaluation of Food for Work Programme", PEO, Planning Commission, November 1980, provides some tangential data.

However, several studies of a similar nature have been conducted in various other parts of the world, especially other developing countries. These are listed below with a brief summary of their findings in order to further substantiate the need for a detailed study of this issue in India.

1. Hernandez M and C.P.Hidalgo et al, "Effect of Economic Growth on Nutrition in a Typical Community", in Ecology of Food and Nutrition, 3.283, 1974.

This study in Mexico found no significant decrease in second and third degree malnutrition among pre-school children after the introduction of a new cash crop agricultural scheme. However, infant and child mortality rates did decline

significantly.

2. K.G. Deway, "Nutritional Consequences of the Transformation from Subsistence to Commercial Agricultural in Tabosco, Mexico", in Human Ecology, 9 (2): 151, 1981.

This study was conducted in the same area as that of Hernandex et al, but with highly improved and sophisticated methodology. It concluded that there was no significant difference for any of the nutritional status measures between subjects in the study area and a control, area, and thus the scheme had not succeeded in improving nutritional status.

3. J.Hitchings, "Agricultural Determinants of Nutritional status among Kenyan Children with Model of Anthropometric and Growth Indicators", Doctoral Dissertation, Stanford University, 1982.

This study showed that there were no strong positive correlations between individuals cash crops and children's nutritional status, and that no definite conclusions could therefore be drawn that cash crops and increased incomes necessarily improve children's nutrition.

4. L.Lev, "The Effect of Cash Cropping on Food Consumption Adequacy. Among the Meru of Northern Tanzania", working paper No.21, Michigan State

University, 1981.

This study conducted in a coffee-growing area concluded that as the amount of land devoted to coffee production increased, so did the family diet improve. However, it has been criticised for not taking into consideration the fact that virtually all households engaged in coffee cultivation also produced large quantities of bananas - Lev did not distinguish between cash crop and food crop and rule out dietary improvements due to the latter. The sample size was also very small.

5. D.R.Gross & B.A.Underwood, "Technological change and Calorie Costs: Sisal Agriculture in North eastern Brazil", in American Anthropologist, 73 (3): 725, 1971.

Gross & Underwood's oft-quoted study of two families engaged in sisal cultivation merely showed that a childless couple could sustain an adequate diet on their cash crop income but not a family with children. There was no control family of data about the situation prior to the introduction of sisal.

- 6.J.N.Lambert, "Does Cash Cropping Cause Malnutrition? National Planning Office Mimeo, Port Moresby, Papua New Guinea, 1973.

This small study of 13 households in a coffee-growing area found there had been a 33% decline in

food intake since the introduction of coffee cultivation.

7. J.Mellor, "Food Price Policy and Income Distribution in Low-Income Countries", in Economic Development and Cultural change, 27 (1):1, 1978.

S.Reutlinger and M.Selowsky, "Malnutrition and Poverty: Magnitude and Policy Options", World Bank Occasional Paper No.23, Johns Hopkins University Press, 1976.

Both these reviews of studies state that while income increases (from whatever cause) result in part of the increased earning being spent on food, the consequent changes in nutrition status are marginal.

Despite the increasing role of cash crop cultivation in the agricultural and development policy of the Third World, one is forced to conclude that surprisingly little research has been conducted, either in India or in other developing countries, on the income and nutritional effects of these policies.

The majority of studies on this issue are methodologically weak and their results inconclusive. The sample sizes have often been extremely small. While some studies indicate a negative nutritional impact resulting from cash cropping, others found a positive

correlation. None of the studies have made a comprehensive study of the process through which cash crop production impacts on nutrition status; most importantly they have not studied the differential impact on women assuming that intra-familial food distribution occurs according to need, and is not skewed by gender inequality cultural norms and food beliefs.

It is of paramount importance, therefore, that a comprehensive, methodology sound study with a significant sample size be conducted on this issue. Only then can we hope to generate results which will enable the government to design new policies and programmes in which social justice for the weak - by class, gender and age - is ensured, along with growth and development.

10. TECHNICAL PROGRAMME:

- A. SAMPLING - Sample selection will be based on the following criteria;
1. Selected villages will culturally and agro-climatically be homogenous,
  2. Villages from the Malur Taluk will be stratified on the basis of cropping pattern, viz., those where all land is under subsistence cultivation, those where there is a mix of subsistence and cash crop cultivation, and those which have switched entirely on cash crops;



3. 2 villages from each strata will be selected giving a total of 6 study villages.
4. In the 6 study villages, households themselves will be stratified on the basis of land- holding, viz., Big farmers (households with 5 acres or more), Small and Marginal farmers (households with less than 5 areas), and landless labourers and non-farming households (such as artisans are craftsmen).
5. After household stratification is complete, household selection will be finalised. The number of households selected per village will be proportionate to the size of the village, with a minimum 30 to 40 households from small villages (population between 1000-2500, 60 to 70 households in large villages).
6. 50% of the study villages will be chosen for a detailed evaluation of the health and nutritional profile of all children (under 5 years) in the village. The sample size would be adequate to reflect the changes that have occurred due to shift in agricultural practices since generally, 15% of the total population are children.

B. DATA COLLECTION - Will be in two phases, the preliminary survey and the sample survey

1. Preliminary Survey:

The preliminary survey is essential designed to provide a relevant framework of basic information upon which the detailed survey data collection can be built. It will sensitize the sample survey instrument to any unique or location - specific factors which affect local cultivation, health and occurred status. The baseline will comprise the following steps:

- a) Collection and scrutiny of all available secondary data about the study area, including Census and NSS data, Agriculture and Revenue Department data (Land records, crop patterns, production figures) etc.
- b) Field visits to obtain first-hand baseline information and also data for selection of sample villages and households. This preliminary survey will collect information on the following heads:
  - i) All current governmental development programmes in the study area, especially in agriculture, health, nutrition, water, irrigation, sanitation, education, employment, women's and children's services, family planning, public distribution system, transport and communications, arts and crafts,

- energy and power, cottage and other industries.
- ii) Land use patterns, land types and quality, land tenure, shifts and changes in land holdings and landlessness.
  - iii) Agricultural patterns including present cropping patterns and productivity., types of crops, calendar of agricultural cycle, cultivation practices, type and costs of agricultural inputs and other costs, level of technology of crop, land size and socio-economic group.
  - iv) Labour-use patterns including participation rates of men, women and children and changes in these, demand for family and non-family labour, gender-based work distribution, changes in work patterns, migration patterns (seasonal and permanent).
  - v) Produce marketing system and infrastructure
  - vi) Social structure including family size, caste and religious break-up of population education and literacy levels, women's status, etc.
  - vii) Food and nutrition including lists of local foods by source and cost, fluctuations in food availability, sequential eating, local food

beliefs and taboos, weaning patterns, local perceptions of food and nutrition problems, perceptions of change in dietary quality and quantity.

viii) Health care including all local health care sources, utilisation patterns, public and private health care and costs, common diseases, perceptions of major health problems,

ix) Village census including obtaining village wise household lists categorisation of villages by size, percentage of landless and backward classes and crop patterns.

This baseline information will be collected from various sources, depending on which source is most appropriate for which item of information. These will include (Taluk/block officials such as BDOs, revenue officials, agriculture extension officers, PHC doctors, paramedicals, local voluntary agencies (if any), village headmen and other elders, political representatives and leaders, mahila mandals and youth clubs (if any), groups of local women and children, landless labourers, marginal small and big farmers, etc.

## 2. Sample Survey:

The sampling methodology has already been described. Data collection here will be done through household level surveys questionnaire and village level questionnaire. While basic household and village data will be collected through one round, all the food, nutrition and health status information will be collected in two rounds based on the local agricultural calendar, in order to pick up seasonal fluctuations.

The items of information to be collected can be grouped into four categories: Socio-Economic Data, Agricultural Data, Food Nutrition and Health Data and Data on Multiple Spin-Off Effects. The following is the lists of specific information to be collected under each of these heads.

### Socio-Economic Status:

- Composition of population by sex and age (0-3, 3-6, 6-14, 15-59, 60+)
- Education status by sex and age
- No. of school-going, dropped out, never enrolled children;
- Age at marriage, no. of pregnancies, family planning acceptors,
- Occupation by sex, age and season;
- Employment by type, source and season
- No. of gainfully employed, adults and children, by cropping pattern (subsistence, mixed, cash crop)
- Size of landholding, landlessness;
- Other assets (livestock, transport, pumps, etc)

- Expenditure heads;
- Indebtedness
- Housing by type and size,
- Household amenities (water, toilet, electricity, cooking fuel, etc.)
- Religion and caste or sect;

**Agricultural profile:**

- Present and past cropping pattern; and reasons for change;
- distribution of land under cultivation by crop;
- Technologies and other inputs by crop, land size and strata;
- Cost of inputs (labour, time, money, materials, etc.)
- Migration by season, where to (rural-urban, rural- rural)
- Land type and quality;
- Land tenure,
- Shifts and changes of land holdings and reasons;
- Calendar of agricultural cycle;
- Cultivation practices by crop and land holding;
- Marketing system by crop;
- Livestock;
- Access to inputs (water, seeds, fertiliser, power, loans, etc);
- Pattern of crop rotation;
- Mode of storage by crop;
- Prices of crops and payment terms;
- Non-specific costs (land rent, interest payments ) by crop
- Other revenue (rent from land, etc);
- Total income and composition of income;

Food Nutrition and Health status:

- Type and quantity of family diet
- Number of meals per day and composition by age and sex
- Here for the 0-2 years and 2-5 years more details have to be collected regarding the following protective foods that the child ate the previous day or previous week.

These food are checked with the respondents after the respondent has given the diet history.

For the under five

- |  |   |  |
|--|---|--|
| 1. Milk with or without sugar  | } | Method of cooking such as use of oil if any etc. |
| 2. Green Leafy vegetable   |   |  |
| 3. Meat  |   |  |
| 4. Eggs  |   |  |
| 5. Groundnut   |   |  |
| 6. Jaggery   |   |  |
| 7. Dal/pulses  |   |  |
| 8. Bananas   |   |  |
| 9. Carrots   |   |  |
| 10. Other seasonal fruit like Papaya, mango, etc.                          |   |  |
| 11. Does the child eat herself/himself or is fed by sibling/mothers/others |   |  |

12. Breast feeding and weaning pattern

- Pattern of food sharing and eating sequence
- Expenditure (per day, week or month) on food
- Festival foods - information on major festivals
- Frequency and impact on normal diet
- Seasonal variation in diet and food availability
- Per capita daily consumption of calories, protein and key micronutrient by individual age and sex.

- Changes if any in dietary pattern over the last 2 years and reasons.
- Food belief and taboos by age, sex and physiological states like pregnancy and lactation
- Cooking methods of main food
- Perception of major health problem
- Source of health care (indigenous, allopathic, public and private and utilisation pattern for the morbidity recorded. (See below)
- Cost of medical care (including travel, medicine, Doctor's fee etc.)
- Morbidity pattern (1 week recall) by age, sex and cause.
- Mortality by age and sex and cause (1 year recall) by season.
- Anthropometry: Measurement of all responders - this includes

I. Height

II. Weight

III. Mid arm circumference and fat fold at triceps classification of malnutrition to be done using the above measurements:

Weight by height ratio for acute malnutrition

Height by age is used to see the prevalence of chronic malnutrition; and

The number of children classified

90% standard weight for height

80-60% of standard

60% of standard are recorded

- Clinical assessment of the respondent, (all the children and pregnant and lactating women and a sub-sample of adults) to assess the following:



Children

1. Anemia
2. B.C.Deficiency
3. Night blindness
4. Bitot's spots
5. Xerophthalmia
6. Oedema
7. Wasting
8. Fever
9. Cough
10. Diarrhoea
11. Enlarged Spleen
12. Any others

Adult

1. Anemia
  2. Glossitis
  3. Angular Stomatitis
  4. Calf tenderness
  5. Tingling numbness
  6. Any others
- Contraceptive history - practice and belief

Multiplier/spin-off effects related changes:

- Changes in cost and availability of food items;
- Changes in demand for specific foods;
- Nature of demand for new goods and services;

- Rate and extent of mechanisation and changes in labour inputs;
- Changes in household expenditure patterns;
- Changes in utilisation of public and private resources and facilities (schools, hospitals/health clinics, family planning services, development programmes, banks, income-generating schemes, etc.) especially by poor, women and children;
- Changes in child care practices and reasons;
- Emergence of new social problems (alcoholism, dowry demands, prostitution etc.) in cash crop area,
- Changes in traditional fuel, fodder and building material sources (firewood, leaves, hay, straw, agricultural waste, etc.) and new expenditure incurred on these heads in cash crop area.

### 3. Intensive Study:

The intensive or in-depth study needs to be described in some detail as it comprises the cost innovative part of the overall enquiry. We submit that the most significant objective of this enquiry, viz., the impact of commercialisation of agriculture on the nutrition of the poor, specially women and children, implies exploring intra - familiar relationships. Specifically, this involves examining the differential access, if any, of individual family members to household resources for seasons of their gender or age. This is an extremely difficult proposition if one attempts it using conventional research techniques, more so when one is attempting to study highly delicate questions such as women's access to food, work

distribution among household members, etc. It is virtually impossible to elicit accurate or reliable information or such areas through a questionnaire, since most respondents may never have considered these questions analytically and would be able to quantify these aspects of their daily lives.

The other conventional method, of observation by the researcher (and daily weighing of food in the case of nutrition surveys) also has its limitations. For instance, the distribution of food amongst family members cannot be measured without the presence of the researcher during meal times, which in our culture will be awkward and invariably distorts normal practice.

Under the circumstances, and based on the experience of some researchers, informed self-monitoring by respondents, if handled well, is the best alternative. But self-monitoring can be successful only if the following prerequisites are fulfilled.

1. Participation in self-monitoring must be entirely voluntary. - volunteers must be obtained in the manner described earlier with special attention paid to the benefits to be gained by participation. In this case, these may range from special nutrition advice to improve family health to more efficient allocation of time.

2. The study should be designed to minimise added burdens on respondents can participate. Several measure have already been envisioned for this:
  - i) for monitoring of food - sharing pre-measured' scopes and ladles will be given to participant families; simple, graphic charts representing family members and main food items will be designed so that through simple 'notch' - type scoring, records of food quantities and types consumed per person can be kept;
  - ii) Clocks may be given along with graphic charts to assist self monitoring of time allocation by activity;
  - iii) Self-monitoring will be done for short periods of time (one week) but at a frequency which will capture seasonal fluctuations and yet not burden respondents with keeping records for long periods of time.
3. The family member chosen to carry out self-monitoring will be a woman, since male respondents may not be able to report on food distribution and time budgets of women.
4. Investigators will be given a special fifteen day training prior to launching the intensive study to enable them to establish the rapport with families which

it is essential for carrying out the intensive study effectively. It will also equip them to assist the respondents with any problems they may have in the self monitoring system.

C. ANALYSIS

Data processing and analysis will be computerised, under the supervision of the project co-ordinator and a computer consultant.

It must be noted that in accordance with ISST practice, a Technical Advisory committee for the study will be set up to finalise the research design and provide overall guidance and qualitative inputs to the study. This Committee will provide their inputs through a series of workshops which will be conveyed at the commencement, midstream, conclusion and report writing stages of the stud. Field-level workshops will also be held to elicit the participation of local representatives (officials, local leaders and male and female community members). These workshops will capture as many local characteristics (social, cultural, economic and technical) as possible and thus positively influence the substance and mode of enquiry.

## 11. FACILITIES

The study will be co-ordinated from the Bangalore office of ISST. The facilities available at this office will be utilised for the study. In addition, the following facilities will be chargeable to the project -

- Office furniture
  - Calculators
  - One typewriter
  - Weighing machines
  - Height rods
- } for adults
- Baby balance - for children upto 3 years
  - Infantometres - for heights of children
  - Measuring tapes
  - Medicines
  - Transport
  - Computer time
  - Clocks, ladles, graphic charts etc - for self monitor
  - Board & Lodge - during field work
  - Salaries of local investigators
  - Stationery, Communications etc

## 12. DURATION OF STUDY

The total duration of the study will be 36 months i.e 3 years.

## 13. STAFF REQUIREMENT

The Study would involve the following personnel:

Project Co-ordinator - 1

Research Assistant - 3  
 Investigators - 6  
 Tabulators - 3  
 Statistician - 1  
 Computer Programmer - 1 Part time  
 Health & Nutrition Expert - 1 Part time  
 Doctor - 1 Part time  
 Typist - 1 Part time  
 Accountant - 1 Part time

14. Has the Institution applied for grant to the Indian Council of Agricultural Research for any other studies?

NONE

15. FINANCIAL ASSISTANCE

|                           | No. | Rate per month | No. of months | Amount      |
|---------------------------|-----|----------------|---------------|-------------|
| <u>a) Salaries</u>        |     |                |               |             |
| Project Co-ordinator      | 1   | 3000           | 36            | 1,08,000.00 |
| Research Associate        | 3   | 2000           | 36            | 2,16,000.00 |
| Tabulators                | 3   | 850            | 10            | 25,500.00   |
| Investigators             | 6   | 1000           | 10            | 60,000.00   |
| Statistician              | 1   | 2500           | 36            | 90,000.00   |
| Typist (part time)        | 1   | 800            | 36            | 28,800.00   |
| Accountant (part time)    | 1   | 1000           | 36            | 36,000.00   |
| <u>Consultants</u>        |     |                |               |             |
| Health & Nutrition Expert | -   | -              | LS            | 15,000.00   |
| Doctor                    | -   | -              | LS            | 30,000.00   |
|                           |     |                |               | -----       |
|                           |     |                |               | 6,09,300.00 |
|                           |     |                |               | =====       |

b) Travel Allowance

|                 |  |             |
|-----------------|--|-------------|
| Travel          |  | 5,000.00    |
| Conveyance      |  | 15,000.00   |
| Board           |  | 66,000.00   |
| Lodge           |  | 20,000.00   |
| Daily Allowance |  | 45,000.00   |
|                 |  | -----       |
|                 |  | 1,51,000.00 |
|                 |  | =====       |

Total: 7,60,300.00

II. NON RECURRING

|                      |                  |             |
|----------------------|------------------|-------------|
| Stationary           | 5,000.00         |             |
| Computer time        | 30,000.00        |             |
| Production of Report | 15,000.00        |             |
| Medicine             | 15,000.00        |             |
| Telephone            | 18,000.00        |             |
| Postage & Telegram   | 4,000.00         |             |
| Workshop (2)         | 14,000.00        |             |
| Miscellaneous        | <u>20,000.00</u> | 1,21,000.00 |

Capital Items

|  |                 |              |
|--|-----------------|--------------|
| Time piece   | 5,000.00        |              |
| Other equipment (Height rods,<br>Weighing scale for adults<br>baby balance, Infantometer | } 10,000.00     |              |
| Typewriter   | 6,000.00        |              |
| Office furniture   | 10,000.00       |              |
| Calculators  | <u>2,000.00</u> | 33,000.00    |
| Add overhead at 10%  | Total           | 9,14,300.00  |
|  |                 | 92,430.00    |
|  |                 | -----        |
| Grand Total  |                 | 10,06,730.00 |
|  |                 | =====        |



16. TERMS OF PAYMENT

The project will be commenced immediately on receipt of the sanction of the Project. 50% of the total budget amount may be made available on sanction of the study. At the end of one year, an additional 30% to be made available and the balance of 20% to be paid on Submission of the Report.

Annexure 1

Curriculum Vitae - Devaki Jain

NAME Devaki Jain nee Mandyam Ananth Devaki  
BORN June 11, 1933  
MARRIED 1966  
CHILDREN Two (1) Born 1967 (2) Born 1969 (M)  
NATIONALITY Indian  
ADDRESS Director, Institute of Social Studies Trust  
S.M.M.Theatre Crafts Museum  
5, Deen Dayal Upadhyay Marg  
New Delhi 110002, Phone:3312972  
EDUCATION Schooling in English language schools -  
completed in 1949  
1949-1951 Pre-graduation University called  
Intermediate  
Subjects: Physics, Chemistry,  
Mathematics I Class.  
1951-1953 Bachelor of Arts, Degree course in  
Mathematics Economics, English  
Literature  
2 Gold Medals - (1) Highest marks in the  
English paper, (2) Highest total marks  
in the 3 papers taken together  
1955-1956 Diploma in Social Sciences, Ruskin  
College, Oxford.  
1959-1962 B.A. (Honors) Oxford  
PPE, Special papers, Public Finance,  
Statistics, Held St.Anne's Exhibition  
1962-1963.

OTHER ACADEMIC  
EXPERIENCE

- 1956                      Research Assistant
- Wrote a pamphlet (published) for Democratic Research Service - "A Third Alternative"
- 1957-1959                Research Associate for Indian Co-operative Union. Wrote 2 reports for the Union:
- 1) Gramdan - a firsthand report.
- 2) Experiments in rural development - a comparative study.
- 1958, Summer          Invited to attend the Harvard International Seminar, organised by the Department of International Affairs, Harvard University.
- 1959, Feb-Sept        Research Assistant to Professor Gunnar Myrdal. Did some preliminary work on new indices for comparing levels of living for his book Asian Drama.
- 1963-1969                Lecturer in Economics, Miranda House, University of Delhi, Delhi. Specialised in Social Accounting, Statistics and problems of Indian Economy.
- 1967-1968                Held Seminar Research Fellowship (University Grants Commission) in the Area Studies Programme at the Delhi School of Economics, the "area" selected being Pakistan. At that time, Dr.K.N.Raj held the Chair in this programme.
- Wrote a long paper on the partition of the Indus Basin and its consequences based on A.A.Michel's book The Indus Ricers.
- 1969, June              Attended conference of International Economic Association at Kennedy, Ceylon. Subjects: India, Pakistan, Ceylon, was one of the Rapporteurs for the Conference.

1974

Completed the volume on Indian women - a collection of essays - for the Publications Division, Government of India. This was released by India as its book for Women's Year.

"Indian Women" - edited by Devaki Jain, Publications Division, Govt. of India, Patiala House, Tilak Marg, New Delhi 110001.

1975 to date

As Director of Institute of Social Studies have prepared reports, books, memoranda, paper on women - especially employment; and have participated in meetings, conferences, seminars on similar themes. A list of Studies reports etc. undertaken by the Institute is attached.

#### BOOKS PUBLISHED

1. "Women in Development Economy - Form Dissociation to Rehabilitation", published by Indian council of Social Science Research, New Delhi, October 1975.
2. Compiled and edited book on Indian Women for Publications Division, Ministry of Information and Broadcasting, Government of India, which was published in 1975.
3. Women's Quest for Power. Published by Sahibabad, Vikas Publishing House, Delhi (1981)
4. Income Generating Projects for Women. Delhi, UNICEF. 1980.
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## ASSOCIATION WITH PUBLIC ORGANISATIONS

1. Member, Advisory committee for the International Women's Year, IWY Tribune, New York.
2. Trustee, Children's Book Trust, 4 Bahadur Shah Zafar Marg, New Delhi.
3. Member, Steering Group on Women and Employment, Planning Commission, Yojana Bhavan, Parliament Street, New Delhi, 110001.
4. President, SEWA, Delhi, K-30, Jangpura Extension, New Delhi.
5. Member, Voluntary Action Group, set up by the Central Social Welfare Board, Jeevan Deep Building, Parliament Street, New Delhi.
6. Member, National Advisory Committee on Women's Employment, Ministry of Labour, Government of India. 1983.
7. Member, Committee on Women and Development, Ministry of Social Welfare, Government of India.
8. Member, Advisory Committee, Development of Women and children in Rural Areas, Ministry of Rural Development, Government of India.
9. Member, Committee on Adult Education, Ministry of Education, Government of India.
10. Member, Committee on Media, Bhagwandas Road, New Delhi.

## Appendix - II Questionnaire



# INSTITUTE OF SOCIAL STUDIES TRUST, BANGALORE

“ THE INCOME AND NUTRITIONAL EFFECTS OF SHIFTS FROM SUBSISTANCE TO CASH CROPPING, ESPECIALLY ON THE POOR, WOMEN AND CHILDREN ”

SPONSORED BY : INDIAN COUNCIL OF AGRICULTURAL RESEARCH, NEW DELHI

- 
- |  |   |                             |   |
|--|---|-----------------------------|---|
| 1. Name of the village                         | : | c) Marital Status           | : |
| 2. Name of the taluk                           | : | d) Education                | : |
| 3. Name of the District                        | : | e) Occupation               | : |
| 4. Name & Address of the head of the Household | : | f) Mother Tongue            | : |
|  |   | g) Caste/Religion           | : |
| 5. Household No.                               | : | h) Land Holding Status      | : |
| 6. Ration Card No                              | : | 8. Name of the Investigator | : |
| 7. Head of Household                           | : | 9. Signature                | : |
| a) Age   | : | 10. Date                    | : |
| b) Sex   | : | 11. Scrutinsed by           | : |







CODE A

1. Male
2. Female

CODE B

01. Head of the Household
02. Father
03. Mother
04. Brother
05. Sister
06. Wife/Husband
07. Son
08. Daughter
09. Daughter-in-law
10. Son-in-law
11. Brother-in-law
12. Sister-in-law
13. Relative
14. Grandson
15. Grand daughter
16. Mother-in-law
17. Father-in-law
18. Nephew
19. Niece
20. Not related

CODE C

1. Unmarried
2. Married
3. Widowed
4. Divorced/separated

CODE D

1. Illiterate
2. Literate
3. Pre-Primary
4. Primary
5. Secondary
6. PUC
7. Graduate/Professional
8. Others (Specify)

CODE E

1. Own Cultivation
2. Agrl. Labour
3. Household work
4. Artisan
5. Service Industry
6. Others (Specify)

|   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|
| 0 | 1 | 2 | 3 | 4 | 5 | 6 |
|   |   |   |   |   |   |   |

**BLOCK II**

**LAND AND OTHER PRODUCTIVE ASSETS**

**A. LAND HOLDING :**

| Sl. No. | Description                   | Dry land (in acres) |      | Wet land (in acres) |      | Garden (in acres) |      | Total (in acres) |      | Annual Income (from land) |
|---------|-------------------------------|---------------------|------|---------------------|------|-------------------|------|------------------|------|---------------------------|
|         |                               | B.S.                | A.S. | B.S.                | B.S. | A.S.              | B.S. | B.S.             | A.S. |                           |
| 1.      | Total land owned              |                     |      |                     |      |                   |      |                  |      |                           |
| 2.      | Land leased out               |                     |      |                     |      |                   |      |                  |      |                           |
| 3.      | Land leased in                |                     |      |                     |      |                   |      |                  |      |                           |
| 4.      | Total Land cultivated (1-2+3) |                     |      |                     |      |                   |      |                  |      |                           |

**B. OTHER AGRICULTURAL ASSETS :**

| Sl. No.      | ITEM                    | Total number Possessed |       | How used (Code-A) |       | Income (if any in Rs.) |       |
|--------------|-------------------------|------------------------|-------|-------------------|-------|------------------------|-------|
|              |                         | B. S.                  | A. S. | B. S.             | A. S. | A. S.                  | A. S. |
| 1.           | Bullock cart            |                        |       |                   |       |                        |       |
| 2.           | Tractor                 |                        |       |                   |       |                        |       |
| 3.           | Trucks/M. Vehicles      |                        |       |                   |       |                        |       |
| 4.           | Agricultural Equipments |                        |       |                   |       |                        |       |
| 5.           | Pumpsets                |                        |       |                   |       |                        |       |
| 6.           | Sericulture equipment   |                        |       |                   |       |                        |       |
| 7.           | Others (specify)        |                        |       |                   |       |                        |       |
| <b>TOTAL</b> |                         |                        |       |                   |       |                        |       |

CODE—A

1. Own use only      2. For hiring out only      3. Both purposes

|                      |                      |                      |                      |                      |                      |                      |
|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| 0                    | 1                    | 2                    | 3                    | 4                    | 5                    | 6                    |
| <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |

C. LIVE - STOCK

| Sl. No. | LIVE - STOCK     | TOTAL No. Possessed |             | Purpose of owning (Code .A) |             | Annual Income (in Rs.) |             |
|---------|------------------|---------------------|-------------|-----------------------------|-------------|------------------------|-------------|
|         |                  | Before Shift        | After Shift | Before Shift                | After Shift | Before Shift           | After Shift |
| 1.      | Cows             |                     |             |                             |             |                        |             |
| 2.      | Buffaloes        |                     |             |                             |             |                        |             |
| 3.      | Bullocks         |                     |             |                             |             |                        |             |
| 4.      | Sheep            |                     |             |                             |             |                        |             |
| 5.      | Goat             |                     |             |                             |             |                        |             |
| 6.      | Poultry          |                     |             |                             |             |                        |             |
| 7.      | Pigs             |                     |             |                             |             |                        |             |
| 8.      | Others (specify) |                     |             |                             |             |                        |             |
|         | Total            |                     |             |                             |             |                        |             |
| TOTAL   |                  |                     |             |                             |             |                        |             |

CODE—A

1. For own use    2. For hiring purpose    3. For sale    4. Multipal use

|                          |                          |                          |                          |                          |                          |                          |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 0                        | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

**BLOCK III**

**1. HOUSING AND HOUSEHOLD AMENITIES**

|   | Before Shift             | After Shift              |
|---|--------------------------|--------------------------|
| 1. Type of house                        |                          |                          |
| 1. Kutcha                               | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Pucca                                |                          |                          |
| 2. Is it                                |                          |                          |
| 1. Owned                                | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Rented                               |                          |                          |
| 3. Others (Specify)                     |                          |                          |
| 3. Is the house built by                |                          |                          |
| 1. Ancestors                            | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. You                                  |                          |                          |
| 3. Government                           |                          |                          |
| 4. Others (Specify)                     |                          |                          |
| 4. Roof of the house                    | <input type="checkbox"/> | <input type="checkbox"/> |
| 1. R. C. C.                             |                          |                          |
| 2. Tiles                                |                          |                          |
| 3. Asbestos                             |                          |                          |
| 4. Thatched                             |                          |                          |
| 5. Tar sheet                            |                          |                          |
| 6. Leaves roof                          |                          |                          |
| 7. Old tin boxes                        |                          |                          |
| 8. Others (Specify)                     |                          |                          |
| 5. Source of Drinking Water             | <input type="checkbox"/> | <input type="checkbox"/> |
| 1. Tap                                  |                          |                          |
| 2. Hand pump                            |                          |                          |
| 3. Well                                 |                          |                          |
| 4. River                                |                          |                          |
| 5. Pond/tank                            |                          |                          |
| 6. Tube well through electric pump      |                          |                          |
| 7. Others (Specify)                     |                          |                          |
| 6. Location of source of Drinking Water | <input type="checkbox"/> | <input type="checkbox"/> |
| 1. Within house                         |                          |                          |
| 2. Within the neighbourhood             |                          |                          |
| 3. Within 1/4 km                        |                          |                          |
| 4. Within 1/2 km                        |                          |                          |
| 5. Within 3/4 km                        |                          |                          |
| 6. Within 1 km                          |                          |                          |
| 7. More than 1 km                       |                          |                          |

|                          |                          |                          |                          |                          |                          |                          |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 0                        | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

|                          | Before Shift             | After Shift              |
|--------------------------|--------------------------|--------------------------|
| 7. Type of Utensils used |                          |                          |
| 1. Mud                   | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Aluminium             |                          |                          |
| 3. Brass                 |                          |                          |
| 4. Steel                 |                          |                          |
| 5. Copper                |                          |                          |
| 6. Others (Specify)      |                          |                          |

8. Are you Utilising the services of the following at home ?

|                     | 1. Yes | 2. No | B.S.                     | A.S.                     |
|---------------------|--------|-------|--------------------------|--------------------------|
| 1. Servant Maid     |        |       | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Men servants     |        |       | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Others (specify) |        |       | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. ....             |        |       |                          |                          |

9. Does the house have

1. Yes

2. No

B.S.

A. S.

|                           | 1. Yes | 2. No |
|---------------------------|--------|-------|
|                           | B.S.   | A. S. |
| 1. Separate kitchen       |        |       |
| 2. Bed room               |        |       |
| 3. Drawing room           |        |       |
| 4. Toilet                 |        |       |
| 5. Separate cattle shed   |        |       |
| 6. Space around the house |        |       |
| 7. Municipal Drainage     |        |       |
| 8. Electricity            |        |       |
| 9. Cooking gas            |        |       |

|                          |                          |                          |                          |                          |                          |                          |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 0                        | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

| 10. Is your house furnished with |                  | 1. Yes                   | 2. No                    |
|----------------------------------|------------------|--------------------------|--------------------------|
| 01.                              | Chairs           | <input type="checkbox"/> | <input type="checkbox"/> |
| 02.                              | Tables/teapoy    | <input type="checkbox"/> | <input type="checkbox"/> |
| 03.                              | Sofas            | <input type="checkbox"/> | <input type="checkbox"/> |
| 04.                              | Dining table     | <input type="checkbox"/> | <input type="checkbox"/> |
| 05.                              | Beds             | <input type="checkbox"/> | <input type="checkbox"/> |
| 06.                              | Cots             | <input type="checkbox"/> | <input type="checkbox"/> |
| 07.                              | Almerahs         | <input type="checkbox"/> | <input type="checkbox"/> |
| 08.                              | Iron safes       | <input type="checkbox"/> | <input type="checkbox"/> |
| 09.                              | Radio            | <input type="checkbox"/> | <input type="checkbox"/> |
| 10.                              | Fan              | <input type="checkbox"/> | <input type="checkbox"/> |
| 11.                              | Others (specify) | <input type="checkbox"/> | <input type="checkbox"/> |



BLOCK IV

0 1 2 3 4 5 6

|  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|
|  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|

A. PRESENT CROPPING PATTERN

| 1. GRAIN/CEREALS |             |                      |                             |                                       |   |                     |                 |
|------------------|-------------|----------------------|-----------------------------|---------------------------------------|---|---------------------|-----------------|
| Sl. No.          | Crops       | Land used (in acres) | No. of Crops grown per year | Quantity Produced (Quintals per Year) | Qntls used for own consumption per year | Qntls sold per Year | Income (in Rs.) |
| 1.               | Paddy       |                      |                             |                                       |   |                     |                 |
| 2.               | Ragi        |                      |                             |                                       |   |                     |                 |
| 3.               | Jowar       |                      |                             |                                       |   |                     |                 |
| 4.               | Wheat       |                      |                             |                                       |   |                     |                 |
| 5.               | Bajra       |                      |                             |                                       |   |                     |                 |
| 6.               | Maize       |                      |                             |                                       |   |                     |                 |
| TOTAL            |             |                      |                             |                                       |   |                     |                 |
| 2. OIL SEEDS :   |             |                      |                             |                                       |   |                     |                 |
| 1.               | Ground nut  |                      |                             |                                       |   |                     |                 |
| 2.               | Sunflower   |                      |                             |                                       |   |                     |                 |
| 3.               | Safflower   |                      |                             |                                       |   |                     |                 |
| 4.               | Seasamum    |                      |                             |                                       |   |                     |                 |
| 5.               | Castor Seed |                      |                             |                                       |   |                     |                 |
| TOTAL            |             |                      |                             |                                       |   |                     |                 |
| 3.               | SUGARCANE : |                      |                             |                                       |   |                     |                 |
| 4 TREE CROPS     |             |                      |                             |                                       |   |                     |                 |
| 1.               | Eucalyptus  |                      |                             |                                       |   |                     |                 |
| 2.               | Mulberry    |                      |                             |                                       |   |                     |                 |
| 3.               | Cotton      |                      |                             |                                       |   |                     |                 |
| 4.               | Rubber      |                      |                             |                                       |   |                     |                 |
| 5.               | Cocoa       |                      |                             |                                       |   |                     |                 |
| 6.               | Cashewnut   |                      |                             |                                       |   |                     |                 |
| 7.               | Pepper      |                      |                             |                                       |   |                     |                 |

0 1 2 3 4 5 6

|  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|
|  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|

4. VEGETABLES/FRUITS & FLOWERS

| Sl. No.     | Crops             | Land used (in acres) | No. of Crops grown per year | Quantity Produced (Quintals per Year) | Qntls used for own consumption per year | Qntls sold per Year | Income (in Rs.) |
|-------------|-------------------|----------------------|-----------------------------|---------------------------------------|---|---------------------|-----------------|
| 01.         | Tomato            |                      |                             |                                       |   |                     |                 |
| 02.         | Coconut           |                      |                             |                                       |   |                     |                 |
| 03.         | Pineapple         |                      |                             |                                       |   |                     |                 |
| 04.         | Jackfruit         |                      |                             |                                       |   |                     |                 |
| 05.         | Mango             |                      |                             |                                       |   |                     |                 |
| 06.         | Sapota            |                      |                             |                                       |   |                     |                 |
| 07.         | Guava             |                      |                             |                                       |   |                     |                 |
| 01.         | Banana            |                      |                             |                                       |   |                     |                 |
| 09.         | Carrot            |                      |                             |                                       |   |                     |                 |
| 10.         | Flowers (specify) |                      |                             |                                       |   |                     |                 |
|             | i)                |                      |                             |                                       |   |                     |                 |
|             | ii)               |                      |                             |                                       |   |                     |                 |
| 11.         | Others (specify)  |                      |                             |                                       |   |                     |                 |
| TOTAL       |                   |                      |                             |                                       |   |                     |                 |
| GRAND TOTAL |                   |                      |                             |                                       |   |                     |                 |

B PAST CROPPING PATTERN/CROPS GROWN BEFORE SHIFTING

| Sl. No. | Crops | Total land used in acres | No. of Crops grown (per year) | Quantity produced (quintals per year) | Quintals used for own consumption (per year) | quintals sold per Year | Income in Rs. |
|---------|-------|--------------------------|-------------------------------|---------------------------------------|--|------------------------|---------------|
| 01.     |       |                          |                               |                                       |  |                        |               |
| 02.     |       |                          |                               |                                       |  |                        |               |
| 03.     |       |                          |                               |                                       |  |                        |               |
| 04.     |       |                          |                               |                                       |  |                        |               |
| 05.     |       |                          |                               |                                       |  |                        |               |
| 06.     |       |                          |                               |                                       |  |                        |               |
| 07.     |       |                          |                               |                                       |  |                        |               |
| 08.     |       |                          |                               |                                       |  |                        |               |
| 09.     |       |                          |                               |                                       |  |                        |               |
| 10.     |       |                          |                               |                                       |  |                        |               |
| 11.     |       |                          |                               |                                       |  |                        |               |
| 12.     |       |                          |                               |                                       |  |                        |               |
| TOTAL   |       |                          |                               |                                       |  |                        |               |



|                          |                          |                          |                          |                          |                          |                          |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 0                        | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

### BLOCK VI

**ACTIVITY & TIME ALLOCATION OF THE MEMBERS OF THE FAMILY**  
 (Information to be obtained from persons above 14 years of age in the family)

| Before shift                    |                   |                             |                         |
|---------------------------------|-------------------|-----------------------------|-------------------------|
| Sl. No. of person (See Block-I) | Activity (Code A) | No. of hours spent per week | No. of years on the job |
|                                 |                   |                             |                         |
| After shift                     |                   |                             |                         |
|                                 |                   |                             |                         |

#### ACTIVITY CODE

01. Agriculture own Cultivation
02. Agriculture Labour
03. Artisan
04. Self-Employed in other Business
05. Wage Employment (non-Agriculture)
06. Animal Husbandry
07. Construction
08. Housework (Cooking etc.)
09. Schooling and training
10. Childcare
11. Fetching wood, fodder & water
12. Others (specify)

**BLOCK VII**  
**HIRED LABOUR**

1. Do you hire labour for the following

| Activity            | Male |      | Female |      | Children |      |
|---------------------|------|------|--------|------|----------|------|
|                     | No.  | Days | No.    | Dsya | No.      | Days |
| 1. AGRICULTURE      |      |      |        |      |          |      |
| (a) Rabi            |      |      |        |      |          |      |
| (b) Karif           |      |      |        |      |          |      |
| (c) Summer          |      |      |        |      |          |      |
| 2. Domestic Servent |      |      |        |      |          |      |
| 3. Construction     |      |      |        |      |          |      |
| 4. Others (specify) |      |      |        |      |          |      |

2. How are the wages paid ?

1. Cash
2. Kind
3. Both

3. What is the money wage per day (in Rs.)

1. Male
2. Female
3. Child




4. What are the wages in kind ? Specify

1. Male
2. Female
3. Child

|  |
|--|
|  |
|  |
|  |

5. Are you able to get labour on time

1. Yes
2. No

B. S.

A. S.



5a. If no what are the reasons

1. Overall Labour supply is deficient.
2. Labour has shifted to non-agirculture in village
3. Labour has migrated to towns.
4. Women workers not available.
5. Family incomes have risen
6. More children go to school.
7. Other reasons (specify)

|                          |                          |                          |                          |                          |                          |                          |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 0                        | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

6 Do you hire the following

| Sl. No. | Item              | Before Shift      |                       | After Shift       |                       |
|---------|-------------------|-------------------|-----------------------|-------------------|-----------------------|
|         |                   | No. of days hired | Rent per day (in Rs.) | No. of days hired | Rent per day (in Rs.) |
| 1.      | Tractor           |                   |                       |                   |                       |
| 2.      | Plough            |                   |                       |                   |                       |
| 3.      | Pumpset           |                   |                       |                   |                       |
| 4.      | Bullockcart       |                   |                       |                   |                       |
| 5.      | Sprinkler Sprayer |                   |                       |                   |                       |
| 6.      | Others (specify)  |                   |                       |                   |                       |



|                          |                          |                          |                          |                          |                          |                          |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 0                        | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

### BLOCK—IX

NOTE : This block pertains if the respondent gives the answer '2' for the question No. 2 of Block-VIII

1. a) What are the reasons for the retained amount being inadequate ?

1. Land owned is limited in size
2. Land is not fertile
3. Land is unusable
4. Family size is too large
5. Most of the crop sold to meet debts/other expenses
6. Others (Specify)

b) Do you purchase the grain for family use ?

1. Yes (go to Qns. No. c)
2. No (go to Qns. No. d)

c) If yes, how much do you spend on the extra grain per month.

Rs.

d) If No.; how does the family adjust with less quantum of grain ?

1. By borrowing for the season
2. By Economising/reducing consumption
3. Through earning in kind from labour on other's farms
4. Otherways (specify)

2. When the price of grain goes up, how would you manage ?

1. By substituting cheaper grain (probe)
2. By postponing or reducing consumption of other items (probe)
3. By working more days/hours to earn money
4. By procuring the grain on credit
5. Otherways (specify)

3r Do you find purchasing grain costlier than cost of cultivating the crop ?

1. Yes
2. No

3. If yes specify why purchasing grain is costly ?

1. Village as a whole is in deficit
2. Local merchant makes too much profit
3. Too many middlemen taking commission
4. Paying out costs have increased
5. Buying on credit hence more expensive
6. Others

4. If costs have risen what are the reasons ?

1. Labour demands more wage
2. Cost of seeds and levelling the land is high
3. Expenditure on other related inputs of agriculture is high
4. Others (specify)



|                          |                          |                          |                          |                          |                          |                          |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 0                        | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

**BLOCK—X**

**REASONS FOR THE CHANGE IN CROPPING PATTERN :-**

1. When did you shift the cropping pattern from subsistence to cash crops.  
(specify the year)

2. What are the reasons for the change in cropping pattern ?

- 01. Anticipating more income
- 02. Availability of water
- 03. Due to suitability of the soil/climate
- 04. Due to the incentives provided by the Government
- 05. Due the availability of market in the vicinity.
- 06. Since the other farmers cultivate the land for commercial crops.
- 07. Commercial farming involves less amount of labour and cost.
- 08. Due to availability of specialised skills and equipment.
- 09. Due to the usage of new inputs.
- 10. Due to easy accessibility of credit.
- 11. To improve land quality
- 12. Others (specify)

|                          |                          |                          |                          |
|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|--------------------------|--------------------------|--------------------------|--------------------------|

2. Are you cultivating for both own-use and sale ?

- 1. Yes
- 2. No

If yes : why ?

- 1. It is better to have grain and money income
- 2. Have sufficient land to do both
- 3. Due to good irrigation facility
- 4. Labour is available sufficiently
- 5. Due to the suitability of land
- 6. Others (specify)

**BLOCK XI**

1. Have you purchased the following after shifting the cropping Pattern.

1. Yes                      2. No

|     |                                    |  |  |
|-----|------------------------------------|--|--|
| 01. | Bullocks                           |  |  |
| 02. | Agriculture Impliments (Specify)   |  |  |
| 03. | Tractor                            |  |  |
| 04. | Motor vehicle/Bycle                |  |  |
| 05. | Radio/T. Recorder                  |  |  |
| 06. | Television                         |  |  |
| 07. | Telephone                          |  |  |
| 08. | Airconditioner                     |  |  |
| 09. | House (including new construction) |  |  |
| 10. | Milch Cows                         |  |  |
| 11. | Others specify                     |  |  |

2. Have you purchased land after the shift ?

1. Yes    2. No

2a. If yes : give the following information.

| Sl. No. | No. of Kuntas/ acres purchased | Year of Purchase | Purchase price (in Rs) | Purpose of purchase (Code-A) | Income generated approx (if any) |
|---------|--------------------------------|------------------|------------------------|------------------------------|----------------------------------|
| 1.      |                                |                  |                        |                              |                                  |
| 2.      |                                |                  |                        |                              |                                  |
| 3.      |                                |                  |                        |                              |                                  |

Code-A

1. Cultivation    2. House Construction    3. Industrial purpose    4. Others (specify)

|                          |                          |                          |                          |                          |                          |                          |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 0                        | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

## BLOCK XII

### PRESENT DIET PATTERN OF THE HOUSEHOLD

1. What is the staple food of the family ?

1. Rice
2. Ragi
3. Wheat
4. Jowar
5. Others (specify)

2. CONSUMPTION EXPENDITURE ON FOOD AND RELATED ITEMS :

1. FOOD GRAINS :

| Sl. No. | Item             | Quantity used by the family per month (in Kgs) | Whether (put ✓ mark) |            | Amount spent per month (in Rs.) |
|---------|------------------|--|----------------------|------------|---------------------------------|
|         |                  |  | grown                | pur-chased |                                 |
| 01      | Rice             |  |                      |            |                                 |
| 02      | Ragi             |  |                      |            |                                 |
| 03      | Jowar            |  |                      |            |                                 |
| 04      | Bajra            |  |                      |            |                                 |
| 05      | Wheat            |  |                      |            |                                 |
| 06      | Maize            |  |                      |            |                                 |
| 07      | Others (specify) |  |                      |            |                                 |
| Total   |                  |  |                      |            |                                 |

2. PULSES :

|       |                  |  |  |  |  |
|-------|------------------|--|--|--|--|
| 08    | Tur dal          |  |  |  |  |
| 09    | Green gram       |  |  |  |  |
| 10    | Horse gram       |  |  |  |  |
| 11    | Black gram       |  |  |  |  |
| 12    | Bengal gram      |  |  |  |  |
| 13    | Spring beans     |  |  |  |  |
| 14    | Others (specify) |  |  |  |  |
| Total |                  |  |  |  |  |

|   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|
| 0 | 1 | 2 | 3 | 4 | 5 | 6 |
|   |   |   |   |   |   |   |

3. a) VEGETABLES AND GREENS (SPECIFY) :

| Sl. No. | Item | Quantity used by the family per month (in Kgs) | Whether (put $\checkmark$ mark) |            | Amount spent per month (in Rs.) |
|---------|------|--|---------------------------------|------------|---------------------------------|
|         |      |  | grown                           | pur-chased |                                 |
| 15      |      |  |                                 |            |                                 |
| 16      |      |  |                                 |            |                                 |
| 17      |      |  |                                 |            |                                 |
| 18      |      |  |                                 |            |                                 |
| 19      |      |  |                                 |            |                                 |
| Total   |      |  |                                 |            |                                 |

B) FRUITS : (Specify)

|       |  |  |  |  |  |
|-------|--|--|--|--|--|
| 20    |  |  |  |  |  |
| 21    |  |  |  |  |  |
| 22    |  |  |  |  |  |
| 23    |  |  |  |  |  |
| 24    |  |  |  |  |  |
| Total |  |  |  |  |  |

4. MILK, MILK PRODUCTS & BEVERAGES

|       |                  |  |  |  |  |
|-------|------------------|--|--|--|--|
| 25    | Milk             |  |  |  |  |
| 26    | Curd             |  |  |  |  |
| 27    | Ghee             |  |  |  |  |
| 28    | Butter           |  |  |  |  |
| 29    | Coffee           |  |  |  |  |
| 30    | Tea              |  |  |  |  |
| 31    | Others (specify) |  |  |  |  |
| Total |                  |  |  |  |  |

5. NUTS & EDIBLE OILS :

|       |                              |  |  |  |  |
|-------|------------------------------|--|--|--|--|
| 32    | Coconut (both dry and fresh) |  |  |  |  |
| 33    | Groundnut                    |  |  |  |  |
| 34    | Groundnut oil                |  |  |  |  |
| 35    | Coconut oil                  |  |  |  |  |
| 36    | Others (specify)             |  |  |  |  |
| Total |                              |  |  |  |  |

6. MEAT / FISH / EGG :

| Sl. No. | Item             | Quantity used by the family per month (in Kgs) | whether (put $\checkmark$ mark) |            | Amount spent per month (in Rs.) |
|---------|------------------|--|---------------------------------|------------|---------------------------------|
|         |                  |  | grown                           | pur-chased |                                 |
| 37      | Meat             |  |                                 |            |                                 |
| 38      | Fish             |  |                                 |            |                                 |
| 39      | Eggs             |  |                                 |            |                                 |
| 43      | Others (specify) |  |                                 |            |                                 |

Total

7. SPICES & CONDIMENTS (Packaged)

|    |                  |  |  |  |  |
|----|------------------|--|--|--|--|
| 41 | Pickles          |  |  |  |  |
| 42 | Sauce            |  |  |  |  |
| 43 | Spices           |  |  |  |  |
| 44 | Others (specify) |  |  |  |  |

Total

8. SWEETS

|    |            |  |  |  |  |
|----|------------|--|--|--|--|
| 45 | Sugar      |  |  |  |  |
| 46 | Gur        |  |  |  |  |
| 47 | Sweetmeats |  |  |  |  |

Total

Grand Total

3. OTHER CONSUMPTION EXPENDITURE OF THE HOUSEHOLD :

| Sl. No. | Particulars                                     | Amount spent in Rs. per month | Amount spent in Rs. per annum |
|---------|---|-------------------------------|-------------------------------|
| 1       | Schooling/Education                             |                               |                               |
| 2       | Travelling                                      |                               |                               |
| 3       | Clothing  |                               |                               |
| 4       | Medical Services including purchase of medicine |                               |                               |
| 5       | Festivals/other social-obligations              |                               |                               |
| 6       | Personal habits (Cigarettes, alcohol etc)       |                               |                               |
| 7       | Fuel  |                               |                               |
| 8       | Marriages                                       |                               |                               |
| 9       | Funerals  |                               |                               |
| 10      | Others (specify)                                |                               |                               |
|         | TOTAL   |                               |                               |

|                          |                          |                          |                          |                          |                          |                          |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 0                        | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

### BLOCK XIII

#### DIET PATTERN - BEFORE SHIFT

1. What is the staple food of the family ?

1. Rice
2. Ragi
3. Wheat
4. Jowar
5. Others (specify)

2. CONSUMPTION EXPENDITURE ON FOOD AND RELATED ITEMS :

1. FOOD GRAINS :

| Sl. No. | Item             | Quantity used by the family per month (in Kgs) | Whether (put ✓ mark) |            | Amount spent per month (in Rs.) |
|---------|------------------|--|----------------------|------------|---------------------------------|
|         |                  |  | grown                | pur-chased |                                 |
| 01      | Rice             |  |                      |            |                                 |
| 02      | Ragi             |  |                      |            |                                 |
| 03      | Jowar            |  |                      |            |                                 |
| 04      | Bajra            |  |                      |            |                                 |
| 05      | Wheat            |  |                      |            |                                 |
| 06      | Maize            |  |                      |            |                                 |
| 07      | Others (specify) |  |                      |            |                                 |
| Total   |                  |  |                      |            |                                 |

2. PULSES :

|       |                  |  |  |  |  |
|-------|------------------|--|--|--|--|
| 08    | Tur dal          |  |  |  |  |
| 09    | Green gram       |  |  |  |  |
| 10    | Horse gram       |  |  |  |  |
| 11    | Black gram       |  |  |  |  |
| 12    | Bengal gram      |  |  |  |  |
| 13    | Spring beans     |  |  |  |  |
| 14    | Others (specify) |  |  |  |  |
| Total |                  |  |  |  |  |

|                          |                          |                          |                          |                          |                          |                          |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 0                        | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

3. a) VEGETABLES AND GREENS (SPECIFY) :

| Sl. No. | Item | Quantity used by the family per month (in Kgs) | Whether (put $\checkmark$ mark) |            | Amount spent per month (in Rs.) |
|---------|------|--|---------------------------------|------------|---------------------------------|
|         |      |  | grown                           | pur-chased |                                 |
| 15      |      |  |                                 |            |                                 |
| 16      |      |  |                                 |            |                                 |
| 17      |      |  |                                 |            |                                 |
| 18      |      |  |                                 |            |                                 |
| 19      |      |  |                                 |            |                                 |
| Total   |      |  |                                 |            |                                 |

b) FRUITS : (Specify)

|       |  |  |  |  |  |
|-------|--|--|--|--|--|
| 20    |  |  |  |  |  |
| 21    |  |  |  |  |  |
| 22    |  |  |  |  |  |
| 23    |  |  |  |  |  |
| 24    |  |  |  |  |  |
| Total |  |  |  |  |  |

4. MILK, MILK PRODUCTS & BEVERAGES

|       |                  |  |  |  |  |
|-------|------------------|--|--|--|--|
| 25    | Milk             |  |  |  |  |
| 26    | Curd             |  |  |  |  |
| 27    | Ghee             |  |  |  |  |
| 28    | Butter           |  |  |  |  |
| 29    | Coffee           |  |  |  |  |
| 30    | Tea              |  |  |  |  |
| 31    | Others (specify) |  |  |  |  |
| Total |                  |  |  |  |  |

5. NUTS & EDIBLE OILS :

|       |                              |  |  |  |  |
|-------|------------------------------|--|--|--|--|
| 32    | Coconut (both dry and fresh) |  |  |  |  |
| 33    | Groundnut                    |  |  |  |  |
| 34    | Groundnut oil                |  |  |  |  |
| 35    | Coconut oil                  |  |  |  |  |
| 36    | Others (specify)             |  |  |  |  |
| Total |                              |  |  |  |  |

|   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|
| 0 | 1 | 2 | 3 | 4 | 5 | 6 |
|   |   |   |   |   |   |   |

| Sl. No. | Item | Quantity used by the family per month (in Kgs) | Whether (put $\checkmark$ mark) |            | Amount spent per month (in Rs.) |
|---------|------|--|---------------------------------|------------|---------------------------------|
|         |      |  | grown                           | pur-chased |                                 |

6. MEAT/FISH/EGG :

|       |                  |  |  |  |  |
|-------|------------------|--|--|--|--|
| 37    | Meat             |  |  |  |  |
| 38    | Fish             |  |  |  |  |
| 39    | Eggs             |  |  |  |  |
| 43    | Others (specify) |  |  |  |  |
| Total |                  |  |  |  |  |

7. SPICES & CONDIMENTS (Packaged)

|       |                  |  |  |  |  |
|-------|------------------|--|--|--|--|
| 41    | Pickles          |  |  |  |  |
| 42    | Sauce            |  |  |  |  |
| 43    | Spices           |  |  |  |  |
| 44    | Others (specify) |  |  |  |  |
| Total |                  |  |  |  |  |

8. SWEETS

|             |            |  |  |  |  |
|-------------|------------|--|--|--|--|
| 45          | Sugar      |  |  |  |  |
| 46          | Gur        |  |  |  |  |
| 47          | Sweetmeats |  |  |  |  |
| Total       |            |  |  |  |  |
| Grand Total |            |  |  |  |  |

3. If there any difference in consumption pattern after shifting the cropping pattern.

1. Yes

2. No

3a. If yes ; spesify the reaon

|  |
|--|
|  |
|  |



|   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|
| 0 | 1 | 2 | 3 | 4 | 5 | 6 |
|   |   |   |   |   |   |   |

**BLOCK-XIV**

**PARTICULARS ABOUT FAMILY PLANNING :**

| Sl. No. of woman   |  |  |  |  |  |
|--|--|--|--|--|--|
| 1. Age at marriage   |  |  |  |  |  |
| 2. Do you Know family planning methods?<br>1. Yes 2. No                      |  |  |  |  |  |
| If yes; what is the source (Code-A)  |  |  |  |  |  |
| 3. Are you presently practising family planning methods ?<br>1. Yes 2. No    |  |  |  |  |  |
| a) If yes; what are they ? (Code-B)  |  |  |  |  |  |
| b) How long have you been practising (Specify the year)                      |  |  |  |  |  |
| 4. If the Ans. is 2 in Qs. No. 3, Why? (Code-C)                              |  |  |  |  |  |
| 5. Are you planning to use family planning methods in future<br>1. Yes 2. No |  |  |  |  |  |
| 6. Have you had an induced abortion<br>1. Yes 2. No                          |  |  |  |  |  |

- Code-A**
- Hospital or Health Centres
  - Doctor/Midwife
  - Friend and Relatives
  - Through Publicity Media (Radio & Cinema)
  - Printed Material
  - Others (specify)

- Code-B**
- vasectomy
  - Tubectomy
  - Contraceptives
  - Conventional
  - Others(Specify)

- Code-c**
- Due to Health Problem
  - Resistance from husband/ Members of the family
  - Lack of interest not to practise / interest to have more number of Children
  - Using Contraceptives
  - Other(specify)

**BLOCK--XV**

**INFORMATION ON GENERAL GYNAECOLOGICAL PROBLEMS OF WOMEN**

| ITEM   | SERIAL NUMBER OF WOMEN |  |  |  |
|--|------------------------|--|--|--|
|  |                        |  |  |  |
| 1. Do you have any gynaecological problem<br>1. Yes      2. No<br><br>a) If yes ; of what nature (Code-A)  |                        |  |  |  |
| 2. If the answer is 1<br>a) How often do you get discharge (Code-B)<br><br>b) Where do you get the treatment (Code-C)  |                        |  |  |  |
| 3. If the answer is 2 in Q. No. 1 (a)<br>a) Are your periods regular<br>1. Yes      2. No<br><br>b) Do you have any problems during your menstrual periods<br>1. Yes      2. No<br><br>c) If yes ; of what nature (Code-D) |                        |  |  |  |
| 4. If the answer is 3 in Q. No. 1 (a)<br>a) How often do you suffer from the infection (Code-E)<br><br>b) Where did you receive treatment (Code C)   |                        |  |  |  |

- CODE-A : 1. Vaginal discharge    2. Menstrual discomfort    3. Bladder infection
- CODE-B : 1. Weekly    2. Fortnightly    3. Monthly    4. Once in 3 months    5. Once in 6 months  
 6. 1-2 years    7. 2-4 years    8. After 4 years
- CODE-C : 1. PHC/Govt. Hospital's name    2. Elderly person in the family/village    3. Local dais  
 4. Religious Treatment    5. Others specify
- CCODE-D : 1. Abdominal pain    2. Backache    3. Any other (specify)
- CODE-E : 1. Once a year    2. Twice a year    3. Once in 2 years    4. 3 to 4 years  
 5. 5 years & above



**BLOCK-XVII**  
**PRE-NATAL CARE**

Particulars of Pre-natal and post-natal care of the mothers having children below 3 years

1. Whether the mother was registered for prenatal care  
 1. Yes                      2. No

| Sl. No. of the Mother | Where registered (Code) |             | Duration of treatment (in months) |             |
|-----------------------|-------------------------|-------------|-----------------------------------|-------------|
|                       | Before Shift            | After Shift | Before shift                      | After shift |
|                       |                         |             |                                   |             |

CODE :

1. In Govt. hospital/PHC/Maternity home
2. With private doctor/Hospital
3. With auxiliary nurse
4. Nursing home
5. Others (specify)

2. Specify the food taken by mother during pre-natal stage :

| Sl. No. of the Mother | Food taken (enter the code) |             |
|-----------------------|-----------------------------|-------------|
|                       | Before shift                | After shift |
|                       |                             |             |

- |                    |           |               |
|--------------------|-----------|---------------|
| 1. More of cereals | 3. Pulses | 5. Vegetables |
| 2. Green leaves    | 4. Meat   | 6. Others     |

|                      |                      |                      |                      |                      |                      |                      |
|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| 0                    | 1                    | 2                    | 3                    | 4                    | 5                    | 6                    |
| <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |

### 3. MEDICAL ATTENDENCE AND CHILD BIRTH

| Sl. No. of the Mother as in block-1 | Sl. No. of the Child as in block-1 | Before shift                      |                         | After shift                       |                         |
|-------------------------------------|------------------------------------|-----------------------------------|-------------------------|-----------------------------------|-------------------------|
|                                     |                                    | Person assisted delivery (code-A) | Place of birth (code-B) | Person assisted delivery (code-A) | Place of birth (code-B) |
| <input type="text"/>                | <input type="text"/>               | <input type="text"/>              | <input type="text"/>    | <input type="text"/>              | <input type="text"/>    |

CODE-A

- |                   |                     |
|-------------------|---------------------|
| 1. Private Doctor | 4. Local Dai        |
| 2. Govt. Doctor   | 5. Relatives        |
| 3. ANM/Nurse      | 6. Others (specify) |

CODE-B

- |                   |                     |
|-------------------|---------------------|
| 1. PHC/Sub-centre | 4. Home             |
| 2. Govt. Hospital | 5. Private Clinic   |
| 3. ESI Hospital   | 6. Others (specify) |

4. If 'other place' /at home, specify the reasons for not going to Government Hospital.

- |                  |                                       |
|------------------|---------------------------------------|
| 1. By preference | 3. Not available in the neighbourhood |
| 2. Too expensive | 4. Others (specify)                   |

5. Do you generally take the food :

- |                      |                         |
|----------------------|-------------------------|
| 1. After feeding all | 3. Together with others |
| 2. Separately        | 4. Others (specify)     |

### 6. KIND OF FOOD AND MEDICINE GIVEN TO MOTHER(S)

Specify the food you give/gave to mother after the child birth (for the first 28 days)

| Sl. No. of Mother    | Food given to mother(s) (specify) |                      |
|----------------------|-----------------------------------|----------------------|
|                      | Before shift                      | After shift          |
| <input type="text"/> | <input type="text"/>              | <input type="text"/> |

6a. food given from 28th day till the end of 3rd month

| Sl. No. of mother | Food given to mother(s) (specify) |             |
|-------------------|-----------------------------------|-------------|
|                   | Before shift                      | After shift |
|                   |                                   |             |

7. What was the system of medicine followed on mother after delivery.

- |               |              |                     |                          |                          |
|---------------|--------------|---------------------|--------------------------|--------------------------|
| 1. Allopathy  | 3. Ayurvedic | 5. Religious        | B. S.                    | A. S.                    |
| 2. Homeopathy | 4. Unani     | 6. Others (specify) | <input type="checkbox"/> | <input type="checkbox"/> |

8. What was the medicine given to mother(s) after delivery ?

| Sl. No. of mother as in Block-1 | Medicine given for the first 28 days |       | Medicine given from 28th day till the 3rd month |       |
|---------------------------------|--------------------------------------|-------|---|-------|
|                                 | B. S.                                | A. S. | B. S.   | A. S. |
|                                 |                                      |       |   |       |

POST NATAL CARE

1. Whether the mother (s) was/were registered for post-natal care

1. Yes      2. No

a) If yes; source of treatment

| Sl. No. of the mother | Source of treatment |       |
|-----------------------|---------------------|-------|
|                       | B. S.               | A. S. |
|                       |                     |       |

- |                                |                         |
|--------------------------------|-------------------------|
| 1. Hospital/PHC/Maternity home | 3. With auxiliary nurse |
| 2. With doctor                 |                         |

|                      |                      |                      |                      |                      |                      |                      |
|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| 0                    | 1                    | 2                    | 3                    | 4                    | 5                    | 6                    |
| <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |

2. Specify the number of times mother was attended for post-natal care (specify in number)

| Sl. No. of mother | Medical Attendance |             |
|-------------------|--------------------|-------------|
|                   | Before shift       | After shift |
|                   |                    |             |

**BLOCK-XVIII**

**GENERAL HEALTH OF WOMEN :**

Have the women in the family been suffering from the following diseases :

| Sl. No. of the women | Kind of disease (code-A) | How long (in years) | Source of treatment (code-B) |
|----------------------|--------------------------|---------------------|------------------------------|
|                      |                          |                     |                              |

**CODE-A**

1. Anaemia
2. Epilepsy
3. Dysentery
4. Diabetes
5. Heart disease
6. ENT related
7. Dental
8. Piles
9. Others (specify)

**CODE-B**

1. PHC/Govt. Hospital
2. Private Doctor
3. Auxiliary nurse
4. Nursing home
5. Others (specify)



**BLOCK-XIX**

**NUTRITION OF CHILDREN**

**1. Children's food practices (0-5 years)**

**Before the shift**

| Sl. No. of the child as in block-1 | Milk<br>1. Breast milk<br>2. Animal milk<br>3. Powder milk<br>4. Others (specify) | Other foods given to child<br>1. Malts<br>2. Semi solid foods<br>3. Fruits<br>4. Others (specify) | After what period was the child weaned ?<br>1. 1 year<br>2. 2 years<br>3. 3 years<br>4. Above 3 years |
|------------------------------------|---|---|---|
|                                    |   |   |   |

**After the shift**

| Sl. No. of the child as in block-1 | Milk<br>1. Breast milk<br>2. Animal milk<br>3. Powder milk<br>4. Others (specify) | Other foods given to child<br>1. Malts<br>2. Semi solid foods<br>3. Fruits<br>4. Others (specify) | After what period was the child weaned ?<br>1. 1 years<br>2. 2 years<br>3. 3 years<br>4. Above 3 years |
|------------------------------------|---|---|--|
|                                    |   |   |  |

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| 0 | 1 | 2 | 3 | 4 | 5 |
|   |   |   |   |   |   |

BLOCK—XX

A. INCIDENCE OF DISEASE

| Sl. No. of the child | Kind of disease (Code-A) | How long has the child been suffering (in years) | Source of treatment (Code-B) |
|----------------------|--------------------------|--|------------------------------|
|                      |                          |  |                              |

CODE-A

- |                   |                      |
|-------------------|----------------------|
| 1. Chicken pox    | 7. Cholera           |
| 2. Measles        | 8. Tuberculosis      |
| 3. Whooping cough | 9. Pneumonia         |
| 4. Tetanus        | 10. Influenza        |
| 5. Diarrhoea      | 11. Malaria          |
| 6. Jaundice       | 12. Others (specify) |

CODE-B

1. PHC/Govt. Hospital
2. Private Doctor
3. Auxiliary nurse
4. Nursing home
5. Others (specify)

B. What are the other protective foods you give/have given to your children from 0 to 5 years.

| Sl. No. | Sl. No. of the Child | Specify the protective food given |             |
|---------|----------------------|-----------------------------------|-------------|
|         |                      | Before shift                      | After shift |
| 1       |                      | 1.<br>2.<br>3.<br>4.<br>5.        |             |
| 2       |                      | 1.<br>2.<br>3.<br>4.<br>5.        |             |
| 3       |                      | 1.<br>2.<br>3.<br>4.<br>5.        |             |

Ins. to Investigator :

1. The following protein-rich foods are Protective foods

- |                           |                             |                      |                            |         |
|---------------------------|-----------------------------|----------------------|----------------------------|---------|
| 1) Jowar                  | 2) Maize                    | 3) Wheat             | 4) Pulses (all the pulses) | 4) Ragi |
| 6) Green leafy vegetables | 7) Nuts (Badam, cashew etc) | 8) Milk and milk pro |                            |         |
| 9) Egg                    | 10) Fish                    | 11) Chicken and meat |                            |         |

|                          |                          |                          |                          |                          |                          |                          |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 0                        | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

**C. IMMUNISATION :**

1. Have you had your child immunised

1. Yes
2. No

If yes; give the following information :

| Sl. No. of the child       |  |  |  |  |  |
|----------------------------|--|--|--|--|--|
| <b>A. POLIO</b>            |  |  |  |  |  |
| 1. Vaccine taken           |  |  |  |  |  |
| 1. Yes 2. No               |  |  |  |  |  |
| 2. Booster dose taken      |  |  |  |  |  |
| 1. Yes 2. No               |  |  |  |  |  |
| 3. Year of administration  |  |  |  |  |  |
| 4. Place of administration |  |  |  |  |  |
| <b>B. TRIPLE ANTIGEN</b>   |  |  |  |  |  |
| 1. Vaccine taken           |  |  |  |  |  |
| 1. Yes 2. No               |  |  |  |  |  |
| 2. Booster dose taken      |  |  |  |  |  |
| 1. Yes 2. No               |  |  |  |  |  |
| 3. Year of Administration  |  |  |  |  |  |
| 4. Place of Administration |  |  |  |  |  |
| <b>C. B. C. C.</b>         |  |  |  |  |  |
| 1. Vaccine taken           |  |  |  |  |  |
| 1. Yes 2. No               |  |  |  |  |  |
| 2. Booster dose taken      |  |  |  |  |  |
| 1. Yes 2. No               |  |  |  |  |  |
| 3. Year of Administration  |  |  |  |  |  |
| 4. Place of Administration |  |  |  |  |  |
| <b>D. TYPHOID</b>          |  |  |  |  |  |
| 1. Vaccine taken           |  |  |  |  |  |
| 1. Yes 2. No               |  |  |  |  |  |
| 2. Booster dose taken      |  |  |  |  |  |
| 1. Yes 2. No               |  |  |  |  |  |
| 3. Year of Administration  |  |  |  |  |  |
| 4. Place of administration |  |  |  |  |  |

**BLOCK-XXI**

**CONTROL OVER INCOMES :**

**1. Who controls over the income of your family**

- 1. Self
- 2. Mother
- 3. Wife
- 4. Son
- 5. Daughter
- 6. Others (specify)

**2. Whether you/he/she spends sufficiently on food for the family**

- 1. Yes
- 2. No

a) If No; what are the reasons ?

- 1. Total income is low
- 2. Family is too large
- 3. High indebtedness
- 4. The head of the household spends income for personal use
- 5. Others (specify)

**3. Does the family have any savings**

- 1. Yes (If yes; go to next Q.)
- 2. No

a) if yes; Where ?

- 1. Post Office
- 2. Co-operative Society
- 3. National Saving Certificate
- 4. Bank
- 5. Others (specify)

b) When was it opened ?

Specify the year

c) In whose name ?

- 1. Head of the family
- 2. Others (specify)



d) Has the shift helped you to add to savings or open new account

- 1. Yes
- 2. No

e) Is any member of the family insured

- 1. Yes
- 2. No

f) If yes; furnish the following

| Sl. No. of the person insured | When was it insured (specify the year) | Amount Insured (in Rs.) | Mode of payment<br>1. Monthly<br>2. Quarterly<br>3. Half yearly<br>4. Others |
|-------------------------------|--|-------------------------|--|
|                               |  |                         |  |

**BLOCK-XXII**

**INDEBTEDNESS :**

| Sl. No. | Institution          | Total Amount borrowed (in Rs.) | Purpose of borrowing (code) | Year of borrowing (specify the year) | Amount Outstanding (in Rs.) | Subsidy (if any) | Rate of interest |
|---------|----------------------|--------------------------------|-----------------------------|--------------------------------------|-----------------------------|------------------|------------------|
| 1.      | Commercial Bank      |                                |                             |                                      |                             |                  |                  |
| 2.      | Grameena Bank        |                                |                             |                                      |                             |                  |                  |
| 3.      | Co-operative Society |                                |                             |                                      |                             |                  |                  |
| 4.      | Land Mortgage Bank   |                                |                             |                                      |                             |                  |                  |
| 5.      | Private borrowing    |                                |                             |                                      |                             |                  |                  |

- CODE :
- 01. Crop loan
  - 02. Sericulture
  - 03. Land development/purchase of pumpsets etc)
  - 04. Borewell & to dig a well
  - 05. To purchase agricultural inputs (fertilizers, seeds, etc)
  - 06. Construction purpose
  - 07. Purchase of livestock
  - 08. Agro based industries (Gobar gas, poultry etc)
  - 09. Purchase of bullock cart
  - 10. Others (specify)

|                          |                          |                          |                          |                          |                          |                          |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 0                        | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

**BLOCK-XXIII**

**INFORMATION OF PERSONAL HABITS**

| Sl. No. of the person | Habit (Code) | Since how long have you have/had this habit | Total expenditure/month (in Rs.) |
|-----------------------|--------------|---|----------------------------------|
|                       |              |   |                                  |

**CODE :**

1. Smoking
2. Tobacco/pan chewing
3. Snuff inhaling
4. Alcohol
5. Others (specify)



|                          |                          |                          |                          |                          |                          |                          |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 0                        | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

**BLOCK-XXV**

General observations by the Investigator :

**Guidelines**

1. Whether the standard of living of the household is high/medium/low etc.
2. Whether the respondent is giving correct information without any prejudice/bias etc.
3. Any important thing the investigator wishes to record after cross examining the informant





Appendix - III

(Ref.Ch.IV pp 117-123 and Ch.VI pp 193-195)

- (i) This Appendix contains the regressions for each of the sample districts and villages, corresponding to the aggregative (i.e for 550 households) regressions discussed in the text.
- (ii) There are two sets of regressions, one relating to Gross Farm Income (FIN) and the other relating to daily Per Capita Energy Consumption (PENE). The Symbols used for district regressions are the same as in the text Vol.I (Main Report).

|        |         |  |
|--------|---------|--|
| Ch. IV | FIN =   | Gross Farm Income                                    |
|        | TLO =   | Total Land Owned                                     |
|        | LUC =   | Land Used for Commercial Crops:<br>Proportion of TLO |
|        | COMIN = | Income from Commercial Crops:<br>Proportion of FIN   |
|        | PFE =   | Paid Out Farm Expenses                               |
|        | FTE =   | Fertilizer Expenditure: Proportion<br>of PFE         |
| Ch. VI | PENE =  | Daily Per capita Energy Consumption                  |
|        | TLO =   | Total Land Owned                                     |
|        | LUC =   | Land Used for Commercial Crops:<br>Proportion of TLO |
|        | HHS =   | Household Size                                       |
|        | GRIN =  | Gross Income   |
|        | HHE =   | Gross Household Expenditure                          |



(OVERALL REGRESSIONS)

$$\text{PENE} = 1.465 + 0.664 \text{ TLO} - 0.0014 \text{ LAND} + 0.3779 \text{ HHS} + 1.48\text{E-}05 \text{ GRIN}$$

(5.659) (4.599) (-0.616) (15.785) (7.726)

$$R^2 = 0.5681, R^{-2} = 0.5649, \text{ D.F.}=545.$$

$$\text{PENE} = 1.013 + 0.0307 \text{ TLO} - 0.0003 \text{ LAND} + 0.3266 \text{ HHS} + 5.34\text{E-}05 \text{ ANULEXP}$$

(4.344) (2.463) (-0.161) (14.711) (13.764)

$$R^2 = 0.6444, R^{-2} = 0.6418, \text{ D.F.}=545.$$

CHITRADURGA

$$\text{PENE} = 1.3774 + 0.4851 \text{ TLO} - 0.0049 \text{ LAND} + 0.3698 \text{ HHS} + 1.75\text{E-}05 \text{ GRIN}$$

(5.659) (4.599) (-0.616) (15.785) (5.908)

$$R^2 = 0.7094, R^{-2} = 0.6962, \text{ D.F.}=88.$$

$$\text{PENE} = 0.9309 + 0.0148 \text{ TLO} - 0.0031 \text{ LAND} + 0.3352 \text{ HHS} + 5.99\text{E-}05 \text{ ANULEXP}$$

(1.804) (0.670) (-0.665) (6.162) (9.271)

$$R^2 = 0.7947, R^{-2} = 0.7854, \text{ D.F.}=88.$$

DODDAULLARTHY

$$\text{PENE} = 2.9643 + 0.0147 \text{ TLO} + 0.2298 \text{ LAND} - 0.0086 \text{ HHS} + 2.04\text{E-}05 \text{ GRIN}$$

(2.496) (0.322) (1.921) (-0.959) (4.538)

$$R^2 = 0.6969, R^{-2} = 0.6681, \text{ D.F.}=42.$$

$$\text{PENE} = 2.0177 + 0.0090 \text{ TLO} + 0.2083 \text{ LAND} - 0.0039 \text{ HHS} + 6.48\text{E-}05 \text{ ANULEXP}$$

(2.362) (0.316) (2.316) (-0.588) (8.290)

$$R^2 = 0.8287, R^{-2} = 0.8124, \text{ D.F.}=42.$$

NANNIVALA

$$\text{PENE} = 0.1567 + 0.8383 \text{ TLO} - 6.74\text{E-}04 \text{ LAND} + 0.4825 \text{ HHS} + 1.2\text{E-}05 \text{ GRIN}$$

(0.282) (2.808) (-0.111) (8.936) (1.084)

$$R^2 = 0.7790, R^{-2} = 0.7575, \text{ D.F.}=41.$$

$$\text{PENE} = 0.1389 + 0.0775 \text{ TLO} - 6.1\text{E-}05 \text{ LAND} + 0.4831 \text{ HHS} + 1.3\text{E-}05 \text{ ANULEXP}$$

(0.250) (0.104) (-0.100) (8.894) (0.976)

$$R^2 = 0.7779, R^{-2} = 0.7562, \text{ D.F.}=41.$$

DAKSHINA KANNADA

$$\text{PENE} = 2.6836 - 0.0179 \text{ TLO} - 0.0022 \text{ LAND} + 0.4030 \text{ HHS} + 1.27\text{E-}05 \text{ GRIN}$$

(-0.216) (-0.263) (-5.597) (1.762) (2.953)

$$R^2 = 0.3699, R^{-2} = 0.3409, \text{ D.F.}=87.$$

$$\text{PENE} = 1.1047 - 0.0402 \text{ TLO} - 0.0013 \text{ LAND} + 0.2344 \text{ HHS} + 1.22\text{E-}05 \text{ ANULEXP}$$

(1.553) (-0.983) (-0.207) (3.919) (7.953)

$$R^2 = 0.3699, R^{-2} = 0.3409, \text{ D.F.}=87.$$

ARANTHOD

$$\text{PENE} = 0.8346 + 0.0248 \text{ TLO} - 5.99\text{E-}04 \text{ LAND} + 0.4533 \text{ HHS} + 5.81\text{E-}05 \text{ GRIN}$$

(0.628) (0.203) (-0.050) (4.070) (4.220)

$$R^2 = 0.6703, R^{-2} = 0.6381, \text{ D.F.}=41.$$

$$\text{PENE} = -0.5374 - 0.0328 \text{ TLO} + 0.0073 \text{ LAND} + 0.3815 \text{ HHS} + 1.29\text{E-}04 \text{ ANULEXP}$$

(-0.460) (-0.300) (0.694) (3.789) (5.808)

$$R^2 = 0.7405, R^{-2} = 0.7152, \text{ D.F.}=41.$$

JALSOOR

$$\text{PENE} = 3.3432 + 0.0640 \text{ TLO} + 0.0024 \text{ LAND} + 0.2673 \text{ HHS} + 2.97\text{E-}06 \text{ GRIN}$$

(2.927) (0.603) (0.229) (2.913) (0.328)

$$R^2 = 0.2757, R^{-2} = 0.2050, \text{ D.F.}=41.$$

$$\text{PENE} = 1.6465 - 0.0201 \text{ TLO} - 0.0021 \text{ LAND} + 0.1751 \text{ HHS} + 1.11\text{E-}04 \text{ ANULEXP}$$

(1.681) (-0.419) (-0.261) (2.312) (4.794)

$$R^2 = 0.5347, R^{-2} = 0.4893, \text{ D.F.}=41.$$

DHARWAD

$$\text{PENE} = 1.5076 + 0.2059 \text{ TLO} + 0.0031 \text{ LAND} + 0.1949 \text{ HHS} + 2.22\text{E-}05 \text{ GRIN}$$

(2.679) (4.419) (0.559) (3.611) (1.592)

$$R^2 = 0.6501, R^{-2} = 0.6332, \text{ D.F.}=83.$$

$$\text{PENE} = -0.4050 - 0.0165 \text{ TLO} + 0.0026 \text{ LAND} + 0.0601 \text{ HHS} + 2.15\text{E-}04 \text{ ANULEXP}$$

(-0.907) (-0.434) (0.655) (1.461) (9.056)

$$R^2 = 0.8186, R^{-2} = 0.8099, \text{ D.F.}=83.$$

DEVIKOPPA

$$\text{PENE} = 1.6219 + 0.3340 \text{ TLO} - 0.0031 \text{ LAND} + 0.2352 \text{ HHS} - 1.51\text{E-}05 \text{ GRIN}$$

(1.630) (4.852) (-0.296) (2.520) (-0.734)

$$R^2 = 0.7609, R^{-2} = 0.7350, \text{ D.F.}=37.$$

$$\text{PENE} = -0.1701 - 0.0072 \text{ TLO} - 0.0056 \text{ LAND} + 0.0368 \text{ HHS} + 2.22\text{E-}04 \text{ ANULEXP}$$

(-0.226) (-0.132) (-0.753) (0.536) (6.280)

$$R^2 = 0.8826, R^{-2} = 0.8699, \text{ D.F.}=37.$$

GANGIGATTI

$$\text{PENE} = 1.7785 + 0.0523 \text{ TLO} + 0.0031 \text{ LAND} + 3.19\text{E-}05 \text{ HHS} + 0.2347 \text{ GRIN}$$

(2.739) (0.805) (0.519) (1.431) (3.256)

$$R^2 = 0.5052, R^{-2} = 0.4569, \text{ D.F.}=41.$$

$$\text{PENE} = 0.1059 - 0.1023 \text{ TLO} + 0.0029 \text{ LAND} + 0.1226 \text{ HHS} + 1.94\text{E-}04 \text{ ANULEXP}$$

(0.187) (-1.799) (0.645) (2.245) (5.799)

$$R^2 = 0.7146, R^{-2} = 0.6867, \text{ D.F.}=41.$$

KOLAR

$$\text{PENE} = 1.3277 + 0.1536 \text{ TLO} - 0.0026 \text{ LAND} + 0.3383 \text{ HHS} + 5.74\text{E-}06 \text{ GRIN}$$

(2.660)      (2.710)      (-0.667)      (7.013)      (1.378)

$$R^2 = 0.5783, R^{-2} = 0.5591, \text{ D.F.}=88.$$

$$\text{PENE} = 1.0178 + 0.1136 \text{ TLO} - 0.0027 \text{ LAND} + 0.3353 \text{ HHS} + 2.60\text{E-}05 \text{ ANULEXP}$$

(2.043)      (2.078)      (-0.709)      (7.152)      (2.561)

$$R^2 = 0.5991, R^{-2} = 0.5809, \text{ D.F.}=88.$$

KUDIYANUR

$$\text{PENE} = 0.7279 + 0.1879 \text{ TLO} + 5.28\text{E-}05 \text{ LAND} + 0.3019 \text{ HHS} + 1.75\text{E-}05 \text{ GRIN}$$

(1.137)      (2.611)      (0.009)      (4.611)      (2.316)

$$R^2 = 0.7583, R^{-2} = 0.7347, \text{ D.F.}=41.$$

$$\text{PENE} = 0.1552 + 0.1868 \text{ TLO} + 2.7463 \text{ LAND} + 0.2402 \text{ HHS} + 7.64\text{E-}05 \text{ ANULEXP}$$

(0.264)      (2.999)      (0.052)      (3.691)      (3.593)

$$R^2 = 0.7921, R^{-2} = 0.7718, \text{ D.F.}=41.$$

LAKKUR

$$\text{PENE} = 2.6609 + 0.0763 \text{ TLO} - 0.0057 \text{ LAND} + 0.2718 \text{ HHS} + 4.59\text{E-}06 \text{ GRIN}$$

(3.313)      (0.871)      (-1.086)      (3.384)      (0.842)

$$R^2 = 0.3649, R^{-2} = 0.3044, \text{ D.F.}=42.$$

$$\text{PENE} = 2.2761 + 0.02 \text{ TLO} - 0.0006 \text{ LAND} + 0.2763 \text{ HHS} + 2.49\text{E-}05 \text{ ANULEXP}$$

(2.823)      (0.238)      (-1.184)      (3.543)      (1.808)

$$R^2 = 0.4008, R^{-2} = 0.3438, \text{ D.F.}=42.$$



MANDYA

$$\text{PENE} = 1.1491 + 0.3352 \text{ TLO} - 7.99\text{E-}04 \text{ LAND} + 0.3721 \text{ HHS} + 2.68\text{E-}06 \text{ GRIN}$$

(1.764) (2.929) (-0.106) (5.708) (0.156)

$$R^2 = 0.6349, R^{-2} = 0.6179, \text{ D.F.}=86.$$

$$\text{PENE} = 1.0611 + 0.1279 \text{ TLO} - 0.0044 \text{ LAND} + 0.3098 \text{ HHS} + 5.01\text{E-}05 \text{ ANULEXP}$$

(1.778) (1.769) (-0.651) (5.149) (3.988)

$$R^2 = 0.6918, R^{-2} = 0.6775, \text{ D.F.}=86.$$

C.A.KERE

$$\text{PENE} = -0.0088 + 0.2373 \text{ TLO} + 0.0045 \text{ LAND} + 0.4856 \text{ HHS} + 1.85\text{E-}05 \text{ GRIN}$$

(-0.007) (1.533) (0.341) (4.706) (0.758)

$$R^2 = 0.7305, R^{-2} = 0.7036, \text{ D.F.}=40.$$

$$\text{PENE} = 0.2187 + 0.1174 \text{ TLO} + 0.0031 \text{ LAND} + 0.3853 \text{ HHS} + 5.44\text{E-}05 \text{ ANULE}$$

(0.191) (0.987) (0.230) (3.534) (2.244)

$$R^2 = 0.7573, R^{-2} = 0.7329, \text{ D.F.}=40.$$

HOSAKERE

$$\text{PENE} = 2.5875 + 0.0713 \text{ TLO} - 0.009 \text{ LAND} + 0.2391 \text{ HHS} + 1.71\text{E-}05 \text{ GRIN}$$

(3.763) (0.336) (-1.182) (3.135) (0.659)

$$R^2 = 0.4201, R^{-2} = 0.3639, \text{ D.F.}=41.$$

$$\text{PENE} = 2.2879 - 0.0043 \text{ TLO} - 0.0126 \text{ LAND} + 0.2382 \text{ HHS} + 4.78\text{E-}05 \text{ ANULE}$$

(3.911) (-0.474) (-1.989) (4.027) (4.081)

$$R^2 = 0.5835, R^{-2} = 0.5428, \text{ D.F.}=41.$$

### RAICHUR

$$\text{PENE} = 1.5080 + 0.0135 \text{ TLO} - 0.0062 \text{ LAND} + 0.4518 \text{ HHS} + 1.74\text{E-}05 \text{ GRIN}$$

(2.840)      (0.430)      (-1.214)      (9.538)      (2.499)

$$R^2 = 0.6915, R^{-2} = 0.6775, \text{ D.F.}=88.$$

$$\text{PENE} = 1.2201 + 0.0198 \text{ TLO} - 0.0046 \text{ LAND} + 0.4211 \text{ HHS} + 3.07\text{E-}05 \text{ ANULE}$$

(2.409)      (0.867)      (-0.954)      (9.053)      (3.878)

$$R^2 = 0.7178, R^{-2} = 0.7050, \text{ D.F.}=88.$$

### HOSAHALLI

$$\text{PENE} = 1.0889 - 0.0513 \text{ TLO} - 0.0052 \text{ LAND} + 0.5254 \text{ HHS} + 2.63\text{E-}05 \text{ GRIN}$$

(1.208)      (-0.805)      (-0.696)      (6.002)      (2.084)

$$R^2 = 0.7061, R^{-2} = 0.6781, \text{ D.F.}=42.$$

$$\text{PENE} = 0.3247 + 0.0154 \text{ TLO} - 0.0023 \text{ LAND} + 0.5559 \text{ HHS} + 2.53\text{E-}05 \text{ ANULE}$$

(0.385)      (0.403)      (-0.315)      (6.721)      (2.021)

$$R^2 = 0.7044, R^{-2} = 0.6763, \text{ D.F.}=42.$$

### PAGADADINNI

$$\text{PENE} = 2.2890 + 0.0871 \text{ TLO} - 0.0055 \text{ LAND} + 0.3471 \text{ HHS} + 5.1\text{E-}07 \text{ GRIN}$$

(3.728)      (2.528)      (-0.839)      (6.982)      (0.043)

$$R^2 = 0.7353, R^{-2} = 0.7094, \text{ D.F.}=41.$$

$$\text{PENE} = 2.0428 + 0.0307 \text{ TLO} - 0.0055 \text{ LAND} + 0.2892 \text{ HHS} + 3.8\text{E-}05 \text{ ANULEXP}$$

(4.180)      (1.396)      (-1.024)      (6.819)      (0.043)

$$R^2 = 0.7353, R^{-2} = 0.7094, \text{ D.F.}=41.$$

(District Sample Chitradurga)

Regression I(i):  $FIN=C+a_1TLO+a_2LUC+a_3COMIN+a_4PFE+a_5FTE$

| Explanatory Variables | Values of Co-efficients for |                      |                         |                          |               |
|-----------------------|-----------------------------|----------------------|-------------------------|--------------------------|---------------|
|                       | All Households              | Marginal Farmers     | Small Farmers           | Med-to-large Farmers     | Co-efficients |
| TLO                   | -1011.2018<br>(-1.481)      | 168.7494<br>(0.89)   | 3101.3768<br>(2.254)    | -1259.7505<br>(-0.905)   | $a_1$         |
| LUC                   | 20.8692<br>(0.125)          | 25.2155<br>(0.721)   | 40.5298<br>(1.163)      | 581.5269<br>(0.885)      | $a_2$         |
| COMIN                 | 222.4101<br>(0.919)         | -33.2022<br>(-0.443) | 22.5304<br>(0.427)      | 587.8246<br>(0.788)      | $a_3$         |
| PFE                   | 8.6152<br>(13.117)          | 1.3578<br>(0.943)    | 1.9024<br>(2.293)       | 8.8657<br>(7.443)        | $a_4$         |
| FTE                   | 279.1641<br>(1.530)         | 48.8193<br>(1.316)   | 43.9484<br>(0.984)      | 770.8783<br>(1.520)      | $a_5$         |
| C                     | -29725.7368<br>(-1.627)     | 2301.7883<br>(0.320) | -10124.6829<br>(-1.693) | -111790.3195<br>(-1.996) | C             |
| $R^2$                 | 0.86942                     | 0.41321              | 0.39299                 | 0.8757                   | $R^2$         |
| $R^2$                 | 0.86191                     | -0.00592             | 0.32073                 | 0.8518                   | $R^2$         |
| D-W Test              | 1.9630                      | 2.6636               | 2.0410                  | 1.5583                   | D-W Test      |
| Total Cases           | 93                          | 13                   | 48                      | 32                       | Total Cases   |

Figures in brackets are T-values)

(District Sample D.Kannada)

Regression I(ii):  $FIN=C+a_1TLO+a_2LUC+a_3COMIN+a_4PFE+a_5FTE$

| Explanatory Variables | Values of Co-efficients for |                        |                         |                        |               |
|-----------------------|-----------------------------|------------------------|-------------------------|------------------------|---------------|
|                       | All Households              | Marginal Farmers       | Small Farmers           | Med-to-large Farmers   | Co-efficients |
| TLO                   | -8658.0715<br>(12.806)      | 6886.0917<br>(2.664)   | -1022.3570<br>(-0.179)  | 9674.9172<br>(6.144)   | $a_1$         |
| LUC                   | 248.7345<br>(2.306)         | 181.0190<br>(2.642)    | 96.4807<br>(0.376)      | -1105.5817<br>(-1.260) | $a_2$         |
| COMIN                 | -70.6323<br>(-0.500)        | -105.7559<br>(-1.227)  | 523.1320<br>(1.493)     | -2855.4185<br>(-1.296) | $a_3$         |
| PFE                   | 2.2940<br>(2.959)           | 1.0521<br>(1.829)      | 5.3893<br>(2.201)       | 7.7269<br>(2.859)      | $a_4$         |
| FTE                   | 92.8601<br>(1.516)          | 33.6403<br>(0.948)     | 259.2694<br>(1.178)     | 1369.3421<br>(2.897)   | $a_5$         |
| C                     | -<br>23957.2292<br>(-1.683) | -5101.5165<br>(-0.544) | -44695.7252<br>(-1.313) | 268759.1432<br>(0.966) | C             |
| $R^2$                 | 0.78602                     | 0.25082                | 0.58392                 | 0.89993                | $R^2$         |
| $R^2$                 | 0.77358                     | 0.18271                | 0.39480                 | 0.83739                | $R^2$         |
| D-W Test              | 0.77358                     | 1.7048                 | 2.53925                 | 1.07222                | D-W Test      |
| Total Cases           | 92                          | 61                     | 17                      | 14                     | Total Cases   |

(Figures in brackets are T-values)

(District Sample Dharwad)

Regression I (iii):  $FIN = C + a_1TLO + a_2LUC + a_3COMIN + a_4PFE + a_5FTE$

| Explanatory Variables | Values of Co-efficients for |                      |                        |                         |                |
|-----------------------|-----------------------------|----------------------|------------------------|-------------------------|----------------|
|                       | All Households              | Marginal Farmers     | Small Farmers          | Med-to-large Farmers    | Co-efficients  |
| TLO                   | 1436.5044<br>(4.848)        | 2033.1698<br>(2.089) | -4350.2544<br>(-0.225) | 1473.3094<br>(2.177)    | $a_1$          |
| LUC                   | 5.8668<br>(0.154)           | 6.7675<br>(0.625)    | -17.9142<br>(-0.348)   | 82.3305<br>(0.372)      | $a_2$          |
| COMIN                 | 11.5009<br>(0.291)          | -12.8754<br>(-0.950) | 24.9560<br>(0.688)     | -123.9131<br>(-0.804)   | $a_3$          |
| PFE                   | 4.1707<br>(4.389)           | -0.2506<br>(-0.741)  | 1.1119<br>(0.741)      | 5.9739<br>(3.076)       | $a_4$          |
| FTE                   | 72.5471<br>(1.737)          | -26.1534<br>(-1.808) | 22.6571<br>(0.561)     | 188.9217<br>(1.266)     | $a_5$          |
| C                     | -10866.0228<br>(-2.387)     | 1480.8724<br>(0.693) | 5829.1608<br>(0.585)   | -25090.5832<br>(-1.442) | C              |
| R <sup>2</sup>        | 0.69747                     | 0.35519              | 0.03453                | 0.76924                 | R <sup>2</sup> |
| R <sup>2</sup>        | 67.902                      | 0.18550              | -0.12119               | 0.71155                 | R <sup>2</sup> |
| D-W Test              | 1.76569                     | 2.02270              | 2.16789                | 1.16890                 | D-W Test       |
| Total Cases           | 88                          | 25                   | 37                     | 26                      | Total Cases    |

(Figures in brackets are T-values)

## (District Sample Kolar)

Regression I(iv):  $FIN=C+a_1TLO+a_2LUC+a_3COMIN+a_4PFE+a_5FTE$ 

| Explanatory Variables | Values of Co-efficients for |                        |                         |                         |               |
|-----------------------|-----------------------------|------------------------|-------------------------|-------------------------|---------------|
|                       | All Households              | Marginal Farmers       | Small Farmers           | Med-to-large Farmers    | Co-efficients |
| TLO                   | 5437.4867<br>(7.579)        | 1108.5111<br>(0.535)   | 1594.2263<br>(0.762)    | 5311.5556<br>(1.951)    | $a_1$         |
| LUC                   | -113.4194<br>(-1.407)       | 92.4752<br>(2.022)     | -118.0866<br>(-1.397)   | -503.1167<br>(-1.687)   | $a_2$         |
| COMIN                 | 512.4324<br>(2.783)         | 57.2348<br>(0.376)     | 392.9781<br>(3.493)     | 1090.2819<br>(1.354)    | $a_3$         |
| PFE                   | 1.3013<br>(6.795)           | 0.5570<br>(4.652)      | 1.9310<br>(4.321)       | 1.6590<br>(3.328)       | $a_4$         |
| FTE                   | 78.4542<br>(1.295)          | 7.3984<br>(0.200)      | 203.5231<br>(1.681)     | 84.5059<br>(0.539)      | $a_5$         |
| C                     | -45584.9100                 | -6170.0597<br>(-0.453) | -25520.5983<br>(-1.999) | -79024.9100<br>(-1.060) | C             |
| $R^2$                 | 0.74441                     | 0.41926                | 0.74916                 | 0.71084                 | $R^2$         |
| $R^2$                 | 0.72972                     | 0.34078                | 0.69215                 | 0.62047                 | $R^2$         |
| D-W Test              | 1.92340                     | 2.23383                | 2.30671                 | 1.87476                 | D-W Test      |
| Total Cases           | 93                          | 43                     | 28                      | 22                      | Total Cases   |

(Figures in brackets are T-values)

(District Sample Mandya)

Regression I(v):  $FIN=C+a_1TLO+a_2LUC+a_3COMIN+a_4PFE+a_5FTE$

| Explanatory Variables | Values of Co-efficients for |                         |                         |                         |                |
|-----------------------|-----------------------------|-------------------------|-------------------------|-------------------------|----------------|
|                       | All Households              | Marginal Farmers        | Small Farmers           | Med-to-large Farmers    | Co-efficients  |
| TLO                   | 6959.9731<br>(15.215)       | 7850.4685<br>(6.985)    | 5966.2219<br>(1.174)    | 6032.9460<br>(3.741)    | $a_1$          |
| LUC                   | -29.4685<br>(-0.546)        | -72.1377<br>(-2.256)    | 226.6664<br>(1.117)     | 570.2564<br>(0.893)     | $a_2$          |
| COMIN                 | 239.1441<br>(3.015)         | 269.9945<br>(5.083)     | 226.4430<br>(1.051)     | 220.2193<br>(0.292)     | $a_3$          |
| PFE                   | -0.3213<br>(-1.388)         | 0.5300<br>(1.875)       | 0.4431<br>(0.634)       | -0.9455<br>(-1.534)     | $a_4$          |
| FTE                   | 10.2203<br>(0.247)          | 49.5324<br>(1.692)      | 20.0534<br>(0.171)      | -11.2848<br>(-0.037)    | $a_5$          |
| C                     | -10198.2728<br>(-1.829)     | -16918.7981<br>(-3.468) | -23197.3067<br>(-1.040) | -15958.1422<br>(-0.444) | C              |
| R <sup>2</sup>        | 0.88752                     | 0.59608                 | 0.57356                 | 0.9183                  | R <sup>2</sup> |
| R <sup>2</sup>        | 0.88091                     | 0.56126                 | 0.37973                 | 0.8162                  | R <sup>2</sup> |
| D-W Test              | 1.83729                     | 1.59963                 | 1.69179                 | 1.99557                 | D-W Test       |
| Total Cases           | 91                          | 64                      | 17                      | 10                      | Total Cases    |

(Figures in brackets are T-values)

(District Sample Raichur)

Regression I (vi) :  $FIN=C+a_1TLO+a_2LUC+a_3COMIN+a_4PFE+a_5FTE$

| Explanatory Variables | Values of Co-efficients for |                       |                        |                         |               |
|-----------------------|-----------------------------|-----------------------|------------------------|-------------------------|---------------|
|                       | All Households              | Marginal Farmers      | Small Farmers          | Med-to-large Farmers    | Co-efficients |
| TLO                   | 3090.8855<br>(12.720)       | 6566.7217<br>(2.268)  | -2320.2159<br>(-0.411) | 2149.7502<br>(6.288)    | $a_1$         |
| LUC                   | 68.0271<br>(1.051)          | -103.0089<br>(-2.543) | -15.9681<br>(-0.291)   | 366.0226<br>(1.937)     | $a_2$         |
| COMIN                 | -0.9142<br>(-0.44)          | -0.8268<br>(-0.123)   | -49.4325<br>(-0.844)   | -128.5929<br>(-0.704)   | $a_3$         |
| PFE                   | 0.7253<br>(4.988)           | 0.0520<br>(0.989)     | 42.2956<br>(0.475)     | 65.1285<br>(0.341)      | $a_4$         |
| FTE                   | 196.0525<br>(2.458)         | 101.1626<br>(2.800)   | 42.2956<br>(0.475)     | 65.1285<br>(0.341)      | $a_5$         |
| C                     | -14471.1642<br>(-2.284)     | 311.4627<br>(0.043)   | 19663.6289<br>(0.839)  | -25743.3674<br>(-2.317) | C             |
| $R^2$                 | 0.79269                     | 0.54411               | 0.26412                | 0.93546                 | $R^2$         |
| $R^2$                 | 0.78078                     | 0.45969               | 0.09687                | 0.92305                 | $R^2$         |
| D-W Test              | 1.86054                     | 2.09304               | 2.29976                | 2.19359                 | D-W Test      |
| Total Cases           | 93                          | 33                    | 28                     | 32                      | Total Cases   |

(Figures in brackets are T-values)



(District Sample Chitradurga)

Regression II(i):  $FIN=C+a_2LUC+a_3COMIN+a_4PFE+a_5FTE$

| Explanatory Variables | Values of Co-efficients for |                      |                     |                          |                |
|-----------------------|-----------------------------|----------------------|---------------------|--------------------------|----------------|
|                       | All Households              | Marginal Farmers     | Small Farmers       | Med-to-large Farmers     | Co-efficients  |
| LUC                   | 63.1612<br>(0.383)          | 24.4572<br>(0.771)   | 26.3670<br>(0.735)  | 727.8447<br>(1.147)      | $a_2$          |
| COMIN                 | 193.9486<br>(0.798)         | -32.7929<br>(-0.469) | 41.2872<br>(0.757)  | 427.1445<br>(0.592)      | $a_3$          |
| PFE                   | 7.769<br>(23.844)           | 1.4046<br>(1.120)    | 2.5068<br>(3.051)   | 7.9309<br>(13.391)       | $a_4$          |
| FTE                   | 248.6091<br>(1.362)         | 50.2229<br>(1.600)   | 49.2305<br>(1.055)  | 700.9742<br>(1.403)      | $a_5$          |
| C                     | -33812.9562<br>(-1.860)     | 2593.2589<br>(0.434) | 119.0132<br>(0.029) | -117669.9630<br>(-2.123) | C              |
| R <sup>2</sup>        | 0.86613                     | 0.41256              | 0.31954             | 0.87176                  | R <sup>2</sup> |
| R <sup>2</sup>        | 0.86004                     | 0.11883              | 0.25624             | 0.85276                  | R <sup>2</sup> |
| D-W Test              | 1.95855                     | 2.65948              | 2.03521             | 1.51530                  | D-W Test       |
| Total Cases           | 93                          | 13                   | 48                  | 32                       | Total Cases    |

(Figures in brackets are T-values)

(District Sample D.Kannada)

Regression II(ii):  $FIN=C+a_2LUC+a_3COMIN+a_4PFE+a_5FTE$

| Explanatory Variables | Values of Co-efficients for |                      |                         |                        |                |
|-----------------------|-----------------------------|----------------------|-------------------------|------------------------|----------------|
|                       | All Households              | Marginal Farmers     | Small Farmers           | Med-to-large Farmers   | Co-efficients  |
| LUC                   | 171.3949<br>(0.939)         | 163.8388<br>(2.281)  | 114.8922<br>(0.510)     | -2132.2451<br>(-1.097) | $a_2$          |
| COMIN                 | -199.3224<br>(-0.835)       | -94.2468<br>(-1.039) | 504.9518<br>(1.570)     | -6374.0816<br>(-1.329) | $a_3$          |
| PFE                   | 7.6748<br>(6.948)           | 1.1545<br>(1.910)    | 5.2436<br>(2.368)       | 13.0987<br>(2.272)     | $a_4$          |
| FTE                   | 124.2253<br>(1.197)         | 43.7425<br>(1.177)   | 248.2013<br>(1.225)     | 1360.7250<br>(1.277)   | $a_5$          |
| C                     | 7486.3339<br>(0.315)        | 5720.4066<br>(0.642) | -47643.4686<br>(-1.667) | 776273.4084<br>(1.294) | C              |
| R <sup>2</sup>        | 0.737796                    | 0.15412              | 0.58271                 | 0.42770                | R <sup>2</sup> |
| P <sup>2</sup>        | 0.34936                     | 0.09370              | 0.44361                 | 0.17335                | R <sup>2</sup> |
| D-W Test              | 1.66674                     | 1.62805              | 2.51893                 | 1.69851                | D-W Test       |
| Total Cases           | 92                          | 61                   | 17                      | 14                     | Total Cases    |

(Figures in brackets are T-values)

(District Sample Dharwad)

Regression II(iii):  $FIN=C+a_2LUC+a_3COMIN+a_4PFE+a_5FTE$

| Explanatory Variables | Values of Co-efficients for |                      |                      |                         |               |
|-----------------------|-----------------------------|----------------------|----------------------|-------------------------|---------------|
|                       | All Households              | Marginal Farmers     | Small Farmers        | Med-to-large Farmers    | Co-efficients |
| LUC                   | -48.1890<br>(-1.172)        | -5.9324<br>(-0.613)  | -14.1543<br>(-0.296) | -153.9168<br>(-0.735)   | $a_2$         |
| COMIN                 | 22.1200<br>(0.496)          | -12.2672<br>(-0.838) | 24.3118<br>(0.682)   | -29.2185<br>(-0.182)    | $a_3$         |
| PFE                   | 7.5374<br>(10.306)          | -0.0672<br>(-0.190)  | 1.0759<br>(0.732)    | 8.9850<br>(6.074)       | $a_4$         |
| FTE                   | 129.7652<br>(2.874)         | -16.8066<br>(-1.130) | 23.8756<br>(0.606)   | 289.7427<br>(1.882)     | $a_5$         |
| C                     | -10323.9778<br>(-2.013)     | 5123.2555<br>(3.840) | 3994.6798<br>(0.709) | -17859.5042<br>(-0.964) | C             |
| $R^2$                 | 0.61075                     | 0.20712              | 0.03296              | 0.71458                 | $R^2$         |
| $R^2$                 | 0.59199                     | 0.04854              | 0.08792              | 0.66021                 | $R^2$         |
| D-W Test              | 2.10321                     | 2.17609              | 2.16982              | 1.29449                 | D-W Test      |
| Total Cases           | 88                          | 25                   | 37                   | 26                      | Total Cases   |

(Figures in brackets are T-values)

## (District Sample Kolar)

Regression II(iv):  $FIN=C+a_2LUC+a_3COMIN+a_4PFE+a_5FTE$ 

| Explanatory Variables | Values of Co-efficients for |                        |                         |                         |               |
|-----------------------|-----------------------------|------------------------|-------------------------|-------------------------|---------------|
|                       | All Households              | Marginal Farmers       | Small Farmers           | Med-to-large Farmers    | Co-efficients |
| LUC                   | -144.9366<br>(-1.406)       | 88.8916<br>(1.984)     | -130.1126<br>(-1.594)   | -357.8452<br>(-1.148)   | $a_2$         |
| COMIN                 | 399.8254<br>(1.701)         | 63.3846<br>(0.421)     | 397.9015<br>(3.587)     | 1032.8167<br>(1.189)    | $a_3$         |
| PFE                   | 2.1115<br>(10.372)          | 0.5627<br>(4.763)      | 1.8523<br>(4.347)       | 2.2257<br>(5.090)       | $a_4$         |
| FTE                   | 105.4594<br>(1.361)         | 3.9909<br>(0.110)      | 220.9889<br>(1.892)     | 43.1604<br>(0.258)      | $a_5$         |
| C                     | -17536.4201<br>(-0.903)     | -4600.7189<br>(-0.349) | -18903.6750<br>(-2.355) | -41404.3277<br>(-0.533) | C             |
| $R^1$                 | 0.57565                     | 0.41477                | 0.74401                 | 0.64204                 | $R^2$         |
| $R^2$                 | 0.55636                     | 0.35317                | 0.69949                 | 0.55781                 | $R^2$         |
| D-W Test              | 1.61576                     | 2.18269                | 2.32377                 | 1.52724                 | D-W Test      |
| Total Cases           | 93                          | 43                     | 28                      | 22                      | Total Cases   |

(Figures in brackets are T-values)

## (District Sample Mandya)

Regression II (v) :  $FIN=C+a_2LUC+a_3COMIN+a_4PFE+a_5FTE$ 

| Explanatory Variables | Values of Co-efficients for |                        |                        |                       |               |
|-----------------------|-----------------------------|------------------------|------------------------|-----------------------|---------------|
|                       | All Households              | Marginal Farmers       | Small Farmers          | Med-to-large Farmers  | Co-efficients |
| LUC                   | -77.9893<br>(-0.755)        | -125.0837<br>(-2.991)  | 270.4941<br>(1.336)    | 1777.7686<br>(1.701)  | $a_2$         |
| COMIN                 | 380.6739<br>(2.519)         | 264.7282<br>(3.705)    | 206.4114<br>(0.946)    | -619.0337<br>(-0.496) | $a_3$         |
| PFE                   | 2.6128<br>(10.649)          | 1.1481<br>(3.178)      | 0.7403<br>(1.120)      | 0.7605<br>(0.967)     | $a_4$         |
| FTE                   | 158.3428<br>(2.051)         | 71.0104<br>(1.813)     | -3.0384<br>(-0.026)    | 269.3058<br>(0.482)   | $a_5$         |
| C                     | -22204.3490<br>(-2.097)     | -6163.6954<br>(-0.990) | -3539.1514<br>(-0.236) | 6497.8517<br>(0.097)  | C             |
| $R^2$                 | 0.58119                     | 0.25626                | 0.52014                | 0.63253               | $R^2$         |
| $R^2$                 | 0.56171                     | 0.20584                | 0.36018                | 0.33855               | $R^2$         |
| D-W Test              | 2.24051                     | 1.87833                | 1.70749                | 2.83178               | D-W Test      |
| Total Cases           | 91                          | 64                     | 17                     | 10                    | Total Cases   |

Figures in brackets are T-values)

(District Sample Raichur)

Regression II (vi):  $FIN=C+a_2LUC+a_3COMIN+a_4PFE+a_5FTE$

| Explanatory Variables | Values of Co-efficients for |                       |                       |                         |               |
|-----------------------|-----------------------------|-----------------------|-----------------------|-------------------------|---------------|
|                       | All Households              | Marginal Farmers      | Small Farmers         | Med-to-large Farmers    | Co-efficients |
| LUC                   | -71.3711<br>(-0.665)        | -133.4034<br>(-3.257) | -13.2260<br>(-0.248)  | 143.2654<br>(0.495)     | $a_2$         |
| COMIN                 | -11.7081<br>(-0.336)        | 2.4340<br>(0.346)     | -53.9680<br>(-0.956)  | -12.8031<br>(-0.045)    | $a_3$         |
| PFE                   | 1.5681<br>(7.206)           | 0.0563<br>(0.999)     | 2.4736<br>(2.077)     | 3.3410<br>(10.651)      | $a_4$         |
| FTE                   | 316.0054<br>(2.373)         | 100.5666<br>(2.598)   | 60.1418<br>(0.788)    | 337.6787<br>(1.166)     | $a_5$         |
| C                     | 6456.9354<br>(0.628)        | 14412.9535<br>(3.730) | 10623.7630<br>(1.345) | -10017.3607<br>(-0.594) | C             |
| $R^2$                 | 0.40715                     | 0.45725               | 0.25847               | 0.83730                 | $R^2$         |
| $R^2$                 | 0.38021                     | 0.37971               | 0.12951               | 0.81320                 | $R^2$         |
| D-W Test              | 1.29611                     | 2.27516               | 2.36460               | 2.36440                 | D-W Test      |
| Total Cases           | 93                          | 33                    | 28                    | 32                      | Total Cases   |

(Figures in brackets are T-values)

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## Appendix - IV

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