DIVERSIFICATION AS A STRATEGY FOR SMALL FARM DEVELOPMENT : SOME EVIDENCE FROM TAMIL NADU

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Introduction

The VIII plan has adopted agricultural diversification as a strategy for income augmentation and employment generation (Government of India, 1992). This strategy is particularly relevant for enhancing the economic opportunities of the small and marginal farm groups whose economic viability is deteriorating fast due to variety of reasons. Not only their farm size is small to take advantage of scale economies, but also their productivity level is very low as compared to other farm groups, partly due to their weaker position in rural input and output markets.

While all farm groups are affected by the phenomenon of rising cost of cultivation (Nadkarni,1988; Acharya, 1992a), smaller farms, whose rate of return from crop cultivation is already precarious, are particularly vulnerable to the problem of escalating cost of cultivation. Added to their woes is the disturbing trend in the income contributed mainly by low value addition in crop cultivation (Vyas, 1994) due to their cereal-based specialisation and self-sufficiency-centred production pattern.

It is in this respect, diversification both within crop enterprise, i.e., towards high value crops like vegetable and horticultural crop as well as across enterprises and activities, i.e., promoting a judicious activities, is being advocated as a strategy for the development of small and marginal farm groups. This paper attempts not only to evaluate the potentials and constraints available for small farm diversification, but also indicate significant implication for formulating an effective agricultural diversification strategy.

Scope and Objectives

While crop diversification is certainly an important component of the overall strategy for small farm development, other dimensions of diversification such as livestock, employment, and income are also equally important for ensuring the economic vaiblity and survival of small farmers as socio-economic entity. This is not only in view of certain inherent economic, resource-related and institutional constraints for smaller farmers to move away from food production but also in view of a relatively better prospects for enhancing their employment and income from non-crop activities especially animal husbandry and rural non-farm occupations.

It is, therefore, useful to consider and evaluate how small and marginal farmers can benefit from agricultural diversification conceived in a much broader context than mere crop diversification per se. Furthermore, in order to understand the comparative advantage or otherwise of smaller farm groups in gaining from various aspects of diversification, it is highly instructive to evaluate their diversification potential vis-a-vis that of other farm groups.

Within the scope specified above, this paper intends to empirically address farm group-specific variations in (i) the land use and cropping patterns, (ii) the income, cost and net return both in the crop and livestock enterprises and (iii) the relative employment and income significant enterprises (i.e., crop and livestock) and activities (i.e., wage labour and non-farm

participation). Finally, based on an analysis of these aspects, important policy implications for an effective strategy for small farm development will be identified.

Empirical Context

Tiruchirapalli district in Tami Nadu provides the empirical context for this study. Four villages representing each of the four agro- climatically distinct regions of the district were selected (For a detailed description of the four agro-climatic regions of Tiruchirapalli district, see Tamil Nadu Agricultural University (1989).). While these sample villages reflect the different irrigation/farming systems of the study district, a total of 218 households with a population of 1234 persons were selected in such a way as to capture different socio-economic configurations within the four study villages (2 For details on the way the study villages and sample households have been selected, see Saleth (1995, Chapter 4).). The sample represents 8 percent of the total households and 10 percent of the total population of the four study villages as per the 1991 Census. The farm size-wise distribution of the sample households and their socio-economic characteristics are furnished in Table 1 .

Table 1 :
Socio-economic characteristics of the sample households.

Farm Size (Acres)	Active Population (%)	Number of sample House-holds	Sample Popula-tion	Total Farm Area (Acres)	Total Animals (CEUs)	Mean Income/ Capita (Rs.)	Mean Assets/ Capita (Rs.)	Mean Age of Head (Years)
0	65.28	39	193	0.00	36.28	2422.04	324.17	41
0-1	78.81	30	151	21.20	37.19	2443.48	1019.64	48
1-2	77.23	36	202	62.10	69.84	2750.79	629.82	48
2-4	77.56	46	254	142.43	122.54	3498.99	1695.63	50
4-6	74.24	24	132	125.15	60.94	6183.03	2811.82	51
6-8	80.23	14	86	102.25	65.51	7338.72	5362.85	50
8-10	68.12	11	69	104.50	41.19	5916.81	5291.52	47
10+	64.63	18	147	308.40	169.29	10018.56	10103.64	56
Total	**218**	**1234**	**73.50**	**866.03**	**602.78**	**4545.46**	**28.159**	**48**

Of the sample households, 18 percent are landless, 30 percent are small and marginal farmers with less than 2 acre of land, 32 percent are medium farmers with a farm size of 2.6 acres and the rest are large farmers having a farm size exceeding 6 acres. The total farm area in the sample is 866 acres representing about 20 percent of the combined total area being cultivated in the four sample villages. The total number of animal units owned by the sample is 603 units. Notably, 14 percent of the sample household do not have any live stock asset at all. While the majority of households have cattle less than four cattle equivalent units (CEUs), only 5 percent of them own more than eight units of cattle. (For aggregation and comparison purpose, different animal categories like bulls, buffaloes, cows, goats, sheep, poultry, etc. are converted into a standard unit known as Cattle Equivalent Unit (CEU) following the procedure used by Mishra and Sharma (1989).)

While land ownership is skewed in favour of larger farms, cattle ownership is concentrated in two farm groups (2-4 and 10+ ac) which together account for about 50 percent of total CEUs. Almost 90 percent of the households have an annual per capita income and household asset

value of less than Rs. 6000. By and large, the sample is essentially representative of the conditions prevalent in most part of rural India and therefore, permits a greater degree of generalisation of the results derived from it.

Crop Sector: Relative Economic Performance

The major premise behind crop diversification strategy is that the economic performance of the crop sector is intimately linked to the underlying cropping pattern. In order to understand better the relative cost, income and net return of different farm groups, it is necessary to evaluate the nature and causes of the observed crop composition of these groups. As a background to such an evaluation of cropping pattern, let us begin first with a description of land use intensity followed by discussion on the nature and extent of land leasing arrangements in our study region.

Land use Intensity

Table 2 gives land use pattern as observed across farm size and irrigation status groups. Land use intensity is evaluated both in terms of cropping and irrigation intensities as well as in terms of the extent of inter-cropping. Given other agronomic and farm-specific factors, the availability and quality of irrigation explain the intensity with which land resources are being utilised. For the sample as a whole, rainfed cultivation dominates with a 50 percent share in net sown area (NSA) and about 39 percent share in gross cropped area (GCA). This is followed by groundwater irrigation with about 28 percent share both in NSA and GCA. Canal irrigation, though accounts for only 12 percent of NSA has a 23 percent share in GCA. Tank irrigation accounts for around 6 percent share both in NSA and GCA.

Table 2 : Land use Intensity Across Farm Groups and Irrigation Types.

Farm size/ Irrigation Status	Net Sown Area (Acres)	Gross Cropped Area (Acres)	Cropping Intensity ', (%)	Net Irrigated Area (Acres)	Gross Irrigated Area (Acres)	Irrigation Intensity (%)	Area Under Inter crop (%)
Farm Size (Acres)							
0-1	20.20	36.14	178.91	14.70	28.95	196.94	19.09
1-2	62.10	93.50	150.56	23.60	51.35	217.58	15.78
2-4	147.18	221.85	150.73	80.48	137.60	170.97	27.59
4-6	125.65	192.35	153.08	77.05	139.15	180.60	15.02
6-8	102.25	194.04	189.77	54.50	128.79	236.31	28.09
8-10	104.50	144.50	138.28	65.00	112.00	172.31	14.53
10+	305.40	444.60	145.58	126.00	217.50	172.62	28.85
Irrigation Status							
Canal	110.08	302.62	274.91	110.08	302.62	274.91	0.83
Tank	47.85	90.01	188.11	47.85	90.01	188.11	9.72
Wells	243.25	371.81	152.85	243.25	371.81	152.85	20.13
Canal +	3.10	9.30	300.00	3.10	9.30	300.00	0.00
Wells							
Tank+ Wells	37.05	41.60	112.28	37.05	41.60	112.28	6.01
Rainfed	425.95	511.64	120.12	0.00	0.00	0.00	44.35
Total	**867.28**	**1326.98**	**159.24**	**159.24**	**441.33**	**815.34**	**24.32**

Obviously, farms located in the rainfed regions have the lowest land use intensity, whereas those especially with supplementary wells in the canal region show the highest land use intensity. Although farms in the size group 6 to 8 acres evince the highest land use intensity, farms larger than 8 acres have not performed better than the small and marginal farmers in this respect. Such a better land use performance of smaller farm groups is due to the fact that 75 percent of the total tiny holdings observed in our sample are located in the canal and tank areas. On the other hand, about 60 percent of the farms larger than 8 acres are located in the rainfed regions.

The intercropped area for the sample as a whole represents about 24 percent of gross cropped area (GCA). Since intercropping is confined largely to rainfed or groundwater regions, it is a characteristic feature of farming under scarce water regimes adopted essentially as an age-old mechanism to cope with weather-related uncertainties. Besides, the practice of inter-cropping also enhances intra-seasonal crop diversification. While the practice of intercropping is common among all farm groups, farms in the size groups of 2 to 4 acres, 6 to 8 acres and above 10 acres have over 27 percent of their GCA under different kinds of intercropping.

Land leasing: Nature and Extent

Our survey provides evidence for an active land lease market in the study region. Although leased-in lands account for 16 percent of NSA for the sample as a whole, in the case of canal region, leasing observed in our study area reveals two distinct patterns (Table 3).

First, the proportion of lands obtained on a lease basis varies directly with farms size, whereas it is exactly the opposite in the case of land obtained on a rent basis. That is, smaller farms obtain land largely under lease arrangement. Since lease arrangement (which is usually long-term in nature) involves a lump sum payment to the landowner at the time of leasing-in land, economically better endowed larger farmers are in a better position to go for this arrangement usually involving payment in kind at the end of an year or season. This system is convenient for small farmer as rent can be paid out of output.

Second, although the canal and the rainfed regions together account for about 74 percent of the total leased-in lands, these regions differ in terms of the dominant mode of land leasing. For instance, while rental arrangement is dominant in the canal area, lease arrangement is dominant in the rainfed area. This is due to the fact that unlike the lease arrangement, the economic viability of rental arrangement involving payment in kind can be ensured only when assured irrigation is available. This also implies that land use intensity will be higher under rental than under lease arrangement.

Table 3 :
Nature and Extent Of Land Leasing, Tiruchirapalli District, Tamil Nadu (1992-93).

Farm Size/Irrigation Status	Own Land (Acres)	Land Leased in Acres	Lease Arrangement		
			Lease (%)	Rent (%)	Crop sharing (%)
Farm Size (Acres)					
0-1	10.98	9.22	0.00	100.00	0.00
1-2	58.60	3.50	0.000	100.00	0.00
2-4	113.13	34.05	11.45	76.80	11.75
4-6	103.40	22.25	13.48	86.52	0.00
6-8	73.85	28.40	28.17	71.83	0.00
8-10	79.00	25.50	47.06	52.94	0.00
10 +	291.90	13.50	100.00	0.00	0.00
Irrigation Status					
Canal	51.66	58.42	6.68	92.47	0.85
Tank	36.60	11.25	53.33	46.67	0.00
Wells	226.35	16.90	23.67	64.50	11.83
Canal + Well;	53.10	0.00	0.00	0.00	0.00
Tank + Wells	31.25	5.80	0.00	100.00	0.00
Rainfed	381.90	44.05	29.51	35.30	35.1
Total	**730.86**	**136.42**	**32.66**	**67.15**	**0.20**

Cropping Pattern: Variation Across Farm Groups

The crop composition in terms of seven broad crop groups observed across farm size groups and irrigation types is depicted in Table 4.

For the sample as a whole, foodgrains account for 41 percent of the GCA followed by oilseeds (27 percent) and commercial crops (16 percent). Importantly, vegetable and horticultural crops taken together have the least share of just less than 3 percent. One notable aspect of the cropping pattern in the study region is the uniform dominance of seasonal crops over trans-seasonal or annual crops irrespective of the farm size groups being considered. However, the area share of seasonal crops is. substantially higher (over 72 percent) among small and marginal farms as well as farms in the size groups of 8-10 acres.

Table 4 :
Crop composition Across Farm Groups and Irrigation Types.

Farm size/ Irrigation status	Cross Irrigation Cropped Area (Acres)	GCAas % of Total Crop Area	Percentage of Gross Cropped Area Under								
			Irrig ation	Seasonal crops	Cereals	Commercial crops	Oilseeds	Pulses	Veg. tables	Hurt. crops	Spices
Farm Size (Acres)											
0-1	36.14	59.64	80.11	72.94	57.44	26.33	15.50	0.00	0.00	0.00	0.83
1-2	93.50	50.19	54.92	70.50	51.76	17.86	22.19	2.83	0.53	0.00	4.81
2-4	221.85	50.24	02.02	63.42	38.45	17.20	24.75	11.95	2.82	0.32	4.53
4-6	192.35	51.03	72.34	57.19	34.45	37.82	22.69	1.04	0.42	1.46	3.12
6-8	190.04	63.26	66 37	52.47	28.09	35.114	21.88	9.66	1.20	0.00	1.00
8-10	144.50	43.09	77.51	77.16	50.52	8.65	24.22	3.46	0.69	8.30	4.15
10 +	444.60	48.53	43.92	57.71	31.23	13.16	24.52	15.63	2.29	0.79	4.39
Irrigation Status											
Canal	302.62	91.64	100.00	30.78	29.06	69.22	1,72	0.00	0.00	0.00	0.00
Tank	90.1	62.70	100.00	46.12	31.95	42.77	14.17	0.00	4.44	0.00	6.67
Wells	371.81	50.95	100.00	75.71	44.41	5.65	32.34	2.29	4.06	4.57	6.68
Canal +	9.30	100.00	100.00	23.66	11.83	76.34	11.83	0.00	0.00	0.00	0.00
Wells											
Tank +	41.60	37.43	0.00	66.35	39.18	0.00	41.59	0.00	2.40	4.81	12.02
Wells											
Rainfed	111.64	40.04	0.00	71.74	43.29	0.00	30.25	22.65	0.20	0.00	2.44

Note: Briefly, in the context of our sample, foodgrains include paddy, cholam (jowar), cumbu (bajra). and ragi; oilseeds include groundnut, gingerly sunflower, and soybeans; commercial crops include banana, sugarcane, cotton, and korai; pulses include redgram, black gram, green gram, horse gram; vegetables include brinjal, tomato, sweet potato, lemon, and flowers; and spices include chilly, onion and coriander.

Regarding farms group-specific crop composition in terms of broader crop groups, farms with less than 2 acres devote over 50 percent of their GCA to foodgrains, while those with 4-8 acres devote over 50 percent of their GCA to non-foodgrains especially commercial crops and oilseeds and pulses. Although vegetable and horticultural crops have only a marginal share in the GCA of all groups, they confine essentially to farms larger than 2 acres.

The role that irrigation types play in shaping regional cropping pattern is also more transparent from Table 4. Across irrigation types, while trans-seasonal crops account for a major share of GCA under canal and tank irrigated areas, seasonal crops have that distinction in groundwater dependent and rainfed area. More specifically, while commercial crops (especially banana and sugarcane) are confined mostly to water-wise better-endowed canal and tank regions, coarse cereals, oilseeds, cotton, and pulses have a dominant share of GCA in the well-based and rainfed regions. Vegetables and horticultural crops and spices, which are either non-existent or negligible both in the canal and rainfed regions, are relatively more significant in the tank and well irrigated regions.

Certain important implications of the crop composition observed in our study area can now be noted. First, smaller farms display the frequently alluded characteristics, i.e., their tendency for cereal-based specialisation. However, even larger farms especially those in the rainfed regions also share this characteristics. Second, even though medium sized farms show greater orientation towards commercial crops, they have a relatively more balanced crop composition as they devote more or less equal proportion of their GCA to cereals, commercial crops and oilseeds/pulses. From the view point of commercialised agriculture, it is this middle level farm groups with better irrigation facilities that occupy a strategic position. Third, while farm groups differ considerably in terms of their relative orientation towards cereals and commercial crops, they differ the least in terms of the share of their GCA devoted to oilseeds. This means that oilseeds having substantial forward linkages in processing are remunerative and can be grown under different agronomic conditions. Fourth, small farms are not at all focusing on the cultivation of vegetables and horticultural crops and larger farms devote only a marginal share of their GCA to these so called high value crops being emphasised in current crop diversification debates. From the view point of the development of vegetable and horticultural crops, large farms groups in the groundwater and tank dependent areas present considerably more potential as compared to those either in the canal or in the completely rainfed regions. Finally, the nature and quality of irrigation play a dominant role in determining the cropping pattern across farm groups and regions. It appears as though the expansion of commercial crops in water-wise better endowed regions could drive out food grain production to resource-wise marginal areas and farm groups. Under this condition, efforts to move small farm groups towards vegetables and horticultural crops may adversely affect foodgrain production.

Crop composition: Economic Implication

While irrigation plays an important role in explaining, crop composition both in a regional and in farm group contexts, it is the economic considerations such as the income, cost and net return as well as food/fodder self-sufficiency requirements that assume significance in determining crop choice at a given resource endowment and socio-economic contest. It is also important to evaluate how the implications of crop composition differ across farm groups especially in terms of market orientation (as reflected by the proportion of output sold) and land and labour productivities.

Comparative Advantage in Crop Cultivation

Do some farm groups have comparative advantage in the cultivation of certain crop groups? This substantive issue can be addressed by considering the crop group-specific net return and income-cost ratios across farm groups. Among these two measures of enterprise performance, the income-cost ratio indicating the return per rupee spent is a better measure of enterprise performance. Since income-cost ratio, unlike the measure of net return, captures well the effects which input use efficiency and scale economies have on the overall economic performance of the enterprise, it can distinguish the low cost-high return enterprises from both the low cost-low return as well as high cost-low return enterprises (Saleth, 1995). Consequently, the comparative advantage that different farm groups have in the cultivation of different crop groups is evaluated mainly in terms of the relative income-cost ratio, while the relative net return does also receive due consideration.

Table 5 provides the farm and crop group-specific net return and income-cost ratio for our sample. For the sample as a whole, net return per acre in crop cultivation is calculated to be Rs. 4,097. Income-cost ratio turns out to be 4.97 suggesting that each rupee spent in crop cultivation brings forth Rs. 4.97 worth of output as well as crop residues. As expected, this overall performance measure conceals considerable variation present in the economic performance of different farm groups and crop groups.

In the case of smaller farms (0-2 acres), the comparative advantage lies in the cultivation of oilseeds especially groundnut (if we go by net return). In the context of two farm size groups i.e., 2 to 4 crops (if we go by net return) and horticultural crops (if we go by income-cost ratio). and commercial crops especially Korai (Korai is a perennial weed-like crop which provides

material for making mats. This crop normally grown in most low-lying areas around canal drainage has considerable capacity to withstand waterlogging and soil salinity. Besides, given its lower cultivation costs and considerable income potential both in production and processing, it is the natural choice of small farmers having tiny waterlogged plots in the canal region.) (if acres and 6 to 10 acres, the comparative advantage lies in the cultivation of horticultural crops such as lemon, flowers and mango irrespective of whether one goes by net return or income-cost ratio. Among farms in the size group of 4 to 6 acres, the comparative advantage lies in vegetables showing the highest income-cost ratio of 26.8. in the case of the largest farm size group, the crops having a comparative advantage are pulses (if we go by income-cost ratio) and horticultural crops (if we go by net return).

Table 5 :
Net Return and Income-Cost Ratio in Crop Enterprise.

Crops Groups	Net Return (Rs./ Acres)					Income-Cost Ratio				
	0-2	2-4	4-6	6-10	10-12	0-2	2-4	4-6	6-10	10-12
Food grains	1220.70	2027. 19	3368.49	4627.72	1838.40	1.4	2.7	4.7	6.3	3.6
Oilseeds	1709.17	-427.71	2160.82	338.48	1843.82	3.0	0.8	2.6	1.1	3.1
Pulses	154.14	1444.94	34.70	1356.42	5703.12	2.27	5.59	1.10	4.93	16.90
Comm. Crops	3894.95	6917.29	6953.16	8180.56	4598.61	2.75	5.18	3.07	4.60	3.39
Vegetables	258.10	2475.24	7316.50	6200.. 94	3044.08	1.58	2.07	26.78	4.03	3.15
Hort. Crops	0.00	11909.4	622.50	8949.12	21995.0	0.00	7.98	0.67	19.15	12.75
Spices	527.11	4020.19	932.73	8585.38	9849.70	1.07	2.36	2.24	5.20	5.88
All	**1109.17**	**4052.37**	**2377.70**	**5462.66**	**6981.83**	**1.71**	**3.80**	**5.88**	**6.47**	**6.976**

Note : The total income per acre in each case covers the income from main crops, inter-crops and residues, total costs per acre cover all cultivation expenses including own labour but exclude the rental value of own land.

So far, we investigated the issue of comparative advantage of crop groups in the context of each farm size group and indicated the crop(s) showing the best economic performance. Now, let us evaluate the comparative advantage of the farm groups in the context of each crop group. In foodgrain cultivation, the farms in the size group of 6 to 10 acres have a comparative advantage over their cohorts. This particular group also has a comparative advantage in the cultivation of commercial crops (if we go by net return) and horticultural crops (if we go by income-cost ratio).

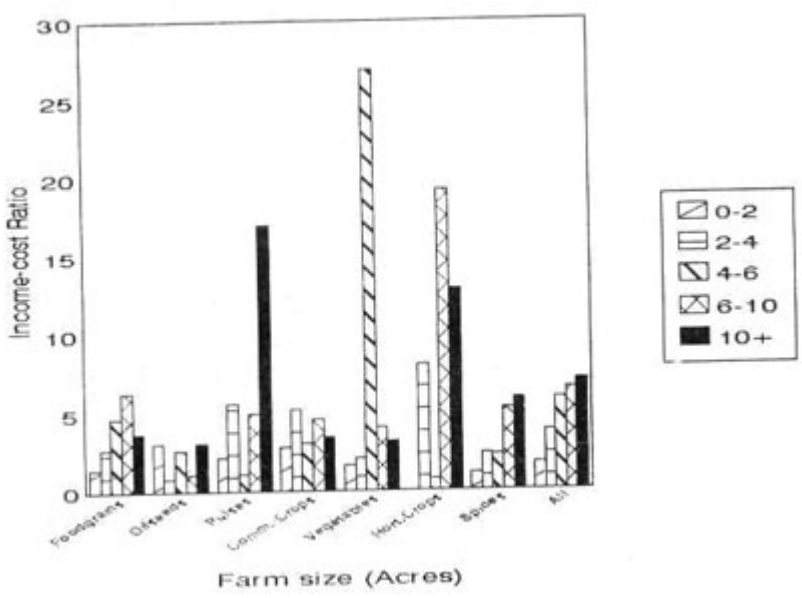
In vegetable cultivation, farms in the size group of 4 to 6 acres has the comparative advantage, as compared to their counterparts. The farms in the largest size group have comparative advantage in the cultivation of pulses, oilseeds, spices and also horticultural crops (in terms of net return). Since most of the farms in the largest size group are located in the rainfed or in the groundwater dependent regions, their comparative advantage in the rainfed crops or those grown in the scarce water regimes are not surprising.

What is notable most is the fact that marginal farms show poor performance in the case of all crop enterprises in comparison to other farms. If we consider the overall income-cost ratio across farm size groups, we find a direct association between farm size and economic performance (The same is also largely true even in terms of the overall net return particularly when we exclude the size group 4-6 acres as it has a lower net return even as compared to the size group 2-4 acres.). This can be seen more clearly from Figure 1 which also gives room for making some policy-wise relevant observations.

First, the increasing income-cost ratio across farm size groups provides some evidence for the presence of scale economies in crop cultivation, that too irrespective of the cropping pattern and the underlying resource endowment pattern. However, the scale-related benefits appear to taper off possibly due to the fact that resource-related constraints (especially irrigation) tend to become binding after a while as we move along the farm size scale. Let us recall the fact that the proportion of unirrigated area increases with farm size (Table 2).

Second, although the small farms have an income-cost ratio greater than one as well as a positive net return, the economic viability of their crop enterprise is far from being satisfactory. The issues of economic viability and scale economy in resource use as observed in the context of our study region may provide justification for relaxing land ceiling especially in the rainfed and scarce water regimes. However, enterprise performance in a strict economic sense is not the only consideration for doing away with land ceiling as the equity issues especially livelihood and employment of current and future landless people as well as the political economy issues are too critical to ignore. (The magnitude of the economic benefits from land ceiling relaxation especially in the from value added gains from processing and export and greater articulation of inter-sectoral linkages depends much on to what extent this policy leads to crop pattern changes towards high value commodities. Crop pattern changes in this sense call for substantial modification in the current institutions governing farm production and marketing. Even if that all happens, it is still a matter of controversy whether such positive effects can compensate for the negative effects emerging from land speculation, landlessness, deterioration in the fodder-based linkages between crop and livestock sector, etc.)

Figure 1:
Crop Enterprise : Income-Cost Ratio Across Farm Groups



Crop Choice : Economic vs Non-Economic factors

What is notable most is the fact that in the case of all farm size groups, the proportion of land allocated to the crops having the highest net return/income-cost ratio is rather negligible. For instance, the combined share of GCA under horticultural and vegetable crops with considerable comparative advantage is just less than 3 percent. This means that in the context of our study area, crop choice is not strictly governed by economic considerations alone but other factors such as food and fodder self-sufficiency, land suitability /quality, irrigation water availability, land tenancy etc., also play a crucial role. While the role that self-sufficiency considerations play in crop choice will be noted shortly, that of the other factors can be explained based on general observations gathered during the survey process.

First, in the canal regions, farmers having tiny plots in the low-lying areas around the drainage canals cultivate only korai that can better withstand waterlogging and salinity as compared to crops like paddy. Consequently, these farmers have very little choice except growing this crop whose production cost is rather low and income prospect both in the production and processing is quite good.

Second, in the case of farmers operating rented land in the canal regimes, crop choice is invariably towards paddy as the rental arrangement itself requires rent payment in terms of a given quantity of paddy per year. In contrast, the lease arrangement which is long-term in nature (3 to 5 years) and involves cash payment presents considerable scope for freedom in the choice of crops, subject to land quality and other resource-related constraints. (Since the scope for crop choice differs considerably between the two lease arrangements, the mode of land leasing - whether rent-based or lease-based-is a crucial factor when one considers land lease market as an institutional substitute for land ceiling relaxation particularly in the context of crop diversification. While, the relative relevance of the two arrangements depends much on the particular resource-endowment context, the lease-based long-term arrangement obviously provides a better scope for crop diversification than the rent-based one.)

Third, in the groundwater regions, it has been observed that those large farmers going for horticultural crops such as lemon, mango etc., do so only as an attempt to cope with groundwater shortage rather than in view of the economic potentials of these high value crops.

Fourth, vegetable cultivation is carried out in tiny pockets in farm corners or as intercrops mostly in scarce water areas (tanks, wells and rainfed). Although quite a substantial proportion of vegetable (also, horticultural) output is sold, the primary motive for their cultivation comes from home than from the market.

It follows from above that the prospects for crop pattern changes-especially under current marketing and after institutional set-up is rather very much limited. By and large, resource endowment including land quality and irrigation availability and household consumption requirements play a dominating role as compared to mere comparative advantage considerations. However, it needs to be recognised that for the promotion of horticultural and vegetable crops especially among larger farms in the water-wise poor regions, there is considerable potential. The translation of such potential into reality, however, calls for substantial efforts in the sphere of extension, credit, processing and marketing and storage. In the canal regions, on the other hand, the possibility for the promotion of horticultural and vegetable crops is rather limited though the expansion of commercial crops such as banana and sugarcane particularly among medium and large farmers is very strong.

Market Orientation and Self-sufficiency

The observed proportion of output sold in the case of different crop groups across farm groups is a rough measure to indicate whether crop production is oriented towards the market or towards home consumption. It goes without saying that the lesser the proportion of output sold, the greater is the significance of farm production from the view point of household food

self-sufficiency. A greater emphasis on self-consumption, of course, undermines the potential for market surplus and commercialisation.

Another aspect of self-sufficiency is related to the extent different crop groups provide crop residues for meeting livestock fodder requirements. This aspect is also significant from the view point of inter-enterprise linkages between crop and livestock enterprises. As such, the fodder potential of crops is an important consideration in the crop choice of farmers in the rainfed regions. The proportion of crop residues used as feed/fodder can serve as an indicator of the fodder significance of crops.

Table 6 shows how different crop groups vary in terms of their ability to meet household food and fodder requirements across farm size groups. The commercial crops are completely oriented towards the market (for obvious reasons) irrespective of the farm size, about 90 percent of the output of spices and 86 percent of the oilseeds output are destined to the market. On the contrary, only a third of the total output of both foodgrains and pulses is sold suggesting their significance for meeting food self-sufficiency requirements. In the case of both foodgrains and pulses, farms greater than 6 acres retain only 45 percent of the output for home consumption as against the tendency for retaining about 70 percent of output by smaller farm groups.

Table 6 :
Relative self -sufficiency significance of crops groups across farms groups.

Crop Groups	Crop Output Sold (%)					Crop Residues Used as Feed (%)				
	0-2	2-4	4-6	6-10	10+	0-2	2-4	4-6	6-10	10+
Food Grain	23.68	25.43	23.78	58.43	55.03	69.43	83.77	88.78	75.02	88.46
Oil Seed	78.67	91.31	88.15	79.83	93.50	51.70	55.22	57.30	62.20	61.02
Pulses	20.00	28.78	0.00	49.96	56.76	6.52	17.65	0.00	3.26	48.24
Comm. Crops	100.00	100.00	100.00	100.00	100.00	0.00	11.07	19.23	0.00	0.00
Vegetables	0.00	66.70	100.00	95.32	99.19	50.00	44.94	0.00	0.00	89.54
Hort. Crops	0.00	100.00	100.01	45.97	86.30	0.00	0.00	0.00	0.00	0.00
Spices	97.76	97.65	74.20	96.08	87.79	0.00	0.00	0.00	0.00	0.00
All	**45.73**	**72.84**	**69.45**	**75.08**	**82.65**	**25.38**	**30.52**	**22.90**	**20.07**	**41.04**

Importantly, even though vegetables and horticultural crops have only a negligible share in the total GCA of the sample, they evince a greater degree of commercialisation as 66 percent of the horticultural output and 72 percent of the vegetables are being marketed, though mostly within the respective villages covered by our survey. Unfortunately, the extent of market orientation of these crops has not translated itself in terms of the expansion of area under these crops. This is due to the influence of non-economic factors in crop choice by farmers.

While spices and horticultural crops do not have any fodder significance (though they provide fuel materials for home requirements), the fodder supply potential of vegetables and pulses is somewhat important. On the other hand, foodgrain and oilseed crops especially groundnut are very important for meeting fodder and feed requirements of livestock enterprises. Since the income significance of livestock enterprises is very pertinent for smaller farm groups with very little scope for enhancing income from crop enterprises as such, the relative capacity of

different crop groups in meeting fodder requirements is obviously an important aspect of self-sufficiency as well as inter-enterprise input/output linkages.

Our analysis reveals that the potential for promoting horticultural and vegetable crops among smaller farm groups especially under current market and other institutional conditions is highly circumscribed. Our understanding of the study area tends to point out that even an improved marketing and extension system can promote rainfed horticultural crops (e.g., lemon, mango, tamarind, etc.) only in the case of larger farmers who can go for these crops without much sacrifice of their foodgrain production.

On the other hand, smaller farms with a characteristically limited land availability and pressing food/fodder requirements cannot be expected to switch to the high value crops whatever may be the economic advantage in doing so. Even those smaller farmers who can be encouraged to go for crop switch cannot be immune from the problem of 'double exploitation' emerging from the fact that not only the price they will receive for their horticultural and vegetable crops may be lower (especially under current market conditions) but also the price they have to pay for foodgrains, may be higher than the ongoing prices. In fact, it is this 'double exploitation' possibility that provides a major economic reason why small farmers cannot easily switch to non-food crops.

Livestock Enterprise : Relative Economic Performance

While the capacity of smaller farms in benefiting from crop diversification schemes is not that much encouraging due to a variety of reasons noted above, they are relatively better placed (in fact, they have an economic necessity) to go for greater occupational and income diversification in their attempt to supplement the limited income and employment opportunities within the crop sector. As a prelude to an evaluation of the relative performance of smaller farm groups in the domains of income and employment diversifications, let us investigate how they fare in the context of livestock enterprise and also identify possible factors that can explain the observed pattern of enterprise performance.

Livestock Composition : Causes and Consequences

Just as the way crop composition affects the overall economic performance of the crop enterprise, so also the livestock composition influence the economic performance of the livestock enterprise. The size and composition of livestock enterprise at the household level is cletermined essentially by an interplay of investment capabilities, fodder supply potential and household labour time availability. For instance, economically well endowed larger farmers can go for a larger sized livestock enterprise composed mostly of investment and input-wise more demanding but income-wise quite attractive livestock categories such as cows, buffalos and bullocks.

By virtue of their larger sized cattle stock, these groups also have a dominating share of young stock. On the contrary, landless and small farm groups maintain a rather small sized enterprise normally with one or few investment and fodder-wise less demanding categories like goats, young stocks or at the most, cows. Such group-specific variations in the size and structure of livestock enterprises does have significant implications for the economic performance of these enterprises.

The distinct pattern in the livestock composition across farm size groups can be seen from Table 7. The two farm groups having a dominant share of total livestock found in our sample are those with a farm size of 2 to 4 acres (20 percent) and 10+ acres (28 percent). On the other hand, the combined share of landless groups and small and marginal farmers is only less than 24 percent. As to the composition of livestock enterprises, while cows, goats (not sheep), and poultry dominate the livestock composition of smaller farm groups, bullocks, buffaloes and young stock dominate the livestock composition of larger farm groups. It can be noted that households with no or less land maintain young stocks essentially for benefiting

from value appreciation rather than for breeding purposes as is the case in the context of larger farmers with larger sized livestock enterprises.

Table 7 :
Livestock Composition Across Farm Groups.

Livestock Category	Total Animals (CEUs)	Percentage Share of Farm Size Groups					
		0	0-2	2-4	4-6	6-10	10+
Bulls	145	0.00	13.91	28.69	8.70	20.87	27.83
Buffaloes	166	6.96	23.52	20.51	13.92	16.04	19.05
Cows	135	7.48	14.02	9.34	9.34	19.63	40.19
Young Cattle	86	4.30	15.33	1775	11.59	20.56	30.47
Goats/Sheep	67	15.74	21.74	27.74	3.60	6.90	24.29
Poultry	5	9.88	27.68	12.65	6.16	25.05	18.59
Total	**603**	**6.02**	**17.76**	**20.33**	**10.11**	**17.70**	**28.08**

Livestock Enterprise : Cost, Income and Net Return

Table 8 gives the income and cost structure of livestock enterprise across farm size groups. The variations in the nature of income structure across farm size groups becomes obvious given the group-specific pattern in the structure of livestock enterprise evident in Table 7. Although the income share of milk sales is dominant for all farm groups, dairy income is relatively more significant for households with a farms larger than 4 acres. In contrast, the income share from value appreciation, poultry, and manure is substantially higher in the context of households with no or less land.

Turning to the cost structure, irrespective of the farm size groups, the cost structure is dominated by feed cost (over 69 percent of the total cost per animal unit). The relative share of feed cost is slightly higher for smaller farm groups. While there is no systematic pattern in the average income per animal unit, average cost per animal unit shows a gradual decline as one moves along the farm size scale. Given the positive association between farm size and cattle stock size, the declining cost suggests the effects of scale economies possible in livestock rearing.

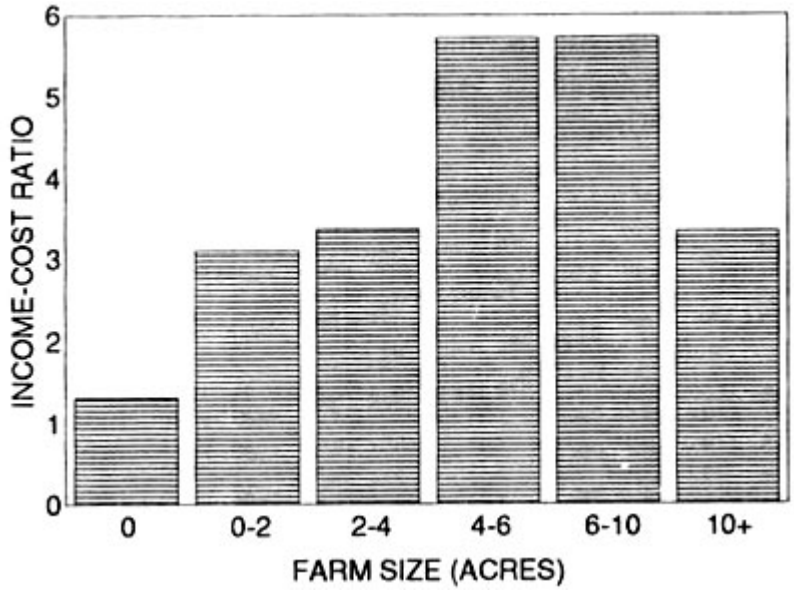
Table 8 : Net Return and Income-Cost Ratio in Livestock Enterprise

Farm Size	Average Income/ Animal unit (Rs.)	Percentage of income from					Average Cost per Animal Unit (Rs.)	Percentage of cost Due to		Net Return (Rs.)	Income Cost Ratio
		Milk Sales	Value Appre	Draught Power	Poultry	Wastes		Feed	Labour		
0	1543.34	47.58	18.31	10.72	10.80	12.60	1177.26	80.04	19.76	388.09	1.31
0-2	1696.67	57.44	19.54	6.85	3.73	12.46	544.94	69.40	30.60	1153.72	3.11
2-4	1547.43	47.95	20.82	16.94	2.28	12.00	458.91	77.51	22.49	1088.85	3.37
4-6	3087.66	69.90	16.37	7.69	0.65	5. .9	540.19	77.03	22.97	2547.47	5.72
6-10	2244.96	68.24	8.36	16.24	1.61	5.56	472.65	74.06	25.94	1772.32	5.73
10+	1242.90	61.58	8.72	13.98	4.95	10.76	372.68	83.65	16.35	878.23	3.34
Total	**1694.37**	**59.60**	**14.93**	**13.07**	**2.64**	**9.77**	**501.87**	**77.94**	**22.06**	**1192.50**	**3.38**

Figure 2 depicts the pattern of income-cost ratio across farm size groups in the context of livestock enterprise. The farms in the two size groups of 4 to 6 acres and 6 to 10 acres show an impressive performance with an income-cost ratio of about 5.72. In terms of net return, however, the farms in the size group of 4 to 6 acres show the best enterprise performance with a net return of Rs. 2,547. Unfortunately, irrespective of the performance criteria one chooses, the livestock enterprise of groups with no or less land, perform rather poorly. Such a poor showing of groups for whom livestock income is very crucial has much to do with the structure of their livestock enterprise which, in turn, is essentially a reflection of their poor economic status.

As shown in Table 8, there is a significant positive correlation between income-cost ratio (or net return) and the share of income from milk sales. In other words, dairy orientation is a major factor affecting the overall performance of the livestock enterprise. Therefore, in order to improve the livestock income prospects of poor rural groups, there is a need for diversifying their livestock assets towards income-wise better placed dairy animals. Obviously, the key to livestock diversification among poor rural groups lies in credit policies and fodder development programmes.

Figure 2 : Livestock Enterprise : Income-Cost Ratio Across Farm Groups.



Employment and Income Diversification for Small Farms

So far, we have seen how did small and marginal farmers in our study area fare in their crop and livestock enterprises as compared to other farm groups. In both cases, the income potential of smaller farmers can be considerably improved through diversification schemes. Unfortunately, economic, resource-related, and other institutional constraints and bottlenecks severely circumscribe the efficacy of crop and livestock diversification efforts in the context of small farm groups. While credit support, infrastructural investments and institutional developments like contract farming (especially those centred around a system of decentralised production but centralised processing and marketing) could facilitate diversification initiatives, the gestation period involved in actualising these programmes is rather large. In the meantime, the potential for enhancing the income and employment diversification among these poor rural groups should be explored, both as an immediate and as a long-term strategy for small farm development.

Let us now turn to an evaluation of the pattern of employment and income diversification observed among different farm groups. For analytical purpose, the occupations are grouped into four categories, i.e., farming, wage labour, animal husbandry, and non-farm activities. (There are 34 distinct non-farm activities in our study area ranging from business/trade,

government jobs including teaching, handloom, gemcutting, transport, etc. For details on the activity-specific income and employment potential of non-farm activities, see Saleth (1995 chapter 13).) The income sources include the respective income from these four occupational categories plus another category, i.e. others, that includes income from money order, interest, land/house rent, etc.

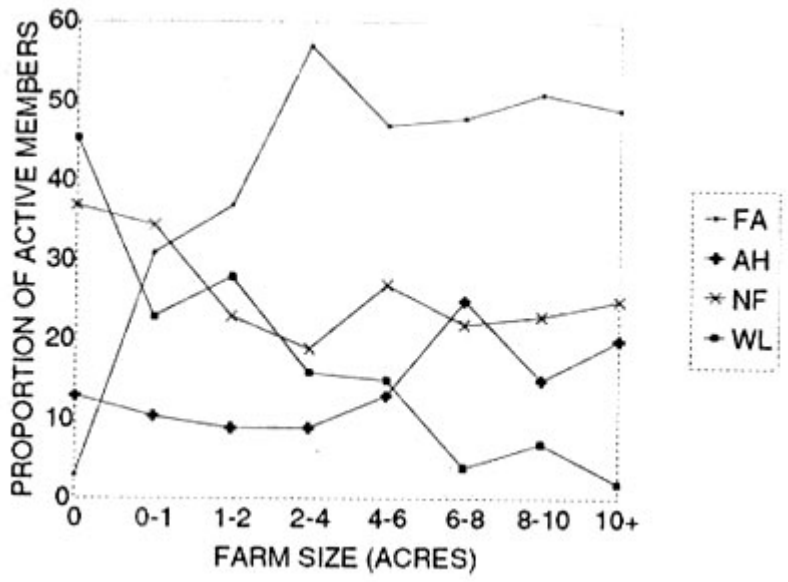
Occupational Diversification

The occupational structure of farm groups is evaluated both in terms of participation (i.e., the distribution of active members across these four occupations) as well as in terms of employment intensity (i.e., the allocation of total household mandays across these occupations). Since rural groups normally have multiple occupations, participation as such could not take stock of the intensity of employment. Therefore, the latter aspect dealing with the intensity of such participation is important for a comprehensive evaluation of the employment implications of the observed pattern in occupational structure across farm groups.

Occupational Structure : Focus on Participation

For the sample as a whole, the occupational structure is] dominated by farming with 40 percent of the active population, followed by non-farm activities with 25 percent and wage labour with 20 percent. Animal husbandry has the least share of only 13 percent of the active population. As can be seen from Figure 3, there is a considerable variation in the occupational structure across farm groups. The direct relationship between farm size and the proportion of active members involved in farming and the inverse relationship that farm size has with the participation in wage labour is consistent with one's expectation.

Figure 3 : Occupational Structure Across Farm Size Groups

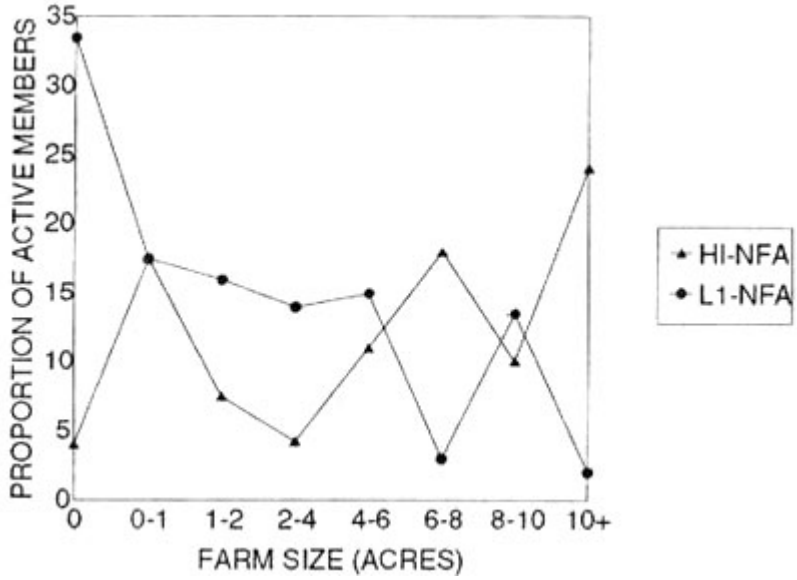


Notably, wage labour participation, though confines mostly to landless and smaller farm groups, is still positive even for larger farm groups. This is due to the fact that large but rainfed farms often rely on wage employment as way of either supplementing limited farm income from their crop sector or obtaining fodder in exchange for human/animal labour in ploughing and in other farm operations. It is exactly these groups which also tend to focus relatively more on livestock enterprises in view of their fodder-oriented cropping pattern and greater uncertainty in farm production. This fact explains in part the observed pattern of the proportion of active members involved in animal husbandry across size groups. As can be

seen from Figure 3, this proportion remains stable or declines only marginally up to 4 acres and shows an increasing trend thereafter.

Interestingly, the proportion of active members in non-farm sector shows a generally declining trend across farm size scale suggesting more non-farm participation among landless and smaller-farm groups. However, there is a substantial difference in the nature and non-farm activities in which different farm groups participate. While small farmers concentrate mostly in lower-income non-farm activities (LI-NFA), i.e., those with lower and more regular income (HI-NFA include government jobs, teaching, driving and business/trade other than petty trade. All the reamining non-farm activities come under LI-NFA.), others participate in higher income non-farm activities. Such a dualistic pattern in non-farm participation can be seem from Figure 4.

Figure 4 : Farm Size Groups : Dualism in Non-Farm Participation



Occupational Structure : Focus on Employment Intensity

Our analysis above is based on mere participation in different enterprises and activities. To take the analysis to a still higher level, let us evaluate the intensity of such participation by considering how the mandays actually spent by households are allocated across the four occupational categories. For the sample as a whole, the total number of mandays per year actually spent in various economically relevant activities is 70,485 giving, on an average, about 104 mandays/active member in the sample. (If we assume a 25 Hays/month/worker as the maximum possible employment level, the average days of employment represents just 35 percent of the potential or maximum possible employment level giving a rather high level of underemployment of about 65 percent. For details on how the underemployment level varies across various analytical categories such as farm size, cattle stock size, income and asset position, and family size and types, see Saleth (1995 chapter 14).)

Interestingly, of the total mandays of employment observed, non-farm activities, as a group, account for the highest share (39 percent) followed closely by wage labour (35 percent) but only distantly by livestock sector (17 percent). It is rather surprising that crop sector, on the other hand, accounts for the least share (9 percent) of total household mandays actually spent in various farm and non-farm activities.

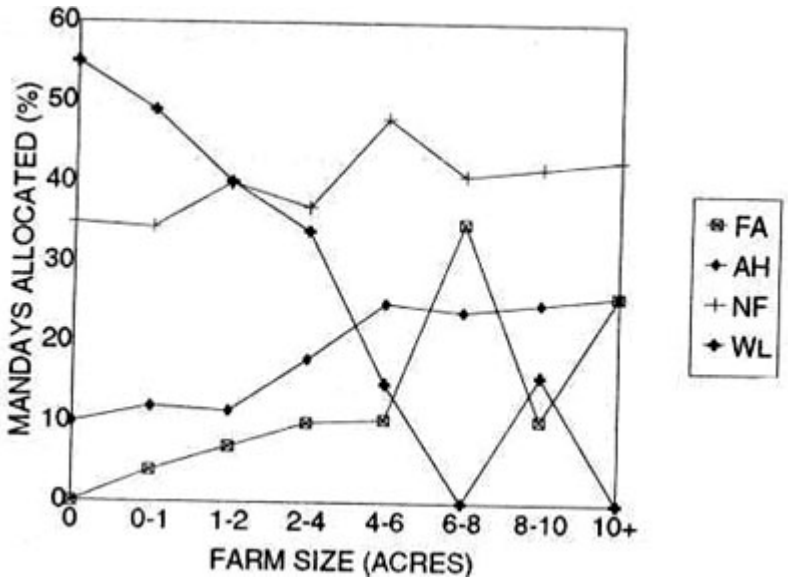
While the mandays devoted to livestock-related activities include the time spent in livestock maintenance and fodder collection, the mandays devoted to crop sector is nothing but the family labour of households spent on their own farms in various farming operations. (This does not, however, include the time spent in supervision, watch and ward, and other

activities. Even if we account for these activities, we do not think that the relative position of the crop sector in household employment is going to change much.) Although the mandays spent in own farms is rather a small proportion of the total mandays of employment at the household level, if we include also the wage labour share of mandays (i.e., the hired labour used in crop enterprises), then the employment potential of crop-sector is the highest as compared to either the livestock sector or the non-farm sector. In any case, still the share of non-farm sector in total mandays comes very close to even the combined share of farming and wage labour.

While the relatively lower share of livestock enterprise in total household mandays is understandable in view of its part-time or supplementary nature of employment, the lowest share of farming can be due to the following two reasons, i.e., seasonal nature of employment in crop enterprises and a relatively higher level of hired labour use. To these, one can also add the relatively greater focus of most households on wage labour and non-farm activities which require a more regular participation and involvement as compared to farming.

In order to see how the allocation pattern of total mandays varies across farm groups, let us turn on Figure 5. Across farm size groups, while the share of family labour time devoted to wage labour is declining rather dramatically, that devoted to farming, livestock and non-farm activities shows an increasing trend. Notably, the allocation pattern of family labour time undergoes a significant change as one moves beyond 2 acres. While wage labour activity accounts for the highest share of total family labour time among landless, small and marginal farm groups, non-farm activity has that distinction for others.

Figure 5 : Allocation Pattern of Mandays Across Farm Size Groups.



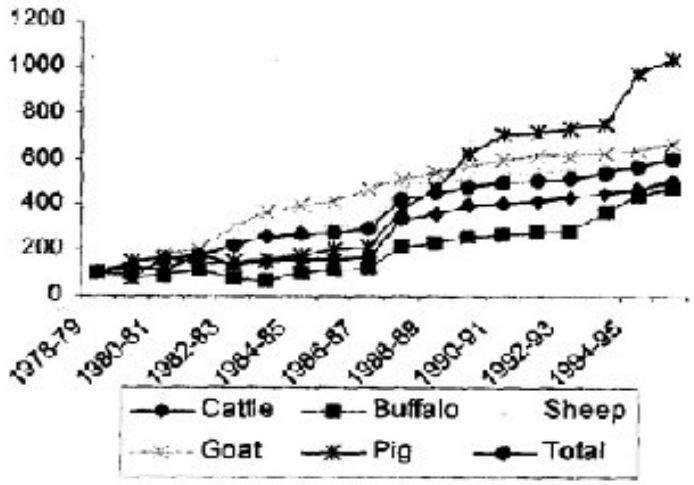
Although household with no or less land and cattle do participate especially in lower order non-farm activities, the generally lower level of their education, skill, and financial status tend them more towards wage labour than towards non-farm activities. Whenever some of these households are in a position to significantly participate in non-farm activities, the relatively higher level of employment and income in these activities as compared to wage labour induce them to devote more time to the former than the latter. In other words, given a fixed level of family labour time, more labour time devoted to wage labour naturally leaves less time for non-farm activity and vice versa.

Income Structure Across Farm Groups

For the sample as a whole, the mean household income for the survey year (1992-93) is observed to be Rs. 25,651. Of this income, farming accounts for the highest share (41

percent) followed by non-farm activities including business/trade (about 26 percent). While wage i income comes to a little over 18 percent, income from animal husbandry accounts for 11 percent of the household income. The least share is accounted by the 'other' income category. Notably, animal husbandry income is essentially corresponds to that from milk sales and value appreciation as income from poultry forms only an insignificant part. Obviously, the overall pattern noted above does vary significantly across farm groups as can be seen from Figure 6.

Figure 6 : Income Structure Across Farm Size Groups



Across farm size groups, the share of farm income increases steadily up to 4 acres but stabilises around 50-60 percent thereafter. While the income share of wage labour declines rather steadily,- that of non-farm activities other than business/trade declines only gradually. On the other hand, the income shares of animal husbandry and business/trade display an increasing, though a less pronounced trend across farm size groups. It is clear that the income contributions of wage labour and non-farm sector are relatively more significant for households with no or less land whereas livestock sector and non-farm activities including business/trade play a relatively greater role in the middle and upper farm size groups.

Regarding the temporal change in the relative income significance of different occupations (i.e. comparing the income shares between 1992-93 and 1987-88 periods), the income significance of farming and wage labour has generally declined for all farm size groups. However, the decline in the share of farm income is the highest for medium farms (4-6 acres) which also show the highest increase in the share of non-farm income. The income share of business/trade is substantially higher for the two extreme groups as compared to others. The change in the share of livestock income is generally higher for landless and smaller farm groups as compared to others. Generally speaking, these groups also appear to have undergone substantial diversification and structural change as indicated by their income structure.

Conclusions and Policy Implications

Our study provides ample evidences for the fact that crop composition does play a dominant role in determining the overall performance of crop enterprise. This justifies the rationale for crop diversification as a strategy for improving the economic prospects in crop cultivation. However, it has been shown that since the crop composition is determined by resource endowment and household economic requirements, crop diversification schemes face serious economic, insurance-related, and institutional constraints especially in the context of small farm groups. Although the poor economic performance of smaller farm groups in crop cultivation is mainly due to their orientation towards cereal crops having very little value

addition potential, such cereal based specialisation is inevitable in view of the pressing food and fodder self-sufficiency requirements.

The ability of small farm groups to move towards high value crops depends upon (i) the extent to which food and fodder requirements can be met economically through alternative means and (ii) the availability of adequate employment and income cushion from non-crop enterprises and activities and (iii) the presence of a favourable institutional environment for adopting high value crops like vegetables, fruits and flowers. Unfortunately, under current conditions prevalent in areas similar to our study region, even the development of processing facilities and marketing and storage networks for these crops are more likely to benefit the economically well endowed larger farmers in water scarce areas than small farmers as such. Institutional changes in the production spheres such as group farming and contract farming hold some promise for promoting high value crops among small farm groups.

While policy changes required for providing an incentive environment for crop diversification among small farms are many and will take considerable time to materialise, the prospects for developing these groups through other aspects of diversification such as livestock, employment and income is considerably brighter for three reasons.

First, most of these programmes are relatively easier to translate and target. For instance, the main factor responsible for the poor performance of the livestock enterprise among small farm groups, i.e the inability to have a greater focus on dairy animals, can be most directly addressed through an effective cattle loan scheme on the one hand and fodder development on the other.

Second, while the capacity of smaller farms in benefiting from crop diversification schemes is not that much encouraging due to the constraints noted above, they are relatively better placed to go for greater occupational and income diversification in their attempt to supplement the limited income and employment opportunities within the crop sector. In view of such an economic necessity for small farm groups to diversify their employment and income sources, the non-crop diversification programmes have a greater potential for their success.

And, finally since employment and income diversification form part of the overall process of rural economic transformation, diversification policies in these spheres can be smoother than crop diversification in sofaras the former get synergetic impulses generated by the transformation process itself.

Greater livestock based employment and income diversification among small farm groups is not only crucial for adding value to their time but also has a strategic role in promoting crop diversification itself. This is in view of the fact that since a higher and more secure income and employment emanating from non-crop diversification provide a stronger cushion for small farm groups, one of the basic constraints for these groups to move to high value crops is relaxed to a greater extent.

Our study does indicate that the economic performance of the livestock enterprise among small farm groups can be enhanced considerably by increasing their dairy orientation. The policy instruments for doing this are more targeted and tied livestock credit and fodder development including the promotion of feed industries and interregional fodder transfer (e.g. the rice straw largely burnt out in Punjab can be moved to other regions, of course, with substantial processing for bulk reduction and nutrition enhancement).

In the context of occupational and income diversification, although small farmers have substantially more diversified occupation and income sources, in terms of the level of income, they have not benefitted to the desired extent. This is in view of their focus mostly on activities with lower and less regular income. The major policy in this respect should aim at the overall upgradation of technical skill among small farmers and landless labourers. While the expansion of skill-wise relatively more demanding rural non-farm activities itself provides some incentive for formation of skill and organisational capabilities among rural groups,

relevant location specific skills (e.g. tamarind processing, gem-polishing korai processing etc.) can be imparted mainly for female groups through training by local voluntary organisations.

Since a more dynamic rural non-farm sector enhances the opportunity cost of rural labour, it is also crucial for improving wage rates in farming sector. To the extent occupational and income diversification leads to a higher opportunity cost of labour time, it also contributes to higher productivity of labour. It is precisely the condition under which small farms are likely to have an incentive to go for high value crops as their value addition potential fits with the opportunity cost and value of the labour time of small farmers with a more diversified livestock, employment and income. The policy implication is that agricultural diversification schemes need to be conceived and implemented in a much broader context than mere crop diversification per se.

Based on a larger study titled "Agricultural diversification in Tamil Nadu: Potentials and Prospects" completed recently at the Institute of Economic Growth, Delhi. The author is grateful to S.K. Ray, B.D. Dhawan, and S.N.Mishra for their valuable comments/suggestions and encouragement/support.

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