THE DETERMINANTS OF RURAL NON-FARM EMPLOYMENT IN TWO VILLAGES OF ANDHRA PRADESH (INDIA)

PRASADA RAO MECHARLA

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Poverty Research Unit at Sussex
University of Sussex
Falmer, Brighton
BN1 9SJ
Tel: 01273 678739
Email:pru@sussex.ac.uk
Website: http://www.sussex.ac.uk/Users/PRU

Abstract

This paper explains the factors which affect rural non-farm employment in two villages; using primary data from the Indian state of Andhra Pradesh, it analyses the reasons for the variations between an agriculturally-developed village and one which is less developed. The survey, conducted during 1993-94 covered a total of 465 households in Veeravalli and 354 households in Anandapuram villages of two districts of A.P. This paper seeks to test 'distress diversification' against ' agricultural growth linkages' as explanations of employment of the propensity of rural people to be involved in the RNFS. Unlike other studies of rural non-farm employment in Asia or Africa, this paper brought together these two opposite hypotheses into a single framework. The data analysis by a detailed household survey on the nature and determinants of the rural non-farm employment supports the hypothesis that growth linkages are the main explanation for high shares in, and the growth of, 'modern' RNFE, and distress diversification for 'traditional' RNFE. It also demonstrates a strong, significant association between traditional RNFE and low literacy and modern RNFE and high literacy.

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Contents

Abbreviations

ADD	: Agricultural Distress Diversification
AGE^2	: Household Head Age Squared
AGL	: Agricultural Growth Linkages
AP	: Andhra Pradesh
ARTEP	: Asian Regional Team for Employment Promotion
ASLH	: Average size of Land Possessed per Household
BC	: Backward Caste
BLs	: Backward Linkages
CD1	: Dummy Variable for Scheduled Caste Household
CD2	: Dummy Variable for Scheduled Tribes Household
CLs	: Consumption Linkages
CV	: Coefficient of Variation
EDUINT	: Interactive Term between Levels of Education and Village Dummy
FC	: Forward Caste
FLs	: Forward Linkages
HH	: Household
HHH	: Household Head
ILO	: International Labour Organisation
K	: Number of parameters used in χ_K^2
Km	: Kilometre
Km2	: Square Kilometre
L^R	: Log-Likelihood Ratio
MAMINT	: Interactive term between March-May season and village dummy
NSS	: National Sample Survey
NSSO	: National Sample Survey Organisation
ODD	: Overall Distress Diversification
ODL	: Overall Development Linkage
OLS	: Ordinary Least Squares
p	: Probability
PAAV	: Per Acre average Value of Farm Output
PWD	: Public Works Department
RGL	: Rural Growth Linkages
RMP	: Registered Medical Practitioner
RNFE	: Rural Non-Farm Employment
RNFS	: Rural Non-Farm Sector
Rs.	: Indian Rupees
RTC	: Road Transport Corporation
SC/ST	: Scheduled Caste and Scheduled Tribe
SD	: Standard Deviation
SE	: Standard Error (of a regression)
SSC	: Secondary School Certificate (new regulations)
SSLC	: Secondary School Leaving Certificate (old regulations)
u	: Disturbance term with the classical properties
UP	: Uttar Pradesh
VD	: Village Dummy
χ_K^2	: Chi- Squared

Glossary of terms

acre	: 2.45 acres = 1 hectare
adda leaves	: used for making plates for meals
anganwadi	: kindergarten helper
bajra	:chickpea
brahmin	: ceremonial caste, highest in the ritual order of the Hindu society
gantilu	: a coarse cereal eaten as a staple food in the uplands
godown	: similar to a warehouse
golla	: shepherd community
harijans	: the traditionally untouchable low castes
harijanwada	: a settlement of harijans at the end of village
jowar	: a coarse cereal
kalasi	: porter
kamma	: a landowner business caste
kapu	: the leading caste
khadi	: hand-woven cloth made of hand-spun yarn
kharif (sarwa)	:the first paddy autumn crop which is grown during June to September in the delta
kirana	: store selling provisions (dry goods)
kutch	: mud path
lakh	: one hundred thousand
madiga/mala	: traditionally an untouchable caste
mandals	: revenue-cum development units
mutta maistry	: foreman
paleru	: permanent servant for farm as well as home
panchayat	: the form of local elected council (self-government) at the village level.
panshop	: a shop selling soft drinks, sweets and cigarettes
parishads	: district peoples' council
purohit	: person who conducts rituals of Hindu religion
rabi (dalwa)	: the second paddy winter crop which is grown during November to March
shandys	: periodic village markets
tapi worker	: mason
toddy	: a drink made from the sap of the palmayra tree
vaisya	: traditional grocer trader in villages

Introduction

The rural non-farm sector was neglected by economists who were mainly working in the two sector growth models (Lewis, 1972; Ranis-Fei, 1961). An explicit effort to incorporate RNFS into a growth paradigm was Mellor's (1976) topic of discussion of agricultural growth linkages (AGL): forward and backward and consumption linkages from agriculture to the non-farm sector. Following on from Mellor's work, Hazell & Haggblade (1991) developed a model designed to estimate the strength of farm and non-farm linkages, based on the hypothesis that the performance of the RNFS is linked to agricultural performance. A substantial share of RNFS involves agro-processing and consumer goods production through forward linkages, and repair and supply of farm inputs through backward linkages. Dominant sectors like trade and services provide largely for rural consumer demand. The growth of RNFE is driven primarily by agricultural growth, while infrastructure also showed a positive impact on RNFE. Poverty is likely to be associated with weak agricultural performance, we also argue that the agricultural distress diversification (ADD) i.e., lower (or slower-growing) agricultural production or 'performance', on cause higher RNFE shares.

This paper seeks to identify differences among households in two villages, that account for differences in the probability that a household has a member who both (1) works for at least 183 days a year, and (2) has his or her main occupation by time in the rural non-farm sector. Next, we look for determinants of differences in probability of a household having such a member in (a) modern, (b) traditional RNFE separately. A central task of this paper is to assess which types of RNFE are associated with ADD and which types with growth linkages.

This paper also analyses the determinants of inter-household differences in RNFE for two villages of AP[1], and highlights households' basic characteristics. Two villages have been analysed in order to see whether there are differences between the villages in the factors influencing non-farm activities (for details see Appendix 1 and 2). Two broad groups of determinants of RNFE participation have been identified in the review of literature: growth linkages from development in agriculture, and distress diversification. A central hypothesis that will be tested in this paper is that quite different factors determine 'traditional' and 'modern' RNFE shares in the total employment. A high traditional rural non-farm share is likely to be associated with low years of education of workers in a household, lower castes, and agricultural indicators suggesting distress diversification. A high modern rural non-farm share is likely to be associated with higher years of education of workers, upper castes and agricultural indicators suggesting rural growth linkages from agriculture.

We therefore hope to contribute to resolving the conflicting explanations of RNFE growth: is it due to 'distress-diversification' into non-farm activities, or to rural growth linkages as explanations of rural non-farm employment, or–more precisely–to the propensity of rural workforce participants in AP to be involved in the RNFS. The 'strict' growth linkages hypothesis is that of agricultural growth linkages (AGL): higher (or a faster growing] agricultural income/output/employment tends to cause more (or faster–growing) nearby rural non-farm share. Then the agricultural distress diversification hypothesis (ADD) is the opposite hypothesis that lower (or slower growing) agricultural production (or 'performance' in agriculture) causes a higher (or faster-growing) RNFE share.

The research will also test a wider 'development linkage/diversification hypothesis' is that of this overall development linkage hypothesis (ODL) is that higher (or faster–growing) development indicators such as literacy, bank branches, urbanisation, tend to cause more (or faster-growing) nearby RNFE. Then on the converse, overall distress diversification hypothesis (ODD) is that lower (or slower-growing) development indicators cause higher (or faster-growing) RNFE share.

Our results suggest that when rural labour is not fully absorbed in the farm sector, the traditional non-farm sector acts as a sponge for overload labour spillover into unproductive

[1] A map of India with the location of Andhra Pradesh is presented on page 5. India is divided into 26 States. AP is a large Southern State with 66.5 million population (Census 1991). It is the fifth State in terms of area (276,254 sq. kms) and of population. The native language is Telugu. AP has 23 districts. It is an agriculturally important state. In casual labour households it is the second in 17 major states in India (the first being Tamil Nadu). It is a state with fast urbanisation and industrialisation.

and low paid (lower than the prevailing wage rates/below subsistence relative to the farm wage) non-farm activities. But the modern RNFS has strong backward and forward production growth linkages and consumption linkages with the farm sector [2].

The factors that influence RNFE at macro (district) and micro (household) levels may be broadly similar but some are particularly significant at the household level. District level studies, by using aggregate data, may miss some of the factors. We discuss the comparison of distinct and household determinants of RNFE shares at the end of this part of the chapter.

In order to analyse the socio-economic characteristics of sample households, we have used simple descriptive statistics: sample mean, coefficient of variations, and t-test of differences in means. To estimate the impact of various factors on non-farm employment at the household level, logit regression analysis for the entire sample of households as well as for sub-samples are used. Marginal effects and impact effects at the mean have been calculated with the help of regression coefficients.

Rural Visakhapatnam is less developed than rural Krishna. This difference in development is also apparent in the two villages selected for our study. The literacy rate in Visakhapatnam is lower than that in Krishna. A larger proportion of workers are dependent on agriculture in the district of Visakhapatnam than in the district of Krishna. Visakhapatnam has also a vast area dedicated to forestry. On the other hand, the area sown is small. The soils of Visakhapatnam are mostly red-earth whereas large tracts of fertile alluviums are present in Krishna.

There is no perennial source of irrigation in Visakhapatnam where agriculture depends mostly on tanks (largely rain-fed) and wells. The Krishna district is dominated by paddy cultivation on irrigated land. In contrast, the agricultural economy of the Visakhapatnam district is dominated by dry-crops such as *bazra*, *ragi*, *jowar*, and groundnut, which are affected by the re-occurrence of droughts. The percentage of area irrigated to total cropped area differs widely between the two districts, since tanks in Anandapuram irrigate most of the area and since tank irrigation is only possible when rainfall is good. The type of irrigation influences the cropping pattern. The major crops grown in Anandapuram are paddy, millet, oil seeds, pulses and sugar cane. In view of these, it is possible to say that Visakhapatnam is relatively under-developed when compared to Krishna.

Similar features distinguish the two villages, Anandapuram and Veeravalli. In Veeravalli, there was no change between 1971-91 in the gender composition of population. In Anandapuram, the gender composition of workers indicated important changes. The proportion of female workers to total female population has increased in both villages. In fact in Anandapuram, both population and the composition of workers have changed. There has been an increase in the proportion of workers to total workers. The number of workers engaged in non-farm activities has increased in occupations which are predominantly unskilled. In Veeravalli there is much change in the occupation-wise distribution of workers. The proximity of an urban area has important implications, by affecting the distribution of workers' wealth. Differences in irrigation sources and cropping patterns in the two villages conform to the differences that are observed in the data at district-wide level for Krishna and Visakhapatnam.

Following some remarks about the HHs, village and district selection, this paper is divided into three sections. Section 1.1 reviews the socio-economic characteristics of the sample households. Section 1.2 shows that some of these characteristics differ substantially between the two villages whilst others do not; separates HHs into self-employed and wage employed, involvement in modern and traditional RNFE, and introduces the discussion of determinants of RNFE at the household level, describing the variables which are thought to matter and their

[2] Forward linkages (FLs) occur from farming to the RNFS (such as agricultural processing and post-harvest activities). Backward linkages (BLs) are related to agricultural use of local tools etc. These are backward from agriculture to RNFS, i.e. forward from RNFS to agriculture Consumption linkages derive from agricultural income spent on local RNFS consumer goods and services. Mellor (1976) and Hazell (1988) suggest on the basis of empirical evidence that (i) per unit of output, more backward and forward linkages originate from smaller farms, and (ii) that consumption linkages (CLs) are the most powerful of the 3 types of linkages to RNFS, and arise from spending of agricultural income. This, in turn, leads to demand for the local RNFS. These backward and forward production linkages determine local RNFS levels and growth.

expected link with RNFE. Section 1.3 presents the results of logit analyses of data gathered for the two villages and compares the household-level with the district-level determinants of RNFE and explains the differences obtained. Section 1.4 summarises the messages of the paper.

Map 1: India and the location of Andhra Pradesh

1. The salient characteristics of the selected households

1.1 Demographic characteristics

Table 1 provides some basic statistics about the selected HHs in the 2 villages. A caveat here is that little can be inferred about the participation rates because we do not have information about the proportion of (1) persons who are of normal working age, or (2) persons in work (of whatever age) as proportion of the number of persons who are of normal working age. The determinants of (1) and (2) are different so that our comments here are limited. Percentages in the Table below relate to proportions of total population (workers and non-workers, all age groups), therefore, not to proportions of persons of working age or of persons in work.

The average size of the household is significantly lower (at 1 per cent) in the developed village. The proportion of male workers in main occupation is higher (and conversely lower for females) although the total number of main workers in the developed village forms a smaller proportion of all workers than in the underdeveloped village.

Table: 1: Primary statistical information of the sample households:

	Veeravalli	**Anandapuram**
Total number of households surveyed (around 35% of households in each village)	465	354
Total population	1974	1713
Total number of main workers (least 183 days a year) in the sample	795	825
% of main workers in total population (Main workers/total)	40.27%	48.16%
Male main (least 183 days a year) workers % of total main workers	588 74.8%	556 67.5%
Female main (least 183 days a year) workers % of total main workers	207 25.2%	269 32.5%
Average size of sample households [no of households]	4.25 [465]	4.84 [354]

Note: Main workers are those that work 183 days in one or more occupations for males and females.

Source: Field-work.

1.2. Age- and gender distribution of total workers in sample households

The age- and gender- distribution of the sample households are given in Table 2. The Table shows that there is a higher proportion of child workers (aged 5 to 15) in Anandapuram than in Veeravalli. In both villages, most workers are aged 16 to 45; the ratio of females to males is also highest in that age group. While approximately 83 per cent of female workers (in both villages) fall in the 16 to 45 years category, the corresponding percentage for male workers is 69 per cent to 73 per cent (depending on the village). Interestingly, a higher proportion of child workers (8.6 per cent) is found in Anandapuram than in the more-developed Veeravalli (3.1 per cent). This may also be directly linked to a higher incidence of poverty in Anandapuram. Lower levels of income in the less developed village might have forced parents to send their children to work.

Table 2: Age group and gender distribution of household total workers

	Age groups (In years)				
	5-15	**16-45**	**46-60**	**60 above**	**Total**
Veeravalli					
No. of Males (%)	8 (1.36)	408 (69.39)	139 (23.64)	33 (5.61)	588 (100)
No. of Females (%)	2 (0.97)	173 (83.57)	28 (13.53)	4 (1.93)	207 (100)
Total (%)	10 (1.26)	581 (73.08)	167 (21.00)	37 (4.65)	795 (100)
Anandapuram					
No. of Males (%)	23 (4.14)	405 (72.84)	102 (18.35)	26 (4.68)	556 (100)
No. of Females (%)	12 (4.46)	222 (82.53)	34 (12.64)	1 (0.37)	269 (100)
Total (%)	35 (4.24)	627 (76.00)	136 (16.48)	27 (3.27)	825 (100)

Note: The figures in brackets are the percentages of total sample population of the specified age plus gender.

Source: Field Survey.

1.3. Literacy

Table 3: Distribution of main workers by educational attainment:

	Primary (1-5 years)	**Upper Primary (6-7 years)**	**High School (8-10 years)**	**Post Secondary (higher) 10+2+3+2 years**	**Literate total**	**Illiterate total**	**Total**
Veeravalli							
Males	113 (19.22)	60 (10.20)	137 (23.3)	82 (13.95)	392 (66.67)	196 (33.33)	588 (100)
Females	31 (14.98)	5 (2.42)	7 (3.38)	2 (0.97)	45 (21.74)	162 (78.26)	207 (100)
Total	144 (18.11)	65 (8.18)	144 (18.11)	84 (10.57)	437 (54.97)	358 (45.03)	795 (100)
Anandapuram							
Males	101 (18.17)	44 (7.91)	53 (9.53)	25 (4.5)	223 (40.11)	333 (59.89)	556 (100)
Females	18 (6.69)	1 (0.37)	12 (4.46)	3 (1.12)	34 (12.64)	235 (87.36)	269 (100)
Total	119 (14.42)	45 (5.45)	65 (7.88)	28 (3.39)	257 (31.15)	568 (68.85)	825 (100)

Note: Figures in brackets are percentages.

Source: Field-work

There are wide variations in educational attainment among the sampled workers in both villages. In Veeravalli, 55 per cent of the 795 sample workers are literate, as against only 31 per cent of the 825 workers in Anandapuram. The probability of being illiterate is two and half times greater for women workers when compared to men workers in the developed Veeravalli but only one and half times as high in the less-developed Anandapuram.

Table 3. indicates those workers who have completed some years of schooling. Levels of schooling might affect the RNFS by increasing the length of time spent in education. More education might lead to longer duration of RNFS, or it might provide better RNFS opportunities in terms of quality and quantity (i.e., employees work more days and therefore obtain a higher income). A third possibility is that it is faster growth, which leads both to greater literacy and a diversification of employment into RNFS. Fig 1. indicates also that percentage of distribution of workers by education is higher in developed village compared to less developed village.

Those with post-secondary education form around 11 per cent of the workers in the developed village compared to around 3.5 per cent in the less developed village. Also, as noted in several studies, post-primary education (upper primary, high school and post-secondary) is an important contribution factor for productivity in agriculture. (Chalam (1986)) As can be seen from Table 3. the less developed village has fewer members of workers with post-primary education compared to the developed village.

The educational background of workers in different occupations is given in Table 4. This Table specifies the average number of years of schooling by occupation and economic status (poor/ non-poor).

The occupational background of the workers can be broadly divided into cultivators, agricultural labours and non-farm workers. Each group of workers is also categorised further into poor and non-poor, partly so as to examine to what extent educational background of workers is related to this distinction. Non-poor workers have more years of schooling in all the categories of occupations. It is further observed that the average years of schooling is higher in the developed village.

Table 4: Occupation and literacy (males / females) -below and above the poverty line

	Anandapuram				**Veeravalli**			
	No of Males	**Average years of schooling**	**No of Females**	**Average years of schooling**	**No of Males**	**Average years of schooling**	**No of Females**	**Average years of schooling**
Cultivator								
Poor	13	0.29	5	2.0	5	1	0	0
Non-poor	98	2.39	35	0.42	150	5.45	16	2.88
Agricultural Labourers								
Poor	106	1.23	86	0.16	124	2.33	104	0.69
Non-poor	41	1.92	35	0	21	1.95	19	0.37
Non-farm activities								
Poor	85	1.65	29	0.37	42	4.05	5	1.4
Non poor	476	2.62	77	2.13	294	6.85	52	3.15

Source: Field-work

Figure 1

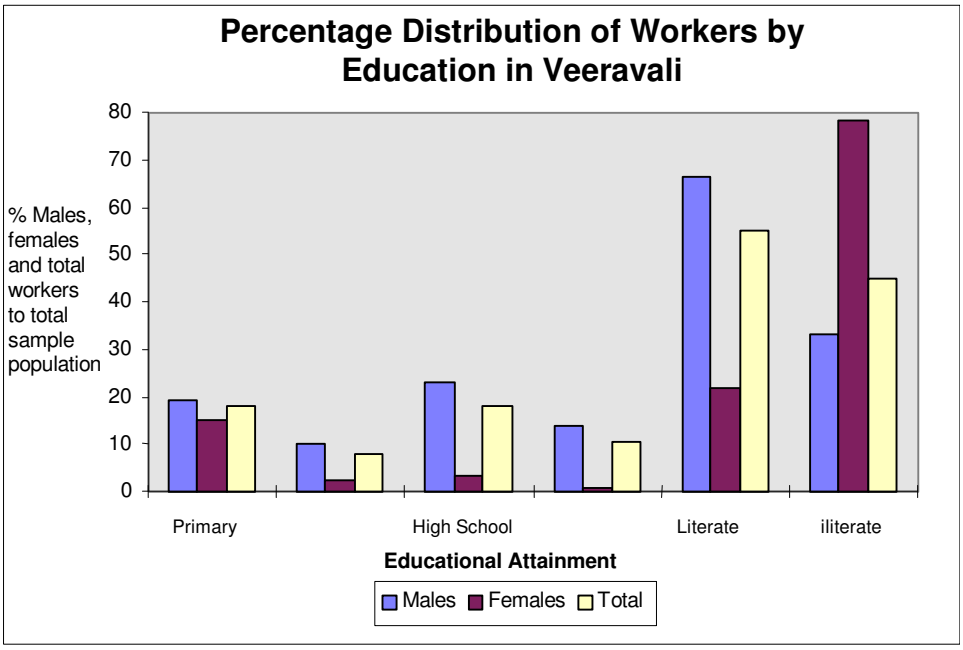
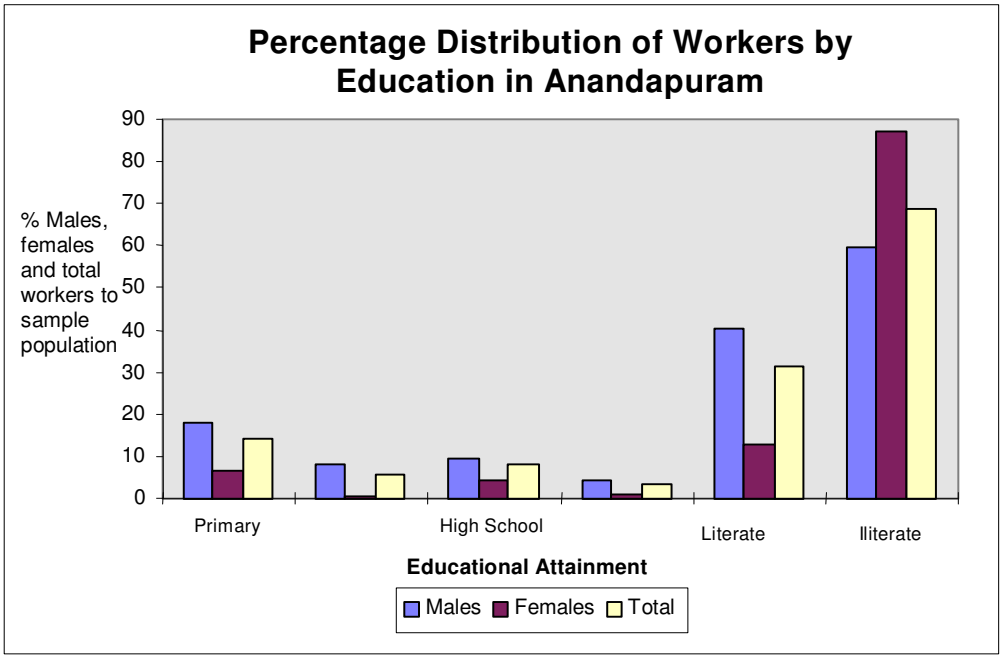


Figure 2:



1.4. Distribution of sample households -worker by caste groups

Backward castes outnumber other caste groups in both Veeravalli and Anandapuram sample groups (Table 5). In the less developed village, backward castes are significantly more

represented, and forward and scheduled castes[3] less, than in the developed village. However Anandapuram has 4.3 per cent of scheduled tribes compared to Veeravalli 1.5 per cent.

The Indian caste is rigid in its influence on occupational structure. A person born in a barber caste may become either a barber (traditional occupation) or if educated can get into a non-traditional occupation. However a person born in a caste other than that of barber will not become a barber. Here is a difference between the Indian caste structure and the Western occupational structure. The same is applicable to other caste-based occupations (e.g. potters, fishermen, carpenters, goldsmiths, basket makers, cotton carders, tinkering families, cobblers, washermen, toddy tapers, earth diggers (who level the fields during the harvest season), shepherds, piggery and butchers). Therefore the predominance of backward, SC and ST casts among the workers in a less developed village is again due to the caste related occupations.[4] But, in fact SCs are much less represented in Anandapuram. In general a less developed village is likely to retain a much larger per cent hanging on to traditional occupations (often with little work for low income)

Table 5: Caste-wise distribution of sample households:

	FC	**BC**	**SC**	**ST**	**Total**
Veeravalli (Total HHs)	155 (33.33)	236 (50.75)	67 (14.41)	7 (1.51)	465 (100.0)
Anandapuram (Total HHs)	51 (14.37)	264 (74.37)	25 (7.040)	15 (4.26)	355 (100.0)

Notes: Figures in brackets indicate the percentage to total sample households. FC: Forward caste, BC: Backward Caste, SC: Scheduled caste, ST: Scheduled Tribe.

Source: Field survey

1.5. Land holding

The distribution of land holdings among the sample households are presented in Table 6. In Anandapuram as much as 86 per cent of households are concentrated in the lowest two land-holding size groups of 0 - 2.50 acres (marginal and small farmers). In Veeravalli 54 per cent of households are in these size groups.

[3] The statutory lists of scheduled castes and scheduled tribes are notified in pursuance of Articles 341 and 342 of the Constitution of India. "The President may with respect to any State or Union Territory, and where it is a State, after, consultation with the Governor thereof, by public notification, specify the castes, races or tribes or parts of or groups within castes, races or tribes which shall for the purpose of this Constitution be deemed to be Scheduled Castes and Scheduled Tribes in relation to that or Union territory, as the case may be".

[4] In AP there are 59 castes in SCs (among them are the major caste systems such as *mala*, *madiga*, *relli*, *mastin*, *malasale*, *manne*, *aravamala*, *pamidi*, *ghasansi* and *saggali*). There are 29 ST castes (the major groups are *savara*, *jatapu*, *koya*, *konda reddy*, *yanidi*, *yerukala*, *chenchu*, *bagata* and *lambadi*).

Table 6: Operational distribution of holding held by farmers and tenants (in acres)

	0 to <= 1.25		> 1.25 to<= 2.5		> 2.5 to <= 5		>5 to <= 10		> 10		total	
	V	A	V	A	V	A	V	A	V	A	V	A
No. of households in each land group (% of total)	57 (30.3)	52 (57.1)	44 (23.4)	26 (28.6)	47 (25.0)	12 (13.2)	29 (15.4)	1 (1.1)	11 (5.9)	nil	188 (100)	91 (100)
Total amount of land (acres) in each land group (% of total land in village)	40.45 (5.45)	32.1 (23.7)	86.9 (11.7)	47 (34.7)	172 (23.2)	50.5 (37.2)	218.3 (29.4)	6 (4.42)	225 (30.3)	nil	742.65 (100)	135.60 (100)
Average land size in acres	0.71	0.62	1.98	1.81	3.66	4.20	7.53	6	20.45	0	3.95	1.49

Notes: The term 'operational' has been used because tenants do not own the land Figures in brackets are percentages.

V = Veeravalli, A = Anandapuram.

Source: Field survey

In Veeravalli, of the total 742.65 acres of cultivated land, a meagre 40.5 acres belong to farmers in the size class of between 0 - 1.25 acres, with a per HH (average) holding of 0.71 acres. 225 acres of cultivable land belong to farmers in the size class of 10 and above acres, with a per household holding of 20.45 acres. In Anandapuram, of the total 135.60 acres of cultivable land, 37 per cent land belongs to farmers in the size class of 2.25 - 5 while 32.45 acres belong to farmers in the size class of 2.5 to 5 acres with a mean per HH holding size of 4.20 acres. From the observations reported in the Table one can say that the distribution of land holdings is highly skewed with most of the cultivable land distributed among relatively wealthy farmers. Because of the relatively high proportion of small size land holdings, households in Anandapuram mainly operate subsistence farms. It can be seen from the data and from figure 4.2 that there are no large farmers in the less developed village, while there are some in the developed village (30 per cent of the land is operated by 11 households; 6 per cent of the sample). In the less developed village there is a slightly higher mean farm size in the 2.5 to 5 acre range; it should be noted though that these represent some of the wealthiest households in this village (with only 1 household operating more than 5 acres).

The Gini coefficients associated with operational distribution of the operational holding held by farmers have been calculated for the 2 villages. The figure obtained (a Gini coefficient of 40.6 per cent for Anandapuram and of 51 per cent for Veeravalli) point that the land holding is more unequal in Veeravalli than in Anandapuram. What one observes from the data is that a greater proportion of households hold smaller plots but that these plots account for a greater proportion of the total land available across all groups. Disparities are relatively acute in Veeravalli towards bigger holdings from 5 acres onwards.

We expect land distribution to affect RNFS participation via operated land per household. More unequal land distribution leads more RNFE.

1.6. Occupational pattern

Table 7: Occupational distribution of the total sample workers

	Number of employed persons					
Main occupation of households	**Veeravalli**		**Anandapuram**		**Veeravalli**	**Anandapuram**
Farm	**Males**	**Females**	**Males**	**Females**	**Total**	**Total**
Cultivators	145 (24.5%)	15 (7.4%)	90 (16.1%)	43 (16.1%)	160 (20.1%)	133 (16.1%)
Agricultural labourers[5]	105 (17.7%)	126 (62.4%)	97 (17.3%)	120 (44.9%)	231 (29.1%)	217 (26.3%)
Total	250 (42.2%)	141 (69.8%)	187 (33.4%)	163 (61.0%)	391 (49.2%)	350 (42.4%)
Non-farm	354 (58.6%)	61 (30.2%)	371 (66.5%)	104 (39.0%)	407 (51.0%)	475 (57.0%)
Total employed persons	604 (100%)	202 (100%)	558 (100%)	267 (100%)	798 (100%)	825 (100%)

Source: Field Survey

Data relating to the farm and non-farm occupational distribution of the sample households are presented in Table 7. The Table shows that for males, there are more cultivators than agricultural labourers in Veeravalli, and *vice versa* in Anandapuram. Whilst there are more female agricultural labour than cultivators in both villages, the excess is much larger (proportionately) in Veeravalli than in Anandapuram.

The farm labourer/cultivator ratio is greater for men in Anandapuram, less for women, and somewhat more for both together. In both villages, there is more RNFE than farm employment for males and females. Occupational distribution signals that there was a trend towards transformation of employment and much more diversification in Anandapuram than Veeravalli. The higher generation of male RNFE in Veeravalli is due to agro-processing industries like sugar, rice and jute factories which surrounded the village. The higher shares of RNFE females in Anandapuram compared to Veeravalli indicates diversification into petty trade and traditional non-farm occupations like toddy tapping, clothes washing, milk vending, tailoring. Usually these activities were undertaken by the poorer sections of the village Traditional and modern RNFE occupations of workers are presented in Appendix Tables 2 and 3.

2 Testing for household involvement in RNFE as a main occupation: Key features of the models

To analyse the determinants of involvement in RNFE as a main occupation among a sample of households and to attribute a weight to these determinants we have used a logit model, in view of the discontinuation, of the dependent variable - i.e. whether or not a household contained a main worker (≥ 183 days of work per year whose primary occupation was RNFE, or in some cases modern or traditional RNFE). In logit models, the dependent variable is a dummy (i.e. a dichotomous variable which takes a value of 0 and 1). Here, it takes the value 0 if the household has no main worker whose primary occupation was RNFE in the year 1993-94 prior to the survey, and 1 otherwise. If a HH has no main worker at all, they are excluded from all analysis because we are trying to discover determinants of RNFE among HHs with main worker (s), not determinants of having a main worker of all. Two cases are modelled; (i)

[5] Agricultural labourer are defined as those which derive more than half of their income from wages paid for manual labourer in agriculture. Hence, agricultural labourer can also cultivate a small piece of land, either owned or leased in.

whether the household is engaged in a non-farm activity; (ii) whether the HH is engaged in traditional or modern non-farm activities;

A list of explanatory variables used in the regression along with some descriptive notes are given in Table 8.

Table 8: Description of the variables used in the logit model:

Variable	Variables notation	Description
Y_i	Dependent variable Rural non-farm employment 0R X_{18} modern/traditional have been used	A household engaged in non-farm activity, if any working member has, as a primary (183 days in year) occupation, one or several activities covered by the Census of India 1991 occupational categories IV-IX.
X_1	Farm size LAND	Number of acres operated by the household.
X_2	Educational levels EDUC	Levels of educational attainment in terms of years of schooling. The potential figure is between 0 for (illiteracy) and 20 years of schooling (including University). Average years achieved by all the workers in the household.
X_3	Per acre value of agricultural output AGR etc	Market average value of agricultural products (paddy, pulses, cereals and vegetables) produced by the household (prices are supplied by the Food Corporation of India, Krishna District Office, Vijayawada, in Rupees per year).
X_4 X_5	Household head age AGE. Also used as squared, AGE^2	Household head age in years.
X_6	Family size of the household FAMILYS	Number of family members (including children) in the household.
X_7	Caste dummy 1 CD1	If the household is from a backward caste the dummy takes the value of 1, or 0 otherwise.
X_8	Caste dummy 2 CD2	If the household is from a Scheduled caste or from a Scheduled Tribe, the dummy takes the value 1, or 0 otherwise.
X_9	Migration into the village by the HH; MIGIN	Value 1 the household/ one or two members/ may be head of HH has migrated into the village at any point in time prior to the interview, or 0 if not.
X_{10} X_{11} X_{12}	Seasonality September-November, December-February, March-May Denoted SON, DJF, MAM.	The year is divided into four seasons. The response of the head of the HH was considered and dummies were attributed depending on the month during which the HH works the most days. I have used 3 dummy variables with June to August as the base case. Then a dummy is attributed to September to November, X_{10}, December to February X_{11}, March to May X_{12}.
X_{13}	Skilled/unskilled SK	If the household is skilled the dummy takes 1, or 0 if it is not skilled. The definition of skills will be given subsequently in the main text
X_{14}	Poor/non-poor POOR	Based on the average per person household income per month compared to a poverty line. If the household is poor the dummy takes 1, 0 otherwise. (see p.)
X_{15}	Village dummy VD	If the household is in the developed village (Veeravalli) it takes 0 and 1 otherwise (Anandapuram).
X_{16} X_{17}	Interaction variable: X_2*X_{15} Interaction variable: $X_{12}*X_{15}$	This is a set of two interaction variables. Village dummy has been multiplied (interacted) with education, and the March-May season.
X_{18}	modern/traditional MODERN	If the HH is most of the time involved in the modern RNFS (Census criteria of a minimum of 183 days in a year) then the dummy takes the value 1, or 0 if involved with the traditional RNFS

Note: u_i = Disturbance term with the classical properties where i denotes the household interviewed.

2.1. The explanatory variables:

Three logit functions were found to generate the best fit and were used for the purpose of our analysis. The determinants of non-farm employment for both village, (Eq.1 and Eq.2), are reported in Table12 (sec. 3) Pooled village level data on all 819 households are considered in Eq.3 (Table 13, sec. 3). Disaggregated RNFE determinants for Modern/Traditional RNFS Eq.4. The basis for pooling the data is given later on as the decision relied on results obtained from the regressions themselves.

The expected relationship between the dependent variable (denoted Y) and the independent variables Presented in Table 9.

Table 9. The expected relationship of independent variables with dependent variable

Sl.No.	Variables notation	Symbol	Expected relationship
1	Dependent variable Rural non-farm employment	Y	-
2	Farm Size operated	X_1	(-ve)
3	Levels of schooling	X_2	+ve Modern RNFS, -ve traditional RNFS
4	Per acre value of agri-output (Rs) (AGR)	X_3	(-ve) / (+ve)
5	Household head age	X_4	(-ve) / (+ve)
6	Household head age^2	X_5	(-ve) / (+ve)
7	Size of household	X_6	(+ve)
8	Caste dummy1	X_7	(-ve)
9	Caste dummy2	X_8	(-ve)
10	Migration-in	X_9	(+ve)
11	September-November	X_{10}	(-ve)
12	December-February	X_{11}	(-ve)
13	March-May	X_{12}	(+ve)
14	Skilled/unskilled	X_{13}	(+ve)
15	Poor/non-poor	X_{14}	-ve for the Whole sample or +ve for traditional RNFS, -ve for modern RNFS
16	Village dummy	X_{15}	(-ve)

The variables listed above are for each of the logit regressions estimated. Before reporting the estimated the equations, the predicted nature of the relationship between the dependent and explanatory variables is discussed.

However, the relationship may differ between the aggregate tests for the entire sample of rural households and the disaggregated tests on subsets of households

The probability of being engaged in non-farm occupation is measured by the logarithm of the odds ratio for the household to be engaged in non-farm employment, and this is explained by a set of explanatory variables, whose definition and selection are given next.

Size of land holdings (X_1): The size of agricultural land holding operated by the household measured in acres can tell us about the economic status of the household member. Land holding increases the involvement in the RNFS (for instance machinery, fertilisers, pesticides, repairs and services). We expect owned and operated holding to affect probability of HH involvement in RNFE in the same way. Land access per person of working age, not per HH, that affects (or is affected by) RNFE participation. If a HH's workers have lots of own/operate

land each they are less likely to do RNFE. Direction of causation: strong RNFE activity cuts the incentive to rent in (and hence operate more) land. We expect the regression to provide information as to whether larger holdings tend to raise the propensity to work in supplying RNFS goods and services.

Level of schooling (X_2): Education is a potentially important determinant of RNFE. Education improves an individual's prospects for non-farm jobs as well as increases his or her ability to allocate time to work efficiently among income producing activities. However, in early development phases many rural non-farm activities require only low levels of schooling.

We expect a positive relationship between modern non-farm occupations (like mechanical repairs of tractors, services, modern textiles, jute, ply-wood factory) and level of education, but a negative relationship between level of education and traditional non-farm occupations (like *toddy* tapers, rickshaw pullers, basket makers, barbers, clothes washing, shepherds, tailors, quarry workers, potters, carpenters, goldsmiths, gunny bag makers).

Per acre average value of agricultural output (X_3): A household's per acre agricultural output may affect its members' decision to be engaged in non-farm activities. Per acre value of agricultural output is treated as a proxy for the accumulation of savings for investment in RNFS capital. A high value possibly means that the household has the resources necessary to train for RNFS activities. In addition to training, the money can be used to purchase the equipment necessary to be involved in the RNFS (for example, TV and radio repairs, scooter and moped repairs, welding, cycle shop, tractor repairs, purchase of a sewing machine, thrift organisation, or cultivation of prawns and pond fish). It can also generally induce a greater demand for education with long run spillovers.

Therefore, a positive relationship is expected between per acre value of agricultural output and RNFE. Per acre value of agricultural production is estimated as the gross value of agricultural output per acre value in rupees. On the other hand, HHs that fail in agriculture may also be pushed into RNFE due to distress diversification. The direction of the link is much clearer when RNFS HHs are separated. We hypothesise a positive link from agriculture output to modern RNFE and negative link to traditional RNFE.

Household head age (X_4) and **Household head age^2 (X_5)**: We expect that household head age is inversely related to non-farm employment. Here, household head age is treated as proxy of the working age in a HH. There are two reasons for this. First, a large proportion of HH heads comprise a large proportion of HH workers as a whole. It was observed during my fieldwork that for a large proportion of HH, the head of the HH is the only earning member. (2) Young household heads tend to have younger working members (spouse, working children).

It is expected that the head of HH age is positively related to modern non-farm employment, but negatively for traditional and total non-farm employment especially for self-employed. The positive relationship for modern RNFE is mainly attributed to the fact that non-farm work generally requires a certain amount of skill, mobility, and training. Moreover opportunities in the non-farm sector are more scarce than in the farm sector which requires information and greater efforts on the behalf of the HH to establish and confirm the opportunities.

The head of the HH might try and persuade the other members (e.g. their sons/daughters) of the HH that are of working age to act in a way (if not too risky) in which household income can be increased (the head behaves like a 'dictator'). In other words HH head wants other members to be part of RNFE, but not if their interest is against it. Nevertheless, although potential income is higher in the non-farm sector, older farm heads may not be themselves able to shift from farm to non-farm work. Therefore, we expect a negative relationship with total non-farm employment.

It is expected that the head of Age^2 negatively related to modern RNFE but positively for traditional RNFE.

Size of the household (X_6): The expected relationship between the household size and the probability of the household being engaged in RNFE is positive. This is the result of two factors. First, even if RNFE activities is randomly distributed across persons, there are more persons in larger households, so there is a relatively greater chance that at least one working member will be in non-farm employment. Secondly it was observed during field work that once a member of the HH is engaged in RNFS, other younger members tend to follow

him/her. The parents in most HH also encourage their children to be educated and employed in better non-farm occupations. Since large family size has a genetic component it is likely to be 'interested' alongside access to modern RNFE.

1. If non-farm activity is random among persons, HHs with more persons have more likelihood of a member in RNFE.

2. If all HHs have the same land area, than in bigger HHs one (or two) working members can 'mind the farm' while other member(s) go to the RNFS.

3. If a large family size is in part 'genetic', RNFS large-family descendants will be more likely to go to the RNFS and to have large farms.

4. One-worker HHs cannot have 2 specialisations, are in age one within RNFS, 2 worker HH can, 3 worker HH, etc. Thus, economic factors as well as demographic factors go together with the RNFS.

Social status (X_7) and (X_8): (Caste) In the Indian context, the majority of occupations are linked to caste. While upper castes predominate in certain activities such as priesthood, trade and education, other backward castes are engaged in agricultural and allied activities. Many are engaged in traditional RNFE (for example leather work, sweeping, butchering). As such, it will be of interest to know whether there is any impact of caste on employment in the RNFS. In this study, we have classified all the sample workers into three Caste Groups. Caste Group1 includes all the upper castes such as *Brahmin*, *Kshatriya*, *Vysyas*, *Kammas* and *Kapu Naidu*. Caste Group2 contains all the backward castes such as *Kummari*, *Blacksmith*, *Gowda*, *Yadava*, *Koppulavelama*, *Turupukapu*, *Uppari*, *Rajaka*, *Jalari*, *Goldsmith*, *Settibalija*, *Mangali*, *Senapathi,* Indian Muslims and other minorities. Caste Group3 includes the Scheduled Castes/Harijans (SCs live in a settlement of harijanwada at the end of villages even after 54 years of independence) and the Scheduled Tribes (STs) such as Madiga, Mala, Relli and Lambadi (nomadic tribe). Generally caste, occupation, and levels of schooling and income of a household determine the HH socio-economic status. Moreover most of the BCs can shift occupations if they are given the employment skills that are necessary. They do not want to go for lower occupations but for higher occupations and they lack resources (STs belong to the landless illiterate group in rural areas). It can be hypothesised that households that belong to BCs and SCs and STs will have the least chances to opt for modern, skilled non-farm employment.

Migration (X_9): Migration into the villages does have an impact on RNFS. Agricultural poverty (of which lack of cash crops is often a sign) stimulates emigration; inadequate access to income-generating land in a village then encourages emigration. Complete households from poorer sections of the population will migrate. It is hypothesised that migration into the villages will lead to greater non-farm opportunities in rural areas. It was noticed during my field work that those migrants (in the sample) found seasonal employment in villages and also were mostly in the RNFS. It is expected that households which have migrated into the villages will be more likely to take up RNFS employment because of better chances of finding employment in this sector. We expect most to enter wage or self employment.

Seasonality (X_{10}), (X_{11}) and (X_{12}): With the agricultural sector dominating the AP economy seasonality may affect RNFE. During the lean season (in terms of agricultural activities) there is a decline in work opportunities in the agricultural sector. Particularly women are withdrawn from the labour force. In rural areas farm-work is available at a peak in the July-September period, and at its lowest in April-June, the lean season. In order to study these fluctuations, the year is divided into 4 seasons. The *kharif* or monsoon season lasts from June to August (planting time), September to November (threshing time). The *rabi* or winter season starts in December and ends in February (harvesting time). The summer season is from March to May. The response of the head of the household has been used to classify household. It was asked of the head and other workers when they were working most. Three dummies were

used, for season one (September to November), for season two (December to February) and for season 3 (March to May). The base is June to August[6].

Since labourers find local farm employment largely at the beginning and at the end of the monsoon, unemployment in the rural areas is seasonal. In some traditional activities (for example *toddy* tapping, carpentry, pot making, *shandy* business (periodic markets), goldsmithy, basket making, construction activity), work is available for few months. People are unemployed during the rest of the year. In the present study, seasonal employment means that certain occupations, like agricultural employment are available only during June-August, and September to December. In the remaining six months people are unemployed in the farm sector and hence people are more likely go to the RNFS between January and June as this period is the main season for traditional occupations and petty trade.

Occupation (X_{13}): The sample households are divided into two pairs of categories: 'unskilled' and 'skilled',[7] modern and traditional. People who are trained for skilled occupations, will generally have better opportunities of employment and their productivity is said to be higher which in turn is reflected in their relatively higher earnings. It is expected that skilled household members will have a better chance of taking up non-farm employment, so that the expected relationship between skilled and RNFE is positive.

Poor and non-poor (X_{14}): The poverty line cut off point which differentiates the poor from the non-poor households is Rs.187.39 per person per month, which is the figure for 1993-94 rural per capita monthly expenditure used by the Directorate of Economics and Statistics, Government of AP, as its poverty line. Household income was determined by income derived from the occupation, eliciting information from the head of the household in the presence of neighbours, village elders that acted as a deterrent from providing misinformation. Each household's income was divided by the number of people in the household. This is a simple unweighted count. The dummy if the household is poor takes the value 1 or 0 if it is not poor.

We expect the sign with modern sector RNFE to be negative because modern sector activities require certain amount of skills, education and mobility. Poor people can not afford such investments. However, this effect might not apply or might be reversed, for traditional RNFS (thus we expect a positive sign).

Village dummy (X_{15}): If the household is in the developed village (Veeravalli) it takes 0 and 1 otherwise (Anandapuram). Since residence in the less developed village is expected to diverse the propensity of RNFE involvement, we expect the sign to be negative for both modern and traditional RNFE.

2.2 Basic sample characteristics:

The results of tests for differences in means of variables between the two villages are presented in Tables 10 and 11. The purpose of these tests is to point out whether the villages differ in terms of some basic characteristics. This exercise is a useful complement to the logit analysis which we have used and whose results we will report in the following section. Unfortunately one limitation of the data is that we do not have comprehensive secondary data for other villages of AP, and thus we cannot decide whether the sample is representative of the broader context of AP.

First, we compare the whole sample i.e. pooled data between the two villages and then the two villages taken separately using all the variables we have used in the logit models. Second, we separated the sample between all farm and non-farm households (i.e. equal to main working time) and excluded all 274 farm households, thereby focusing on the

[6] The person may have worked for six months or 183 days or more in more than one activity in different seasons. For example s/he may have worked for 3 months in cultivation one month in gur making and 3 months as an agricultural labourer. S/he is requested to indicate which of these three activities according to him/her was main activity, i.e. in which capacity s/he spent more time in different seasons. In the instant case since the person has spent three months each in cultivation and as agricultural labourer the choice as to which of these two would be his/her main activity in which season maximum worked would be left to him/her.

[7] Skill defined as in the 1996 NSS, "Any marketable expertise however acquired, irrespective of whether marketed or not, whether the intention is to market it or not, is considered as a skill". Sarvekshana, Vol.XX, No.1 68th Issue July-September 1996, p. 6.

characteristics of those HHs involved with the RNFS as primary time criteria. The idea was to see if there were any variations among the variables, which we used in the logit models.

Table 10: Summary statistics and test of differences in means for independent variables between the two study villages

Variable	Mean for whole sample [N =.819]	Mean for Anandapuram [N = 354]	Mean for Veeravalli [N = 465]	t-value Anada/Veerva
LAND HOLDING SIZE (in acres operated)	1.07 (8.70)	0.38 (0.89)	1.60 (14.02)	5.96***
C.V.	2.76	2.47	2.34	
EDUCATION [average (years of education) of the workers in sample)]	3.81 (19.02)	2.29 (11.98)	4.97 (21.30)	9.14***
C.V.	1.14	1.51	0.93	
PER ACRE AVERAGE VALUE [of agri- output (Rupees)]	3192 (29573833)	2757 (32447093)	3524 (27196938)	0.57
C.V.	1.70	2.07	1.48	
HH HEAD AGE	44.01 (170.09)	43.77 (169.59)	44.19 (170.76)	0.46
C.V.	0.30	0.30	0.30	
FAMILY SIZE	4.50 (2.94)	4.84 (3.23)	4.25 (2.59)	4.95***
	0.38	0.37	0.38	
CASTE DUMMY 1	0.61 (0.24)	0.75 (0.19)	0.51 (0.25)	7.22***
C.V.	0.80	0.57	0.98	
CASTE DUMMY 2	0.14 (1.16)	0.11 (0.10)	0.16 (0.14)	2.18**
C.V.	2.5	2.81	2.31	
MIGRATION IN	0.16 (0.14)	0.14 (0.12)	0.18 (0.15)	1.43
C.V.	2.31	2.5	2.11	
SEPTEMBER - NOVEMBER Season 1	0.25 (0.19)	0.29 (0.20)	0.22 (0.17)	2.10**
C.V.	1.72	1.55	1.91	
DECEMBER - FEBRUARY Season 2	0.28 (0.20)	0.27 (0.20)	0.29 (0.21)	0.72
C.V.	1.61	1.63	1.55	
MARCH - MAY Season 3	0.39 (0.24)	0.34 (0.23)	0.43 (0.25)	2.70***
C.V.	1.26	1.38	1.16	
POOR (1 for poor HH)	0.38 (0.24)	0.47 (0.25)	0.31 (0.21)	4.80***
C.V.	1.29	1.06	1.48	
VILLAGE DUMMY (1 for Anandapuram)	0.43 (0.25)	N/A	N/A	
C.V.	1.16	N/A	N/A	
SKILLED (proportions of main workers who are skilled) (1 for skilled)	.57 (.25)	0.47 (0.25)	0.65 (0.23)	5.02***
C.V.	0.86	1.06	0.74	
MODER1 (1 for modern employment)	0.25 (0.19)	0.15 (0.13)	0.32 (0.22)	5.48***
C.V.	1.72	2.4	1.47	
NON-FARM	0.67 (0.22)	0.80 (0.16)	0.57 (0.25)	7.15***
C.V.	0.70	0.5	0.88	

Notes: The figures in brackets are the variance. The variance considered with the mean has been used to calculate the of each coefficient of variation (CV). The t-tests assume equal variance as were obtained from SPSS.

*** Significant at 1 per cent, ** significant at 5 per cent, * significant at 10 per cent.

Table 10. reports the means (some of the results are proportions), coefficients of variation (CVs) as well as the values of t-statistics for the selected variables for the villages under study, as well as for the pooled data set that are used in the logit models.

A cursory analysis shows that there are differences between the two villages that match the developed and less developed prediction pattern. Veeravalli is much wealthier than Anandapuram with regard to education, mean land holding size, and per acre average value of agricultural output. HHs from Veeravalli are somewhat better off than those in Anandapuram [although PAAV (per acre average value of farm output) is not significantly different from poverty incidence, at 31 per cent versus 47 per cent is significant (at the 1 per cent level). In Veeravalli the average household (the proportion of households with a main worker whose primary work is in the modern non-farm sector) is more than double that of Anandapuram; and Veeravalli has a significantly higher proportion of its main workers who are skilled, but a lower proportion self employed.

The significant differences between the villages are visible not only in terms of mean values but also by CV. The distribution of 'years of education per worker' is much less spread in Veeravalli than in Anandapuram, as is that of PAAV and (to a lesser extent) landholding size. The differences between the villages set out in part one of this chapter reflect these results. There are both higher levels of small holdings and a larger area under small holdings in Anandapuram compared to Veeravalli. The type of crops in Veeravalli is also different giving a higher gross value of output/acre. We can see the links much more clearly. Lower PAAV in Veeravalli (i.e. less variability) in Veeravalli presumably reflects wider access to water control. All of these trends explain the differences between the two villages. Besides the economic variables, seasonality in agriculture is important in the villages. In particular the involvement of people in the RNFS in the March-May period is greater. It shows the non-farm signs of distress diversification in Anandapuram. RNFS has a greater proportion of HH in Anandapuram compared to Veeravalli because of distress diversification. Partly the farm sector is not prosperous which is responsible for this distress diversification. Basic sample characteristics for HHs engaged in the RNFS only are presented in Table 11.

Table 11: Summary statistics and test of differences in means for households with a main worker principally engaged in rural non-farm employment only

VARIABLES	Mean for whole sample [n= 545]	Mean for Anandapuram [n=282]	Mean for Veeravalli [n=263]	t-test Anandapuram / Veeravalli
LAND HOLDING SIZE (in acres)	0.38 (1.18)	0.25 (0.61)	0.52 (1.76)	2.91***
C.V.	2.86	3.13	2.55	
EDUCATION (Average literacy of the workers in sample)	4.18 (20.64)	2.65 (13.80)	5.81 (22.88)	8.64***
C.V.	1.09	1.40	0.82	
PER ACRE VALUE [of agri-output (Rupees)]	1931.44 (21103372)	1966.71 (25366610)	1893.62 (16608742)	0.19
C.V.	2.38	2.56	2.15	
HH HEAD AGE	43.06 (164.97)	43.05 (166.98)	43.19 (164.3)	0.33
C.V.	0.30	0.30	0.30	
FAMILY SIZE	4.52 (3.24)	4.80 (3.40)	4.21 (2.89)	3.75***
C.V.	0.40	0.38	0.40	
CASTE DUMMY 1	0.64 (0.23)	0.73 (0.20)	0.54 (0.25)	4.81***
C.V.	0.76	0.61	0.93	
CASTE DUMMY 2	0.12 (0.11)	0.10 (0.09)	0.14 (0.12)	1.48
C.V.	2.72	3.02	2.48	
MIGRATION IN	0.20 (0.16)	0.16 (0.14)	0.24 (0.18)	2.13**
C.V.	2.01	2.27	1.80	
SEPTEMBER-NOVEMBER	0.15 (0.13)	0.20 (0.16)	0.10 (0.09)	3.18***
C.V.	2.40	2.04	3.02	
DECEMBER - FEBRUARY	0.23 (0.18)	0.26 (0.44)	0.21 (0.17)	1.17
C.V.	1.81	1.71	1.93	
MARCH -MAY	0.54 (0.25)	0.42 (0.24)	0.67 (0.22)	6.05***
C.V.	0.92	1.18	0.7	
POOR	0.38 (0.24)	0.45 (0.25)	0.30 (0.21)	3.83***
C.V.	1.28	1.10	1.54	
VILLAGE DUMMY (1 for Anandapuram)	0.52 (0.25)	N/A	N/A	
C.V.	0.97	N/A	N/A	
SK SKILLED/UNSKILLED (1 for skilled)	0.55 (0.25)	0.46 (0.25)	0.65 (0.23)	4.33***
C.V.	0.90	1.08	0.74	
MODER1 MODERN/TRADITIONAL (1 for modern)	0.32 (0.22)	0.19 (0.16)	0.45 (0.25)	6.80***
C.V.	1.47	2.06	1.10	

Note: As for Table 10.

Table 11. reports the means, proportions and coefficients of variation (CVs) of the selected variables for the villages and pooled sample only for households with at least one member whose primary employment is in the RNFS. These households only were used in logit models in which the dependent variable was modern/traditional.

Households involved only with the RNFS appear (from comparing Tables 10 and 11) to be on average "worse off" in economic terms; the mean land holding, and per acre value of agricultural output are lower. Yet, the comparison would be misleading as a guide to per capita income in that such HHs could get their income from predominantly non-farm sources. Indeed, literacy is somewhat higher for those involved in the RNFS.

The RNFS as a whole thus either requires or attracts on average slightly more educated HHs, but this too may be misleading, i.e. time of modern RNFS, but the reverse of the truth for traditional. Also, however, this sample contains a similar proportion of poor people to the entire sample, signalling that belonging to the RNFS does not necessarily improve poverty incidence.

Whilst social and demographic characteristics appear relatively similar (family size, caste dummies, skill), a greater proportion of households with RNFS main workers contain people that work in March-May (54 per cent, compared to 39 per cent for the entire sample).

Focusing next on Table 11. we find that the indicators of HHs engaged in the RNFS being worse off in terms of farm income than those that do not is more pronounced for Veeravalli than in Anandapuram. Thus, land size holding of those HHs in Veeravalli engaged in the RNFS whilst greater than that of those HHs in Anandapuram engaged in the RNFS is substantially smaller than the full sample averages. Also when comparing the per acre value of agricultural output of those HHs engaged in the RNFS in Veeravalli to that of the entire sample of per acre value.

RNFS HHs differ between the two villages in a number of characteristics. RNFS households in Veeravalli are significantly (at 1 per cent) more educated, have larger land holdings, are older, more skilled, are more involved in the modern sectors than in Anandapuram. RNFS HHs in Anandapuram are more likely than in Veeravalli to have a large family size, to be poor, to work as self employed and in December-February and are more likely to belong to backward castes. The proportion of those belonging to Scheduled castes and Tribes and working in the September-November season, however, do not differ significantly between the two villages.

In relation to the caste composition, 73 per cent of the HHs in the RNFS in Anandapuram belong to CD1 (backward caste HH takes the value of 1, and forward caste 0), 10 per cent belong to CD2 (scheduled caste and scheduled tribe caste HH takes the value of 1, and forward caste 0) and another 17 per cent to the base case which is the upper castes. In Veeravalli, the breakdown is of 54 per cent, 14 per cent and 32 per cent respectively. Thus the RNFS is the preserve of CD1 followed by the base. There is comparatively little involvement of those HHs which belong to CD2. As for the seasons, most of the RNFS HHs in Veeravalli work most in March-May (67 per cent) whilst in Anandapuram 42 per cent work most in March-May. Overall 32 per cent of those involved with the RNFS (only) work in the modern sector, an average between the figure of 45 per cent for Veeravalli and that of 19 per cent for Anandapuram.

HHs with main workers primarily committed to RNFS are 'more advanced' in Veeravalli than in Anandapuram (agriculturally, land size and productivity, and otherwise) reflecting their 'more advanced' village and suggesting agricultural growth linkages, not distress diversification, as the mainspring of RNFS involvement of a household. But these RNFS households are, on the whole behind the levels of their agricultural fellow-villages both in agriculture (land size and productivity) and otherwise - and this is more so in the 'advanced' Veeravalli than in Anandapuram village suggesting the opposite to the above. The apparent contradiction will be resolved in the logit analysis Section 3.

3. THE LOGIT results

Two distinct categories of non-farm employment are identified: modern wage-employed and traditional wage-employed. Moreover data for farm households (households with no main worker principally in non-farm employment, i.e. 'pure' farm HHs) have been collected. It is useful to separate these categories in order to capture the dynamics of both growth linkages from agriculture and distress diversification whilst bearing in mind that multiple factors influence the labour market. The equation used is of the form[8] (Appendix Table1. pooled data correlation matrix).

$$Y_i = a_o + b_1 X_{1i} + b_2 X_{2i} + b_3 X_{3i} + b_4 X_{4i} + b_5 X_{5i} \ldots\ldots b_{14} X_{14i} + b_{17} X_{17i} + u_i$$

Where i denotes households, and

Y_i = A HH is engaged in non-farm activity, if any working member has, as a primary occupation at least 183 days in a year (in one or several activities).

X_1 = Farm Size operated (number of acres operated by the HH)

X_2 = Levels of schooling (number of years of schooling)

X_3 = Per acre value of agri-output per year (in Indian Rs)

X_4 = Household head age in years

X_5 = Household head age^2 in years

X_6 = Size of household (Number of family members including children in the HH).

X_7 = Caste dummy 1 (if the HH is from a backward caste the dummy takes the value of 1, 0 otherwise)

X_8 = Caste dummy 2 (if the HH is from a scheduled caste or scheduled tribe the dummy takes the value of 1, 0 otherwise)

X_9 = Migration-in (if the HH has migrated - at any point in time prior to being interviewed into the village the dummy takes the value 1 or 0 otherwise).

X_{10} = September-November (Dummy takes value 1, if this is the period during which the HH works the most days in farm/non-farm)

X_{11} = December-February (as above)

X_{12} = March-May (as above)

X_{13} = Skilled/unskilled (if the household is skilled the dummy takes 1, 0 otherwise)

X_{14} = Poor/non-poor (if the HH is poor the dummy takes 1, 0 otherwise)

X_{15} = Village Dummy if the HH is in the developed Veeravalli it takes 0 and 1 otherwise

X_{16} = Interaction variable $X_2 * X_{15}$

X_{17} = Interaction variable $X_{12} * X_{15}$

u = Disturbance term with the classical properties.

In the logit regressions the log likelihood function is maximised using interactive techniques given in the programme LIMDEP. The interpretation of coefficients in the logit model is less

[8] In order to obtain a basic understanding of the nature of the relationships between the endogenous and exogenous variables discussed earlier, a correlation matrix of all the variables was constructed. The highest correlation coefficient found was -0.65 (between March-May and December-February). Generally the coefficients are small although some are of the order of 0.5.

straightforward than in OLS. Usually, a positive coefficient for an independent variable reveals that a high value of that variable will increase the probability of a household being upwardly mobile. The marginal effects of the regressors, X, on the probabilities are not equal to the coefficients. Instead, a further calculation is required to obtain the marginal effects (for continuous variables) or impact effects (for the dummy variables). Marginal effects are reported by estimating them at the mean values of the explanatory variables and likewise for the impact effects[9]. The intercepts are not significant, which suggests that no important variable has been omitted from the model. The overall predictability of the model is given by the frequencies of the "predicted" outcomes[10] although a Mac Fadden R^2 has also been calculated.

Log-likelihood ratio tests were performed to test that two villages are same of the model with pooled data[11].

[9] The effects for interaction variables cannot be directly interpreted.

[10] Predictions which match the actual values of the dependent variable. I have also independently checked variables that can be eliminated on the basis of log likelihood ratio tests. However, in order to remain consistent in the results presented and to focus on the particular model tested full models are presented.

[11] A log-likelihood ratio test was performed, but rejected null hypothesis of pooled data.

Table 12: Logit model of the probability of a household engaged in non-farm employment in sample households in each village, 1993-94, [the dependent variable is non-farm 1, all farm = 0].

	Result. Eq. [1] Anandapuram		**Result. Eq. [2] Veeravalli**	
Variables	**Coefficients**	**Marginal/ Impact effects**	**Coefficients**	**Marginal/ Impact effects**
CONSTANT	3.45 (1.41)		1.04 (0.68)	
LAND HOLDING SIZE	-0.642 (-3.09)***	-0.0391 (-2.74)***	-0.538 (-4.78)***	-0.131 (-4.58)***
EDUCATION (years of education)	0.428 (4.06)***	0.0261 (3.75)***	0.136 (3.74)***	0.0332 (3.76)***
AGR (per acre value of agri.output)	-0.0000619 (-1.85)*	-0.00000377 (-1.79)*	-0.000114 (-2.96)***	-0.0000276 (-2.99)***
HH HEAD AGE	0.0207 (0.24)	0.00126 (0.24)	-0.0924 (-1.58)	-0.0225 (-1.58)
HH HEAD AGE^2	-0.000241 (-0.27)	-0.0000147 (-0.27)	0.000890 (1.51)	0.000217 (1.51)
FAMILY SIZE	0.0623 (0.54)	0.00380 (0.54)	0.148 (1.58)	0.0360 (1.58)
CASTE DUMMY 1	-0.0295 (-0.34)	-0.0180 (-0.34)	-0.653 (-1.88)*	-0.159 (-1.88)*
CASTE DUMMY 2	-0.652 (-0.68)	-0.0397 (-0.68)	-0.755 (-1.73)*	-0.183 (-1.73)*
MIGRATION IN	0.916 (1.39)	0.0558 (1.38)	0.867 (2.31)**	0.211 (2.31)**
SEPTEMBER - NOVEMBER	-3.489 (-3.15)***	-0.213 (-2.93)***	0.226 (0.37)	0.0549 (0.37)
DECEMBER-FEBRUARY	-2.459 (-2.19)**	-0.150 (-2.20)**	0.759 (1.27)	0.184 (1.27)
MARCH - MAY	0.0708 (0.06)	0.00431 (0.06)	2.71 (4.48)***	0.659 (4.47)***
SKILLED 1, UNSKILLED 0	-0.0109 (-0.02)	-0.000663 (-0.02)	0.865 (2.41)**	0.210 (2.41)**
POOR 1, NON-POOR 0	-0.537 (-1.31)	-0.0327 (-1.25)	-0.865 (-2.56)***	-0.210 (-2.55)***
LOG- LIKELIHOOD	- 111.12		- 184.79	
CHI-SQUARED (14)	135.35***		267.02***	
NUMBER. OF OBSERVATIONS	354		465	
MAC FADDEN R^2	0.38		0.42	
%CORRECT PREDICTION	86.16		84.52	

Notes: The t-ratios are in brackets.

-*** Significant at 1 per cent level; ** Significant at 5 per cent level, * Significant at 10 per cent level.

3.1 General results

Given these equations each of them have done the separate regressions estimated for two villages. But before estimating separately for each of the villages we can impose a restriction that the villages can be pooled together and thus that the data can be considered jointly. If these restrictions cannot be statistically rejected, the pooled model would then be the more efficient procedure. In order to test these restrictions we have carried out the necessary statistical tests. These statistics are derived from the standard log likelihood ratio test statistic. Our results suggest that in the case of the three models the restrictions of pooled estimation cannot be rejected. We have therefore estimated these models with pooled data. For other models we need to estimate the models separately for each of the villages.

3.1.1. Results for Anandapuram:

Logit regressions for which dependent variable have been estimated separately for Anandapuram and Veeravalli because the log likelihood ratio is higher than the critical value for non-farm model - i.e. we accept non-farm where the pooling hypothesis is rejected. We provide interpretations only where the variables are significant. We have not used any interaction dummies for these variables[12].

The coefficient on the land holding is negative (results [1] Table 12). This implies a negative correlation between the size of land operated and the probability of being involved with non-farm employment. This suggests that the growth (AGL) linkage impact on modern RNFE dominates the distress diversification (ADD) impact on traditional RNFE. This may be attributed to the predominance of small and marginal farmers in this village. As such the lower the farm size the higher the probability will be of it being engaged in non-farm employment.

The marginal effect of a unit increase in landholding on non-farm employment at the means[13] of all variables is -0.04. This implies that, at the mean, if land holding increases by one unit (one acre in this exercise) the probability of non-farm employment decreases by 4 percentage points.

Similarly at the means of the data if education increases by one year the probability of RNFE increases by 2.6 percentage points. The coefficient has the expected relationship and is statistically significant at the 1 per cent level. Therefore, it can be said that the higher the years of schooling, the greater will be the likelihood of being engaged in the RNFS. Later on we shall argue that this is a net effect; the impact of schooling via higher 'modern' RNFE exceeds its impact via lower 'traditional' RNFE.

We found a negative link between land productivity (per-acre agricultural output produced by the households) and non-farm employment. However, the estimated coefficient is very small. Even when agricultural output increases this creates a somewhat negative influence on non-farm employment.

We inserted three dummy variables to assess the seasonal impact of non-farm employment. September-November and December-February are the peak seasons when there are numerous agricultural activities to perform. As a result we would expect a negative sign on the coefficients of these two dummy variables. The results are similar to our expectations, since the coefficients on these dummies are negative as well as being significant. These results imply that a household with an average set of characteristics is 21.3 percentage points less likely to be involved in RNFE in the peak September to November period i.e. if HH works more days in September-November than in March-May or December-February; or 0 otherwise. On the other hand, the impact of December to February peak season reduces the possibility of RNFE of a typical household by 15 percentage points. The season March to May

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[12] We thought there is a potential endogenity problem in the equations. We tested that the model was run by taking the ^ (fitted) values and residuals from the first model and then inserted in the non-farm model. It was found that the residuals term was not significant. The t-values on the residual was captured at only 0.964.

[13] We know that the marginal effect computed for the logit for any variable is:

$\frac{\delta prob[RNFE]}{\delta X_i} = \beta X_i * \frac{\exp[z]}{[1+\exp(z)]^2}$ where z is the sum of coefficients multiplied by the means of the respective variables plus the constant term.

is considered to be a slack period in agricultural activities and, as a result, there is not enough scope for agricultural employment. So ideally the impact of this season on non-farm employment should be positive. In our case the coefficient of March to May is positive but fails to be significant.

Our analysis in the context of the relatively less developed village suggests that land holding size and agricultural output per acre have a negative effect on RNFE. This suggests that for RNFE as a whole growth linkages to the modern sector. On the other hand education has a positive impact. The link between education and RNFS is strong. This supports wider (ODL) hypothesis.

3.1.2. Logit analysis for Veeravalli

It is observed from the estimates that the coefficient on the land holding for Veeravalli is also negative. The marginal effect obtained from (results [2] Table 12) is -0.13. This indicates that at the mean of the data if the land holding increases by one acre the probability of non-farm employment decreases by 13 percentage points. The coefficient obtained implies that even in the relatively more developed village there is also a negative link between the size of land ownership and the probability of non-farm employment. We observed a similar relationship in the literature review. This suggests that, the growth (AGL) linkage impact on modern RNFE dominates the distress diversification (ADD) impact on traditional RNFE.

On the other hand, the means of the data obtained show that with one extra year of schooling the probability of RNFE increases by 3.3 percentage points. For Anandapuram the increase was 2.6 percentage points. The difference between the two villages may have been due to (a) a difference between the means of the education obtained by villagers, increase in education in Anandapuram, for work in more RNFS, compared to Veeravalli. In Veeravalli the mean is higher and thereby induces less RNFE. This supports wider (ODL) hypothesis.

Per acre value of agricultural output the coefficients are not significant for Anandapuram, so size can not be usefully compared. All we can compare is that in Anandapuram there is no effect, but on Veeravalli a significant though small, effect. This suggests that for RNFE as a whole there are growth linkages (AGL) to the modern sector.

The migration-in dummy is found to be positively associated with RNFE as expected. A HH that has migrated into the village increases the probability of RNF by 21.1 percentage points. This is particularly true in the case of relatively more developed Veeravalli, this shows growth linkages (AGL) and expansion of RNFE which might in turn induce migration.

The season dummy March to May is found to be significant at the one per cent level and the coefficient has the expected positive sign. It may be inferred that the “doing most work in agricultural slack season March to May” has on an “household that HH has a main worker principally engaged in non-farm employment. But the causality is the other way round. This supports the wider (ODL) hypothesis.

We included two dummies to consider the impact of caste on non-farm employment. Caste dummy two is found to be negatively associated with RNFS as expected but not significant.

The coefficient related to skill has as expected a positive sign and is significant at the 5 per cent level. The impact effect is 0.21. This implies that if the HH has acquired skills by way of training and education the probability of non-farm employment increases 21 percentage points. This variable is significant only in Veeravalli, not in Anandapuram perhaps because most RNFE is modern in Veeravalli but traditional in Anandapuram. The developed village supporting the growth linkages (AGL) hypothesis,

On the other hand the coefficient for the poor/non-poor dummy variable reveals a negative link between being poor and the probability of non-farm employment. This can be attributed to the RNFS requiring certain levels of skills as well as a specific amount of education. Poor people do not obtain these skills and, as such, the probability of RNFS decreases by up to 21 percentage points for poor households. By implication this suggests that household development out of poverty is associated with increased RNFE prospects (ODL).

The coefficients associated with household head age, household head age^2 and family size have expected signs but are not significant, even at the 10 per cent significant level. This indicates a weak relationship with RNFE in this model. Seasonal dummies September to

November and December to February are also not significant and have unexpected positive signs. This may be because consumption linkages induce little scope for RNFS in those periods.

Table 13: Logit analysis of the probability of a household engaged in non-farm employment in pooled sample households in each village, 1993-94. [the dependent is non-farm is 1 and all farm = 0].

Variables	**Result Eq. [3] [3] Coefficients**	**Marginal/Impact effects**
CONSTANT	1.388 (1.14)	
LAND HOLDING SIZE	-0.555 (-5.82)***	-0.0898 (-5.06)***
EDUCATION (Years of Education)	0.153 (4.33)***	0.0247 (4.14)***
AGR (per acre value of agri. output)	-0.0000860 (-3.47)***	-0.0000139 (-3.52)***
HOUSEHOLD HEAD AGE	-0.637E-01 (-1.33)	-0.0103 (-1.33)
HOUSEHOLD HEAD AGE^2	0.630E-03 (1.29)	0.000102 (1.29)
FAMILY SIZE	0.111 (1.54)	0.179 (1.54)
CASTE DUMMY 1	-0.643 (-2.07)**	-0.0104 (-2.08)**
CASTE DUMMY 2	-0.873 (-2.31)**	-0.141 (-2.30)**
MIGRATION IN	0.881 (2.78)***	0.142 (2.76)***
SEPTEMBER - NOVEMBER	-0.919 (-2.26)**	-0.148 (-2.22)**
DECEMBER - JANUARY	-0.113 (-0.28)	-0.0183 (-0.28)
MARCH -MAY	1.78 (4.08)***	0.288 (4.05)***
SK	0.529 (1.87)*	0.856 (1.86)*
POOR	-0.716 (-2.79)***	-0.116 (-2.74)***
VILLAGE DUMMY 2	1.56 (5.38)***	0.253 (4.89)***
MAMINT2	1.570 (2.30)**	
EDUINT	0.239 (2.41)**	
LOG - LIKELIHOOD	-301.77	
CHI- SQUARED (13)	440.45***	
NUMBER OF OBSERVATIONS	819	
MAC FADDEN R^2	0.42	
% CORRECT PREDICTION	85.10	

Notes: As before (for Table 12).

3.1.3. The aggregate (pooled) results:

The results of the aggregate exercises (for which data for Veeravalli and Anandapuram have been pooled) and the statistical significance of the variables are presented in Table 13. To identify the factors which are responsible for RNFE at the household level, one logit model is estimated. When interaction variables are included the log likelihood ratio is less than the critical value. Interaction variables were introduced to test changes of the relationship between (1) the village dummy and education and (2) the village dummy and March-May season variables. This is to observe whether the slope of the line is changing or not.

We shall now discuss these results in turn. The chi-squared test of the log likelihood values for this model is significant at the 1 per cent level. We observe that some variables (land holding size, education, per acre value of agricultural output, migration into the villages, season March-May, poor and village dummy) are significant at 1 per cent, and two variables (caste dummy one and two, season September-November, Mam interaction and education interaction) at the 5 per cent significance level.

The coefficients of land holding size, education, per acre value of agricultural output, caste dummy1, caste dummy2, migration in, September to November, March to May, Skill, poor, and village dummy have the expected signs and are significant.

In general we get the results which we expected for Veeravalli for the pooled data - but for Anandapuram alone the expected effects are obtained only for landholding size, years of education, and seasonality.

For the pooled sample, the land variable is found to be negatively associated with RNFE (as expected and statistically significant at the 1 per cent level). As land size increases the participation of the household in non-farm activities declines. To some extent this relationship may capture distress-diversification. Land concentration can lead to an overspill of surplus labour into unproductive non-farm jobs

The important result of this model from the RNFS point of view is found to be the coefficient for education. It may be noted that the coefficient is positive and significant at the 1 per cent level, indicating a rather strong relationship with RNFE. Its marginal effect is positive, suggesting that households with higher education are more likely to seek non-farm employment in rural villages. The marginal affect is 0.0247. One year of education increases the probability of non-farm employment by 2.47 percentage points. But this is more in Veeravalli and less in Anandapuram It is understandable that, where the education of household workers is higher, they are (a) reluctant to work in the farm sector as they have better prospects elsewhere (b) more attractive to RNFE employers. Education is robustly significant.

The coefficient for per acre value of agricultural output is significant at the 1 per cent significance level indicating a strong negative relationship with RNFE - but the effect is tiny.

As expected the caste (social background) variables CD1 and CD2 (upper caste being the base) is found to be negatively associated with non-farm employment. If the worker belongs to a SC or a ST community - or even to a Backward caste - s/he has relatively less scope for non-farm employment compared to a worker from the upper castes. This may be due to low levels of literacy; skill, training and social structure among these caste groups are lacking. The present caste system would seem not to encourage the diversification of these caste groups into the RNFS.

The village dummy (Anandapuram = 1, Veeravalli = 0) is statistically significant. This shows there are significant differences between the two villages. The model of rural RNFE spelled out here is that households are more inclined to non-farm activities in Anandapuram, with the coefficient being positive. This is as expected, in the sense that in Anandapuram, which is agriculturally backward. ”Agricultural backwardness” is already captured in “output per acre” (i.e. gross land productivity) in Table 13 and ‘skills’ and ‘years of education’ captured other ‘backwardness’ variables. Perhaps it is the nearness of Visakhapatnam which causes people of given skills and literacy in Anandapuram to move to Visakhapatnam city. In Veeravalli they would stay in their work in the RNFS. People are more likely to move towards more types of RNFS - perhaps mainly traditional RNFS. We explore this below.

Two interaction variables were used: education with village dummy (EDUINT), and the season March-May with village dummy (MAMINT2). They are significant at the 5 per cent level. If the households in less developed villages engage in non-farm employment during March-May, the household scores 1 on the interaction March-May * village dummy. This result indicate an increased probability of being employed within a non- farm employment in March-May in less developed Anandapuram. This shows that the seasonal effect varies across the villages. This result indicates an increased probability of employment in less developed village compared with those in more developed village. To summarise it may thus be inferred from the results, that per acre value of agricultural output (growth linkages between farm and non-farm), social background such as caste and seasonality are important factors of non-farm employment at the household level. It suggests that economic, environmental and social factors would matter for the RNFS.

Skilled variable significant at 5 per cent in Veeravalli is not significant in Anandapuram.

There are more extra chances for the educated in RNFE in a backward village because of distress diversification. It is an odd result for 'education' happening because we (in effects) hold skills constant i.e., given skills, education is doing more for RNFE prospects if interacted with education in the backward village - but that is because education effect in inducing higher skills, which in turn increase RNFE chance, is between into the coefficients or skills, which induces, as expected, is significant in Veeravalli not Anandapuram.

To summarise, it may be inferred from the results, that land holding size, years of workers education, per acre value of agricultural output, social background such as caste, migration, seasonality, skills, absence of poverty are important factors for non-farm employment at the household level. It suggests that economic, environmental and social factors would matter for the RNFS.

Table 14: Logit analysis of the probability of a household being engaged in modern RNFE only for sample households with a main worker principally engaged in non-farm employment in villages, 1993-94, pooled data: [the dependent variable is Modern RNFS = 1, Traditional RNFS = 0]

Variables	Result. [4] Coefficients	Marginal/Impact effects	Result. [5] Coefficient	Marginal/Impact effects
CONSTANT	-0.998 (-0.74)		-1.261 (-0.93)	
LAND HOLDING SIZE (In acres owned)	-0.222 (-1.95)**	-0.0417 (-1.95)**	-0.253 (-2.14)**	-0.0480 (-2.13)**
EDUCATION (Years of education)	0.28 (8.56)***	0.0528 (8.22)***	0.313 (7.41)***	0.0592 (6.89)***
AGR (per acre value of agri.output)	0.0000491 (1.75)*	0.00000921 (1.76)*	0.0000463 (1.63)	0.00000876 (1.64)
HH HEAD AGE	-0.0963 (-1.83)*	-0.0181 (-1.82)*	-0.0917 (-1.72)*	-0.0174 (-1.72)*
HH HEAD AGE^2	0.00115 (2.08)**	0.000215 (2.07)**	0.00112 (2.01)**	0.000212 (2.00)**
FAMILY SIZE	0.0587 (0.80)	0.0110 (0.81)	0.0485 (0.66)	0.00919 (0.66)
CASTE DUMMY 1	-0.0327 (-0.11)	-0.00613 (-0.11)	-0.0522 (-0.18)	-0.00989 (-0.18)
CASTE DUMMY 2	0.500 (1.19)	0.0938 (1.19)	0.453 (1.06)	0.0859 (1.06)
Migration in	0.590 (1.98)**	0.111 (1.97)**	0.630 (2.08)**	0.119 (2.08)**
SKILLED 1, UNSKILLED 0	0.764 (2.84)***	0.143 (2.87)***	0.889 (3.18)***	0.168 (3.20)***
POOR 1, NON-POOR 0	-0.555 (-1.89)*	-0.104 (-1.91)*	-0.535 (-1.81)*	-0.101 (-1.83)*
VILLAGE DUMMY (Anandapurm1)	-0.469 (-1.73)*	-0.0879 (-1.74)*	-0.547 (-1.19)	-0.104 (-1.20)
SEPTEMBER - NOVEMBER	-0.505 (-0.90)	-0.946 (-0.90)	-0.332 (-0.58)	-0.629 (-0.58)
DECEMBER - FEBRUARY	0.478 (0.95)	0.0897 (0.95)	0.586 (1.11)	0.111 (1.11)
MARCH - MAY	0.194 (0.39)	0.0930 (0.37)	0.0191 (0.04)	0.00362 (0.04)
EDUINTER2			-0.0667 (-1.03)	
MAM INTERACTION 2			0.866 (2.08**)	
LOG - LIKELIHOOD	-231.25		-228.24	
CHI - SQUARED (15) (17)	218.66***		224.69***	
NUMBER OF OBSERVATIONS	545		545	
MAC FADDEN R^2	0.32		0.33	
% CORRECT PREDICTION	82.57		82.39	

Notes: - As before. (for Table 12)

3.2. Results for modern/traditional variable:

The results of the two logit models taking modern/traditional non-farm employment as the dependent variable are presented in Table 14. We observe that two variables education and skilled/unskilled, are significant at the 1 per cent level. Migration into the villages, HH age, land holding size are significant at the 5 per cent level. March-May interacted with village dummy and land holding size are significant at the 10 per cent level. The chi-squared test of the hypothesis that this model was rejected was significant at the 1 per cent level.

The coefficients which have the expected signs are land holding size, education, caste 2, skilled/unskilled, village dummy, family size, September-November, March-May, household head age and poor.

Whether a HH is likely to have a main worker primarily in RNFS. Whether a HH, that does have such a worker, is likely to place him/her in the Modern RNFE. Especially if the traditional RNFS is a substantial part of (the total RNFS), there is no obvious reason to make the same predictions about what the determining variable will be, or about their signs.

However, caste dummy 2 and December-February have the opposite sign of what was predicted. The most important variables in terms of marginal effects of the model are education, skilled/unskilled.

Education is highly significant and positive. Thus, being educated matters in the determination of the probability of a household being engaged in the modern RNFS. The reverse also holds, so that the probability of participation in the traditional sector decreases with the level of education (schooling). It seems to be confirmed this for traditional as against modern activities - but not for traditional as against 'other activities' including farming. This is also possible.

As for skills, the positive sign means that the probability of participation in the modern sector is less for HHs that possess traditional skills. However, that participation in the RNFS is less than could be caused by a shift in production activities from the traditional to the modern sector following development. Skills are particularly important in the developed village which supports the ODL hypothesis.

Land (the size of HH land holding) has a negative sign and is significant at the 10 per cent level suggesting that the probability of a household already in RNFE being engaged in modern non-farm activities may be lower in cases where the size of land holdings is comparatively higher.

It goes against the simple 'growth linkages' hypothesis at household level - though it supports the version that such a hypothesis works best for poorer/smaller farmers. The growth linkage impact on modern non-farm employment dominates the distress diversification (ADD) impact on traditional non-farm employment.

Affluent families in agriculture may not go for RNFE, particularly in the less developed village, whereas the poor sections of the village will work in the RNFS to ensure their survival, the RNFS acts for this group, as a residual sector. However, absence of growth linkages at household levels even if it is the case does not mean that much linkages are absent across households i.e., it may well still be true that villages showing greater agricultural prosperity also demand more village non-farm products, i.e. as agricultural yields as land size increases. Thus the developed village has more participation in non-farm activities due to agriculture's location advantage.

The demographic variable HH age^2 is positive and significant at the 5 per cent level. HH head age was not significant although both have expected signs.

Households whose main activity (all activity) occurs in the December-February period are more likely - if in RNFE -to be in the modern non-farm sector. The probability of participation on modern activity is higher among the self employed. Most traditional activities are associated with self-employment, not with wage employment. As for the 'poor' variable, it is negatively associated with modern activities.

Two interaction variables were used: education with village dummy (not significant), and the season March-May with village dummy. If the households in the developed village engage in modern farm employment during March-May, the household scores one on the interaction

March-may * village dummy. Thus March-May * Village dummy turned to be significant at the 5 per cent level. This shows that the seasonal effect varies across the villages.

The model of modern/traditional non-farm employment is better in identifying the key factors associated with modern non-farm employment at the HH level. Education, skills, season, land holding size are important factors. Migration into the villages, and per acre value of agricultural output the growth (AGL) linkage impact on modern non-farm employment play crucial roles the developed village.

We have identified landholding size as consistently unfavourable to RNFS participation (and within RNFS, to modernity), years of education as consistently favourable; and in-migration, and a work peak in March-May, as generally favourable.

Thus more education and fewer big land holdings, would reduce poverty as well as increasing the modernisation of RNFE; smaller families, older HH heads, would reduce poverty but not affect RNFE; and in-migration would increase the modernisation of RNFE, but not affect poverty. The policies likely, on these findings, to raise and modernise RNFS participation be good or bad for the poor is important. Education supports the wider (ODL) hypothesis. Summary of the signs and significance of the coefficients see Table 15.

Table 15: Summary of the signs and significance of the coefficients obtained in the logit

Independent variables	**Anandapuram RNFE = 1 all Farm = 0**	**Veeravalli RNFE = 1 all Farm = 0**	**Pooled RNFE =1 all Farm = 0**	**Modern: 1 Traditional: 0 (RNFE HHs only) Pooled**
CONSTANT				
LAND	(-)***	(-)***	(-)***	(-)**
EDUCATION	(+)***	(+)***	(+)***	(+)***
AGRL. PER ACRE VALUE OF OUTPUT	(-)*	(-)***	(-)***	(+)*
HH HEAD AGE				(-)*
HH HEAD AGE^2				(+)**
FAMILY SIZE				
CASTE DUMMY1		(-)*	(-)**	
CASTE DUMMY2		(-)*	(-)**	
MIGRATION		(+)**	(+)***	(+)**
SEPTEMBER-OCTOBER	(-)***		(-)**	
DECEMBER - FEBRUARY	(-)**			
MARCH - MAY		(+)***	(+)***	
SK ILL		(+)**		(+)***
POOR		(-)***	(-)***	
VILLAGE DUMMY			(+)***	
LINTER2			(+)**	
MAMINT2			(+)**	(+)***

Notes: - The signs of the coefficients are reported in brackets unless insignificant

- *** Significant at 1 per cent, ** Significant at 5 per cent, *Significant at 10 per cent levels.

Table 16: Key results Table (from 12, 13 and 14 Tables)

	Marginal/impact effects				
Variables	**Anandapuram**	**Veeravalli**	**Pooled**	**Modern/tradi**	**Modern/tradi**
Land Holding Size	-0.0391***	-0.131***	-0.0898***	-0.04**	-0.05**
Education (years of education)	0.0261***	0.0332***	0.0247***	0.05***	0.06***
Per acre value of agri.output	-0.00000377*	0.000028***	-0.000014***	0.00*	0.00*
HH head age	not significant	not significant	not significant	-0.02*	-0.02*
HH head age^2	not significant	not significant	not significant	0.00**	0.00**
Caste dummy 1	not significant	-0.159*	-0.0104**	not significant	not significant
Caste dummy 2	not significant	-0.183*	-0.0141**	not significant	not significant
Migration in	not significant	0.211**	0.142***	0.11**	0.12**
September - November	-0.213***	not significant	-0.148**	not significant	not significant
December - February	-0.150**	not significant	not significant	not significant	not significant
March - May	not significant	0.659***	0.288***	not significant	not significant
Skilled 1, Unskilled 0	not significant	0.210**	0.856*	0.95***	0.17***
Poor 1, Non-poor 0	not significant	-0.210***	-0.116***	-0.09*	-0.10*
village dummy (A=1 V=0)	-	-	0.253***	-0.37*	not significant
log - Likelihood	-111.12	-184.79	-301.77	-231.25	-228.24
% correct prediction	86.16	84.52	85.10	82.57	82.39

Notes: *** Significant at 1 per cent level, ** Significant at 5 per cent level, * Significant at 10 per cent.

For Anandapuram a one acre increase in land holding decreases the probability of HH having non-farm employment by 3.91 percentage points. For Veeravalli village the corresponding figure is very high and it is 13.1 percentage points. For pooled regression the marginal effect is close to 9 percentage points (see Table 16).

The next explanatory variable is years of education. The marginal effect of education on the dependent variable is also higher in the village compared to Anandapuram, a one year increase in education of workers raise the probability of non-farm employment by 3.3 percentage points. The comparable figure for Anandapuram is 2.6 percentage points which is almost similar to the pooled regression results.

For per acre value of agricultural output it is found that in Veeravalli this particular variable is significant at one per cent level but in Anandapuram the variable was significant only to somewhat reduce the value of confidence (at 10 per cent). However, the same variable was also significant at a 10 per cent level in the pooled regression. Although a significantly negative marginal effect is being detected what is very striking about these coefficients is that all are very close to zero. In relation to the impact effect of the caste variables, it is found that if the HH belongs to backward caste, with the given average characteristics, the probability of non-farm employment decrease 1.04 percentage points in pooled regression and exactly the same impact can also be found in the case of the caste dummy variable.

The dummy variable for skilled and poor was found to be significant only in Veeravalli with an equal size of impact effect.

We can now conclude from the above discussion that land holding size per acre value of agricultural output can have a negative effect on non-farm employment. This is also expected *a priori* because the more land a HH possesses the more likely it is that it will be involved in agricultural activities. On the other hand, for education the relationship is positive because the higher the level of education the higher the chance of finding employment outside agriculture.

Some general observations moreover emerge. The much greater propensity of a HH to have a main worker principally in the RNFS is explained in Veeravalli than in Anandapuram (in terms of log-likelihood, χ^2 tests, the number of significant variables, the size of marginal impact coefficients) and in pooled data than in dealing with Veeravalli and Anandapuram separately. Land holding size (- vely) and years of education (+vely) are significant in all cases. Migration-in is significant and positive, except in Anandapuram, similarly skills and absence of poverty.

4. Conclusions of the logit results:

The logit regression results reported in this paper are summarised in Table 16. The conclusion for the Logit Regression analysis of the determinants of whether a household has a main worker in non-farm employment in Anandapuram, in Veeravalli and in the pooled data for both villages, reveals that it is significantly negatively related to land holding size. This relationship is stronger (i.e. the decrease is greater) in the agriculturally developed village compared to the less developed village. This suggests either that, for total RNFE, the growth (AGL) linkage impact on modern non-farm employment 'dominates' the distress diversification (ADD) impact on traditional non-farm employment, or that modern, 'agriculture-stimulated' activity has higher weight (or some of each). In either case, big farmers are less likely to have a main RNFE, suggesting that farm land actively reduces total-RNFE participation. Households with less farm land do more RNFE, supporting the hypothesis that distress diversification (ADD) dominates growth linkages. In the pooled data set; for a one acre increase in land holding size, the probability of household having any non-farm employment decreases by 9 percentage points, and in modern non-farm employment decreases marginal impact effect more in the developed village by 4 percentage points compared to less developed village.

However, there is of course the multivariate effect of farm size; because there are higher levels of production following from ownership of more land, the production-consumption linkages mean that the likelihood of non-farm employment is increased through another channel. Wealthier villagers invest more in their children's education, which increases the likelihood of them taking non-farm employment; they also consume more, meaning more work for others. In the pooled data set one more year in education increases the chances of getting

modern non-farm employment by 5 percentage points. It seems some of the results have economic and non-economic barriers.

The more land a household has, the less likely that this household itself will be involved in agricultural activity. But this 'same-house' approach conceals the fact that the production linkages between the farm and non-farm are strong consume more, meaning more work for other households. Also there are production linkages. Households with more land require agricultural mechanisation (tractors and threshing machines, etc.) which, in turn, creates more non-farm employment but less so than animal draught, so small farms have higher propensity to use local RNFE (e.g. Hazell and Ramasamy (1991)] Meanwhile, the capital generated from the agricultural output may be invested in non-farm activities[14].

Education is significantly positively related to non-farm employment in each village, and on the pooled data. The marginal effect of education on the probability of HH having non-farm employment is greater in the more developed village compared to the less developed village. In this case, the effect of literacy in raising demand and/or supply for 'modern' RNFE appears to outweigh the effect in reducing them for traditional RNFE.

Per acre value of agricultural output is significant negatively related to household RNFE likelihood in Veeravalli and the pooled regression ($p = .01$) but in Anandapuram the variable was significant only to the reduced level of confidence ($p = .1$). This supports that for RNFE as a whole growth linkages to the modern sector, from agricultural growth, are very slightly outweighed in these villages by distress diversification to traditional RNFE. Land holding size and per acre value of agricultural output going opposite side in the case of modern RNFE. However, the elasticity for value of agricultural output is tiny and very close to zero.

If the household belongs to backward caste, scheduled caste or scheduled tribe the probability of non-farm employment decreases by 1.04 percentage points in the pooled and Veeravalli regressions. For members of these castes (BC, SC and ST) there is less likelihood of non-farm employment. These groups are mainly agricultural labourers, for non-farm employment requires resources such as capital, education, technology, and political influence, which are available mostly to the higher caste elite minority. The point is social status makes it harder; social status effects economic status. These groups are often locked farm labour, and neither good nor bad agricultural growth will much affect their RNFE share, which will be below that of other households. But in villages with tanneries the result would be the opposite, again very important but again saying little or nothing about distress diversification verses growth linkages. Lower caste people may feel inhibited from entering certain types of RNFE because they fear discrimination treatment from employment and fellow workers. Also lower castes even among poor this makes their children achieve higher levels of education, this intern restrict modern RNFE.

In Veeravalli one would expect these growth linkages from agriculture would lead to a greater expansion of modern RNFE relative to traditional RNFE than in less developed village. This is likely to make it harder for backward castes to engage RNFE in the more developed village for both the referred identification earlier (education or fear of discrimination); hence the more significant link of RNFE to caste in Veeravalli.

The marginal effect of migration-in on the probability of HH having non-farm employment is also high i.e. 21.1 percentage points in the developed village, and for the pooled data 14.2 percentage points. This result can be interpreted more cautiously for the growth linkages (AGL) hypothesis on the following grounds. In the agriculturally more developed village one would expect these growth linkages and expansion of RNFE which might intern induce migration. If it is agricultural growth that induces migration (as migration will be; evidence was certainly more from Bihar, Eastern UP, to Punjab). This again suggests that at household level the 'linkage' effect of such growth in swelling total RNFE (via the modern sub-sector) outweighs its negative effect in shrinking the trade subsector of RNFE.

The dummy variable 'skills' (any marketable expertise, e.g. barber, motor mechanic, astrologer, photographer, radio repairs, etc.) is found to be significant only in Veeravalli, the developed village, supporting the growth linkages (AGL) hypothesis (even prosperous

[14] The results do not directly demonstrate this but it is what we would expect.

modern farmers use much more astrologers and barbers) of modern non-farm employment. A lack of skills provides an entry barrier into the wider market place.

Poverty was negatively related (p = .01) to the possibility of non-farm work for the developed village, and for the pooled data, which does not support for the overall distress diversification (ODD) hypothesis. By implication it suggests that household development out of poverty is associated with increased RNFE prospects (ODL).

Both Caste dummy variables, as well as migration into villages and seasonality (September-November) have quite strong effects on non-farm employment. For example, a household with average characteristics in terms of in caste dummy 2 (if the household/ is from a Scheduled caste or from a Scheduled Tribe, the dummy takes the value 1, or 0 otherwise), has a 9 per cent greater chance of being employed in modern non-farming. However the effect of the March-May (agriculturally rough period) dummy is a 9 per cent lower chance of modern RNFE. It is very striking to see that the 'skill' and 'poverty' dummies have the expected signs *a priori*. A HH with a single main skilled worker has a 95 per cent greater chance of being involved in the modern sector. Again the requirement of special skills for entry into the modern non-farming sector is stressed. Similarly we can that the poor/non-poor dummy variable is negatively related to modern non-farm employment (p = .1).

For the pooled data the probability of any household the higher the level of education, the greater the chance of engagement in modern non-farm employment (p = .05). The per acre value of agricultural output, and age^2, are significantly positively associated with modern RNFE, and household head age negatively so. The marginal effects are -0.02 for age and 0.0002 for household head age^2. The impact of per acre value of agricultural output is negligible.

These results highlight the fact that in many cases the critical variables modern and traditional RNFE vary significantly. Also, different factors are influential on the outcome of the dependent variable in the three models (the two villages separately and pooled). For example, land size (the growth (AGL) linkage impact on modern non-farm employment 'dominates' the distress diversification (ADD) impact on traditional non-farm employment], education (supports wider (ODL) hypothesis) and seasonality are equally important for both the villages separately (although different seasons are relevant in the different villages; September-November in Anandapuram and the pooled data, December-February season negatively, and March-May positively, for Veeravalli village only Work in March to May season which under line a particular set of activities (When the agriculture season was slack) and the pooled data. Poverty, migration into the villages, and per acre value of agricultural output (he growth (AGL) linkage impact on modern non-farm employment] lay crucial roles in the developed village and in the pooled data. Caste is also an important factor for developed village and the pooled data. Skills are particularly important in developed village has supports the ODL hypothesis.

With a one per cent increase in age, the probability of the household being engaged in modern RNFE reduces by 1.8 per cent. In this model the relationship is not linear. The reason is that the coefficient on household age^2 is positively significant (beyond a certain age the probability will fall). Those households below average age experience a decline in probability of working in RNFE as age increases. But for those households aged above mean, the probability of working in modern RNFE increases. We have to interpret these two variables together. The sign patterns show that the probability decreases for younger households and increases for older household heads. Younger household heads will be in traditional non-farm occupations whereas older household heads will be in modern RNFE. This is possibly because modern RNFE requires certain skills which it is not possible to acquire immediately. As time passes the younger generations gradually acquire skills and move to the modern RNFE because of growth linkages effect.

For interaction between village dummy (less developed 1 and more developed 0), the relationship is positive. More education increases the probability of non-farm employment. An increase in education by one year i.e. 1 per cent increase in education leads to an increase of 2.47 per cent in RNFE. In each village for which the score 1, the village dummy (i.e. less developed village) those with less education are less likely to work in non-farm. This is possible because when agriculture development is poor, people go for relatively lower paid jobs because of distress diversification. The relationship between education and probability of working in RNFE is positive and significant. That means that if a person lives in the less

developed village and everything else is constant, that person has a 25 per cent increased chance of working in the non-farm sector. For those who have the same level of education the probability of working in non-farm is higher in the less developed village.

RNFE is often seen as an offshoot of bad agricultural performance - a distress diversification in India. That is where the problem arises. Our work suggests that more RNFE emerges primarily out of prosperity of agriculture. This will lead to a healthy employment environment and also boost demand for non-traditional consumer goods. Our results support these recommendations, for example the variable ‘skills’ (any marketable expertise) is found to be significant at household level only in a developed village supporting the growth linkages hypothesis into modern RNFE.

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Appendix 1

The study of the two selected districts (Krishna and Visakhapatnam) presents a picture of contrasts. Demographic characteristics, according to the 1991 Census, show that the population of Visakhapatnam is less than that of Krishna. Literacy rates for both males and females is also lower, indicating the backwardness of rural Visakhapatnam.

The total geographical area of Visakhapatnam is greater than that of Krishna but the NSA is only 29.1 per cent compared to 57.1 per cent for Krishna.

The area irrigated by different sources (canals, tanks and wells of different types) is much higher for Krishna (427,000 hectares), compared to Visakhapatnam (132,000 hectares). The cropping intensity of the Krishna district (partly because of the good irrigation system) is 149.1 per cent and 128.18 per cent for the Visakhapatnam district.

The area taken up by food crops is 88.3 percent of the total cropped area in Krishna and 79.4 per cent in Visakhapatnam, but the NSA, even per rural person or worker, is itself much higher in the Krishna district. The food crops in Krishna are a commercial link to greater land inequalities than in Visakhapatnam.

Considering the demographic characteristics, cropping patterns and the available irrigation facilities in the two districts, we find that the district of Krishna is relatively more developed compared with the district of Visakhapatnam. Similar differences are noted in the two villages (Veeravalli and Anandapuram respectively) that have been selected from the two districts.

The villages covered in the study are: (1) Veeravalli (Census 1991, population 5,437) in the district of Krishna; (2) Anandapuram (census 1991 population 5,573) in the district of Visakhapatnam[15]. In Visakhapatnam most irrigation is performed through tanks and most of the tanks are rainfed. In Anandapuram rainfed tanks are also the predominant source (77.8 per cent) of irrigation, the remaining 23.7 per cent originating from tube and dug wells. The cropping pattern in the village resembles that of a dry region. Most farmers in the area have marginal farms (less than 2.46 acres). Indeed, the majority of the land holdings (51.61 per cent in Veeravalli and 77.93 per cent in Anandapuram) are concentrated in the lowest size groups viz. 0.5 to 2.46 acres. A detailed land-holding pattern is presented in Chapter 4. A study of the village of Anandapuram village enables us to understand the relationship between less-developed agriculture and the growth of non-farm employment.

In Veeravalli a canal is the predominant source of irrigation supplying 77 per cent of the Gross Irrigated Area. The remaining 23 per cent is irrigated from tube and dug wells. The entire village is located in the delta region. Cropping patterns and labour use are different from those of Anandapuram. Veeravalli is endowed with a rich soil, and is agriculturally advanced (in terms of yield rates) with paddy being the main food crop produced. The net irrigated area in the village is 4,000 acres occupying 84 per cent of the cropped area. The unirrigated area is only 238 acres. Paddy is the main crop with 3,486 acres, with sugar cane (378 acres) and groundnut (192 acres). The main source of irrigation for the village is the river Krishna. The village will be studied to examine the relationships between the prosperity of agriculture and the development of non-farm activities. In both villages 35 per cent of the total households were randomly selected for interview, these yielded a total of 465 households in Veeravalli, and 354 households in Anandapuram. From each selected household, information relating to a number of variables was collected by canvassing a pre-designed schedule which included information on a number of demographic, social, and economic characteristics, such as the number and size of households, family members' occupation, social status, land holding status, value of agricultural output, number of working days, percentage of non-farm employment to total employment, migration/commuting in and out, literacy, income and expenditure.

The important consideration was the presence of various non-farm activities alongside agriculture activities. Almost all occupations under different categories of non-farm activities (traditional and modern) are covered in the two villages. The survey covered small and marginal farmers and agricultural labourers, households with exclusively non-farm

[15] Visakhapatnam city is the district headquarter. It is a port city and the industrial centre of North Coastal Andhra.

employment, as well as households with both farm and non-farm employment. It covered traditional and modern varieties of non-farm employment.

An in-depth survey among a sub-sample of households was then conducted with a comprehensive questionnaire. The field work involving the household surveys in the villages, collection of secondary data at district level, the primary data of two villages, was completed over 6 months (June 1993 to January 1994), and a second phase of field-work took place (March 1995 to April 1995). Further visits were made to the two villages at regular intervals throughout the second phase of the study. Data collection and interviews were carried out by the researcher.

The village survey findings help to understand the employment (occupational distribution of the population) pattern in the village. It is possible to compare the survey results with the occupational distribution of the populations of the villages as revealed historically by the Census (from 1971, 1981, 1991). This will help to ascertain whether the significance of traditional occupations is decreasing. The employment and income levels of the non-farm sector are compared with those of the farm sector. Such a comparison can help to establish whether there is distress-diversification (people employed in the non-farm sector because there is no place for them in the farm sector).

Statistical tools (such as LOGIT models, and correlations) have been used in the present study. The details of these techniques is given in relevant chapters.

In order to analyse socio-economic characteristics of the sample households, simple percentages are used. To identify the inequalities in the distribution of land assets and income Gini coefficients and Theil indices are estimated. To estimate the impact of various factors on non-farm employment, at the micro (household) level, single linear model regression techniques and elasticity estimates are used (detailed techniques are presented in the respective chapters).

Appendix 2

The method of data collection:

We define a household as 'engaged in non-farm activities' if any member has a primary (at least 183 days a year) occupation, one (a primary occupation always in just one) Census of India 1991 occupational categories 1V-1X.[16]. For simplicity we shall refer to such households as 'non-farm households' even though they may also derive part of their income from farming. The probability that a household will fit this definition can then be determined by certain location/village specific factors and household-specific variables. The logit model is used to estimate the probability, (conditional on the HH specific independent variables being at the mean) of a household in a village being engaged in rural non-farm activity. All beta elasticity, etc. estimates are at the point of means in any set of linear best fits either OLS-regression based or logit. Thus the combined effect of more than one variable on the conditional probability of a household being a non-farm household can be calculated. In addition, the marginal effect of a unit change in a single variable, holding all other variables constant (normally at their means), on the probability of a household being non-farm household can be computed.

[16] The term 'RNFS', is often used interchangeably with 'rural non-agricultural activities', 'rural non-farm activities', and even 'rural industries'. While there are subtle differences between these terms we have chosen to treat them as synonymous, since employment is the focus of this chapter. [Cf. Chuta and Liedholm (1979); Shand (1986); Islam (1987a) and Ranis and Stewart (1993)]. Definition of non-farm workers: All those who worked in any field of economic activity other than cultivation, agricultural labour. It includes categories IV (mining and quarrying), V (a) a household industry is one that is engaged in production, processing, servicing, repairing or making and selling (but not merely selling) or goods. It does not include professions such as those practised by a pleader or doctor or barber, musician, dancer, dhobi, astrologer or merely trade or business, even if such professions, trade or services are run at home by members of the household) V (b) manufacturing, processing, servicing and repairs in other than household industry, VI-IX 9 (constructions, trade and commerce, transport, storage and communications, other services) [Census of India (1991), Primary Census Abstract Part-II B (ii) p. xlvii].

In the villages surveyed, the household and not the individual was taken as the unit of enumeration and also in fact we had find out whether each working individual had a primary occupation in the RNFS. This was done because occupations such as cultivation, trade, household industry, services, arts and crafts (non-farm activities) are often carried out jointly within the household. Whilst such a view of the household is perhaps not accurate, it is difficult to calculate an individual's efforts in any activity on the basis of standard interviews. We do rely on each HH member's 'primary occupation' being RNFS. For further details see Appendix to Chapter 4 (a).

Principal occupations were determined on the basis of the time spent by the HH members. Respondents (who were mainly the HH head but occasionally all of the inhabitants within the HH) were asked to rank their occupation as being primary on the basis of what they spent the majority of the year employed as. So, a household may have several secondary occupations, but only one primary one. The occupation which was occupied by working members of the HH most often and which required at least 183 or more days employment per person in a year (Census of India, 1991) was treated as primary. If all members of the HHs were found to work less than 184 days each, then they were treated as being involved with a subsidiary occupation. The occupation which was selected was the one which the working HH member(s) spent most time employed in.

We seek to account for a household's involvement in the RNFS by reference to its demographic features (e.g. male/female and child/adult ratios, household size) and to other household specific characteristics (occupation, education level, poor non-poor, caste, seasonality, family size, land holding size).

District and village selection criteria:

Most data were not publicly available (e.g. household head age; level of schooling of the workers). Hence primary data were collected from July 1993 to January 1994. Data for 819 households was gathered from two villages (Anandapuram 354, Veeravalli 465), the former from a more agriculturally developed district (see part one of this chapter). Once a district had been selected, all the *Mandals* of the district were listed and one *Mandal* was randomly drawn. In selecting the village a similar procedure was adopted. The selection of the village was based on village characteristics.[17] In other words, we looked for villages near the district average for certain characteristics. Considerations of a logistics nature also mattered as we needed to be able to access the nearby villages.

Selection of Households:

[17] Prof. G. Parthasarathy and the late Dr. Pramit Chaudhuri (both of whom worked extensively in these areas for more than 3 decades) were consulted in the design of the sample. AP is divided into 23 districts and each district was sub-divided into *Mandals* for administrative purpose. Each *Mandal* comprises a group of villages with a population of 5000 or below.

The households[18] were a random sample of 35 per cent taken from our list of all the HHs in the village, prepared with the help of the *gram panchayat* (village council) administrative officer.

The analysis is at an aggregated and disaggregated level. In order to capture the impact of RNFE share increase and decrease, entry and exit, it is necessary to separate them. Thus, we develop four models using a different set of variables.

The households were divided into those spending the longest proportion of working time (1) RNFE and farm employed, (2) modern or traditional RNFE.

[18] A 'household' as defined in the 1991 census, is a group of persons who commonly live together and take their meals from a common kitchen unless the exigencies of work prevented any of them from doing so. A household may comprise persons related with blood or a household of unrelated persons or having a mix of both. Examples of unrelated households are boarding houses, messes, hotels, residential hotels, rescue homes, jails, ashrams etc. These are called 'institutional households'. There may be one member households, two member households or multi-member households. For census purposes each one of these types is regarded as a 'household' (Census of India 1991, India, Final population totals paper-2 of 1992, Brief Analysis of Primary Census Abstract, p.4). I have used this definition for my analysis.

Appendix Table 1. Correlation matrix of all variables used in the logit model at household level:

Variables	non-farm	Land	hhage	familysize	casted1	casted2	migration	sep-nov	Dec-feb	poor	education	skill	agrl.value	March-may
non-farm	1													
Land	-0.33	1.00												
hhage	-0.10	0.16	1.00											
familysize	0.01	0.06	0.05	1.00										
casted1	0.07	-0.18	-0.07	0.01	1.00									
casted2	-0.09	-0.10	-0.02	0.02	-0.51	1.00								
migration	0.14	-0.07	-0.07	-0.07	-0.09	0.12	1.00							
sep-nov	-0.33	0.09	0.08	0.04	-0.06	0.11	-0.07	1.00						
Dec-feb	-0.14	0.12	0.03	-0.06	-0.01	-0.06	0.03	-0.36	1.00					
poor	0.42	-0.18	-0.07	0.02	0.11	-0.12	0.00	-0.46	-0.50	1.00				
education	0.12	0.24	-0.02	-0.02	-0.30	-0.07	0.20	-0.08	0.05	0.06	1.00			
skill	-0.06	0.30	0.05	0.05	0.00	-0.21	-0.03	-0.02	-0.04	0.11	0.28	1.00		
agrl.value	-0.33	0.42	0.15	0.09	-0.01	-0.14	-0.11	0.18	0.11	-0.22	0.10	0.47	1.00	
March-may	0.42	-0.17	-0.08	0.02	0.11	-0.10	0.02	-0.43	-0.50	0.89	0.07	0.08	-0.21	1.00

Comment: In the majority of cases, the variables are not correlated at a high level.

Appendix Tables 2 and 3

Non-farm Occupations of Selected Households' Members in the two Villages

Appendix Tables 2 and 3 show that different kinds of traditional and modern non-farm activities are undertaken in the two villages. The type of activity people undertake in these villages also reveals that there are direct linkages between agriculture and non-farm activities.

The traditional non-farm employment in household enterprises are persons who operate their own non-farm enterprises, or are engaged independently in a profession or trade (on their own account or with one or a few partners).

For the purpose of these tables "traditional" is taken to mean pre-industrial. There is no specific time point at which "modern" starts as some industrial innovations were introduced prior to independence and others afterwards.

Appendix Table 2 Part 1: Traditional rural non-farm occupations of selected households' members (in Anandapuram)

Occupations		**Males**	**Females**	**Total**
1	Tailoring	19	4	23
2	Panshop, soft drinks (soda sales) Shop selling sweets, tobacco, cigarettes.	8	2	10
3	Kirana (dry goods) store Selling provisions, soaps, detergents.	25	8	33
4	Servant maiden household	1	2	3
5	Shandy business	29	7	36
6	Milk vendor	14	16	30
7	Rickshaw puller	21	0	21
8	Shepherding	11	2	13
9	Vegetable vendor	4	1	5
10	Poorohit (Person who conducts rituals of Hindu Religion).	4	0	4
11	Tea Stall	10	5	15
12	Porter (local names mutta worker Maistry)	4	0	4
13	Fishing	3	1	4
14	Fostering	1	0	1
15	Fruit vending	3	1	4
16	Mutton vending	8	0	8
17	Barber	9	0	9
18	Mediator (who buys and sells paddy, pulses) (not legal)	3	0	3
19	Onion vending (exclusively)	3	0	3
20	Carpenter (mill repair helper)	16	1	17
21	Mango vending	1	0	1
22	Washermen	7	10	17
23	Butcher	1	0	1
24	Toddy tapping	23	9	32
25	Tapi worker (mason)	4	0	4
26	Middle man (sale of commercial crops yield)	2	0	2
27	Butter milk vending (exclusively)	0	2	2
28	Astrologist	8	8	16
29	Banana coconuts seller (exclusively)	0	2	2
30	Kalasi (porter)	3	0	3
31	Sweet vendor	1	0	1
32	Petty Trade	3	1	4
33	Cloth business	1	0	1
34	Cleaner	1	0	1
35	Harikatha (traditional profession entertaining people)	1	0	1
36	Tobacco business +Soda only	10	6	16
37	Hostel worker	1	0	1
Total		263 (70.5)	88 (84.6)	351 (73.6)

Source: Field Survey:

Appendix Table 2 Part 2: Modern non-farm occupations[19] of selected households' members (Anandapuram)

		Males	Females	Totals
38	RTC (Road Transport Corporation) Driver and conductor	2	0	2
39	Quarrying	29	6	35
40	Convent Principal (teacher)	7	3	10
41	Gooddaku factory worker	2	0	2
42	Jute mill worker	4	0	4
43	Hotel worker	3	2	5
44	Factory employee	3	0	3
45	Plastic worker	1	1	2
46	Security	1	0	1
47	RMP Registered Medical Practitioner Doctor + veterinary	3	0	3
48	Govt. Hospital attender & Co-operative	2	0	2
49	Plywood factory worker	1	0	1
50	Supervisors	1	0	1
51	Hospital Nurse	0	1	1
52	Co-operative	1	0	1
53	Post master	1	0	1
54	Rice mill worker	3	0	3
55	Lorry driver	1	0	1
56	Co-operative Society	1	0	1
57	Cycle repair	6	0	6
58	Cycle vendor	3	1	4
59	Medical shop (trade medicine)	2	1	3
60	Cycle parts vending	1	0	1
61	Construction (building work for public)	1	0	1
62	Lodge worker (freemasons)	3	0	3
63	Lorry cleaner	2	0	2
64	Ice selling on bicycle	3	0	3
65	Electrician Mike (audio) set & lighting	2	0	2
66	Mini contracts (low budget) in irrigation	1	0	1
67	Auto driver	4	0	4
68	Scooter Mechanic	1	0	1
69	Photography	1	0	1
70	Worker in sea food company	1	0	1
71	Bed making worker	1	0	1
72	Painter	1	0	1
73	poultry keeping	3	1	4
74	Timber Department (private)	1	0	1
75	Oil business	1	0	1
76	Radio repair	1	0	1
77	Ganuga Oil extraction from seasmum and ground nut	5	0	5
Total		110 (29.5)	16 (15.4)	126 (26.4)
Grand Total		373 (100)	104 (100)	477 (100)

Note: The figures in brackets are percentages.

Source: Field survey.

[19] Regular salaried/wage employee: persons working in other's farm or non-farm enterprises, both household and non-household, and getting in return salary or wages on a regular basis (and not on the basis of daily or periodic renewal of work contact) are the regular salaried/wage employees. This category not only includes persons getting time wage but also persons receiving piece wage or salary and paid apprentices, both full time and part-time.

A close look at Table 4.20 parts 1 and 2 (traditional and modern non-farm occupations of members of selected households in Anandapuram) reveals that there are more workers in traditional non-farm occupations than in modern occupations. The majority of males and females are traditional such as milk vendors, washer women, *toddy* tapping, and *shandy* business which are all traditional occupations. A higher number of male workers are found in traditional occupations such as *shandy* business, *kirana*, rickshaw pulling, *toddy* tapping, and tailoring. But there is diversification in occupations, due to changing consumer demand for tailoring and *kirana* businesses.

Forty occupations are listed for modern non-farm employment. Of these, quarrying records the highest percentage of male and female workers. Other important occupations are doctor, teacher, and nurse for both males and females.

The total number of non-farm occupations (traditional+modern) observed in our sample study in Anandapuram is found to be 77 in total. The number of persons going in for these non-farm activities is still found to be higher among the traditional occupations based on caste such as *purohit* (a person who performs marriages) or astrologer. It appears that economic pressure in less developed villages is strengthening the traditional occupations rather than diversifying these occupations into modern occupations. At the same time non-farm occupations are expanding into both traditional and modern occupations providing scope for the breaking up of the structure of the rural society.

Appendix Table 3 Part 1: Traditional non-farm occupations of members of selected households in Veeravalli:

Occupations		Males	Females	Total
1	Kirana (dry goods) store	7	1	8
2	Cloth selling (mobile)	4	1	5
3	Petty trade	1	0	1
4	Carpenter	14	1	15
5	Pottery	32	20	52
6	Rickshaw pullers	9	0	9
7	Tea stall	10	2	12
8	Maistry	2	0	2
9	Dairy milk	6	0	6
10	Priest	2	0	2
11	Pan business	9	5	14
12	Tailor	7	4	11
13	fish vending/pisciculture/processing	1	1	2
14	Poorohit	2	0	2
15	Banana + fruit seller	6	1	7
16	Cobbler	1	0	1
17	Milk seller	5	5	10
18	Washer man	4	3	7
19	Adda Leaves selling for use of tiffin and meals plates made by Bauhinia vahlii or ternihalia catappa leaves.	1	4	5
20	Toddy tapping	2	1	3
21	Barbers	8	0	8
22	Butcher	5	1	6
23	Soda shop	4	0	4
24	Vegetable vending	6	0	6
25	Animal Husbandry	1	0	1
26	Curtain Stitching	4	0	4
27	Rice Business	1	0	1
28	Basket making	1	1	2
29	Ration shop	1	0	1
30	Cook	3	0	3
31	Anganwadi work (Kindergarten helper)	0	1	1
32	Attender	6	0	6
33	Village servant (Administrative)	2	0	2
34	Sweeper	2	0	2
35	Bill collector	1	0	1
Total		170 (49.3)	53 (85.5)	221 (54.3)

Source: Field survey

Appendix Table 3 Part 2: Modern non-farm occupations of members of Selected HHs in Veeravalli:

		Males	Females	Total
36	Worker tyre shop	1	0	1
37	Lorry labour drivers & cleaners	18	1	19
38	Paints Company	1	0	1
39	Jute mill	16	0	16
40	Tractor driver	4	0	4
41	Rice mill	8	1	9
42	Paper mill	2	0	2
43	Teacher	10	4	14
44	Railway worker	6	0	6
45	Assistant Engineer	2	0	2
46	Sugar factory	23	1	24
47	Private job apprenticeship	1	0	1
48	Health Inspector	2	0	2
49	Clerks	5	0	5
50	Factory employ	10	1	11
51	Field supervisors	1	0	1
52	Leafco (lorry equipment) factory	2	0	2
53	Co-operative Bank + clerk	2	0	2
54	Operator (machine)	2	0	2
55	Village Administrative Officer	2	0	2
56	Supervisors	1	0	1
57	Bank supervisors	1	0	1
58	Instructor in training institute	1	0	1
59	Mechanic operator	2	0	2
60	Post master	3	0	3
61	Telephone worker	1	0	1
62	RMP Doctor	1	0	1
63	Alcohol factory	3	0	3
64	Chemical factory	1	0	1
65	Bus driver (tourist)	1	0	1
66	Librarian	1	0	1
67	Security	1	0	1
68	Public works Department (PWD) employee	1	0	1
69	Operator in agro industry	1	0	1
70	Excise Constable	1	0	1
71	Electrician	10	0	10
72	Oil engine operator	2	0	2
73	Oil mill	2	0	2
74	Contract	2	0	2
75	Cycle shop	1	0	1
76	Grinding	0	1	1
77	Medical shop	1	0	1
78	Wine shop	1	0	1
79	Cycle shop	5	0	5
80	Welder	1	0	1
81	Construction	5	0	5
82	Technician	1	0	1

83	Motor Mechanic	2	0	2
84	Painting	1	0	1
85	Wood cutter	3	0	3
Sub-Total		175 (50.7)	9 (14.5)	184 (45.2)
Total		345 (100)	62 (100)	407 (100)

Note: The figures in brackets are percentages

Source: Field-survey.

The overall occupational structure in Veeravalli is more diversified than in Anandapuram, but less so for the traditional 35 different occupations. Potters, carpenters, tea-stall owners, and barbers account for the highest percentage of male self-employment. For women pottery is the most important occupation. Fifty modern RNFE occupations were recorded in Veeravalli. Among males, employment in the local sugar factory accounts for the highest percentage. Other important modern non-farm occupations for men are lorry driver and cleaner, jute mill worker, other factory worker, electrician and teacher respectively. Among females, teachers constitute the highest percentage.

In contrast to traditional RNFE, modern employment is more diversified in the developed village of Veeravalli, but female work participation is limited to the educational service sector, rice mill, sugar factory, and other factory employees only. This could reflect that families are financially sounder, because they obtain regular wage employment and there is less need for family income supplementation.

The number of occupations in the RNFS in a developed village suggests that it is possible to strengthen employment in such a village rather than in an under developed village. It may also be concluded that non-diversification of occupations in a traditional village reflects underdevelopment of the village and that non-diversification in RNFS could result in further underdevelopment.