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FOREWORD

Economic liberalization has expanded and altered the possibilities for income growth in Indian agriculture. Growing incomes and trade, coupled with favourable and diverse agro-ecological production environment, offer opportunities not hitherto available. Accordingly, diversification and value addition have become priority themes.

On the other hand, dominance of small-scale and capital-starved farming sector, characterised by numerous marketing imperfections restrict exploitation of this potential. The National Workshop on Small Farm Diversification : Problems and Prospects" organised at this Centre on May 22-23, 1995 addressed these concerns and this volume contains the conclusions of the Workshop and selected papers presented therein.

The Workshop was conceived, organised and coordinated by my predecessor, Dr. C.C. Maji. His interest and leadership contributed to the success of this effort.

Apart from Dr. T. Haque who shouldered the onerous task of editing this volume, Dr. Rasheed Sulaiman V., Umeeta Mansukhani, Ravindra Kumar and Seema Khattar have also worked hard for proper presentation of the manuscript. We appreciate their contributions. All this, we hope, will enhance our understanding of this exciting and complex challenge.

March 11, 1996
New Delhi

Dayanantha Jha
Director

SUMMARY

Introduction

The National Workshop on "Small Farm Diversification" was organised by the National Centre for Agricultural Economics and Policy Research (NCAP) in Delhi on May 22-24, 1995. Eminent economists and other scientists, administrators and policy makers participated in the workshop. Dr. R.S. Paroda, Secretary, DARE and Director General, ICAR, inaugurated the Workshop. Professor V.S. Vyas, Director, Institute of Development Studies, Jaipur chaired the inaugural session. Dr. Paroda underlined the need for small farm diversification for sustainable agricultural development. He pointed out that the second green revolution in the country should be realised through small farm development, particularly in rainfed areas. He further emphasized that diversification, involving integrated development of both farm and non-farm sectors was crucial from the point of view of alleviation of rural poverty. Professor Vyas mentioned in his Presidential remarks that India will continue to be a small farm dominated agricultural economy and therefore, we have to plan for viability and sustainability of small farms through diversification. It is difficult to think of viable small farms, without synergistic development of farm and non-farm activities particularly in the context of rainfed agriculture.

Twenty-nine papers were presented for discussion in the workshop dealing with various aspects of small farm diversification. However, on the basis of referees' comments, only twelve papers have been selected for publication in this volume. Dr. T. Haque, National Fellow, presented the theme paper, highlighting the problems and prospects of diversification of small farms in India.

The theme paper by Haque emphasised that a number of technological, infrastructural, physical and policy constraints need to be removed for facilitating vertical and horizontal diversification of small farms.

The paper by Bhanu Pratap Singh titled "Backward Agriculture -A Cause of India's Poverty" underlined the need for reorientation of agricultural research and mechanisation for small farm diversification.

Dr. R.P. Singh's paper on "Farm Level Diversification in Dryland Regions of India" analysed the determinants of crop diversification in the semi-arid tropics of India. The author concludes that at the present level of technology, increasing land fragmentation associated with plot diversification doesn't represent a significant cost. Besides, the emergence of crop diversification decreases the demand for crop insurance policy, as farms can rely on self-insurance through diversification.

The paper entitled "Sustainability of Small Producer Units through co-operatives - Lessons from Several Case Studies" by Samar K. Datta deals with institutional arrangements for small farm diversification. The author has analysed several case examples of cooperative and other institutions in West Bengal, Maharashtra, Gujarat and Andhra Pradesh. It has also been examined by him whether and how far the programmes of land reform will be helpful in generating sustainable development of the poor people with and without successful cooperatives.

The paper on "Agricultural Diversification and Small Farm Development in Western Himalayan Region" by Ramesh Chand examines the potentials for income and employment generation in Himachal Pradesh by agricultural diversification through vegetable crops. According to him, vegetable cultivation, due to its labour intensive nature is highly beneficial for marginal and small farmers because of higher availability of family labour. According to him, it is not the farm size but infrastructure like access to motorable road, market and

irrigation which determine the extent, success and profitability of diversification through high value crops.

Hiremath and Vishwa Ballabh in their paper titled " Integrating Small Farmers with Market: Problem and Prospects" make an assessment of the role of agri-business consortium in promoting small farms diversification on the basis of experience in Valsad District of Southern Gujarat. They conclude that small farmers face a number of organisational constraints which need to be overcome through either cooperative or agri-business consortium.

Maria Saleth's paper on "Diversification as a Strategy for Small Farm Development "analyses the potentials of crop and non-crop diversification based on a case study of Tiruchirapalli District in Tamil Nadu. According to him, the ability of small farms to move towards high value crops would depend upon the extent to which food and fodder requirement can be met through alternative means, adequate employment and income cushion from non-crop enterprise and the presence of a favourable institutional environment. While policy changes required for providing an incentive environment for the crop diversification among small farms will take considerable time to materialise, the prospects for developing other aspects of diversification such as livestock and others is considerably brighter.

Maji and Rahim in their paper entitled "An Investigation into Small Farm Diversification" analyse the profitability of small and marginal farmers which have diversified their activities in the selected villages of Birbhum district in West Bengal. According to them there is an inverse relationship between the diversification index and return per unit of land.

B.K. Jha and Dayanatha Jha in their paper on "Constraints in Small Farm Diversification" examine the potential for diversification on wheat-paddy based small farms. They have examined the impact of risk on enterprise pattern with six risk-efficient plans. The study emphasizes that vertical integration of dairy with fodder crops can increase income and employment on sustainable basis. However, it is important to note that such diversification should not bring changes which lead to land degradation problem.

The paper entitled "Structural Change in Consumption and Small Farm Diversification" by Praduman Kumar, analyses how the structural changes in consumption pattern influence the demand for high value commodities like milk, fruits, vegetables, meat, egg and fish. According to the author, growth of income results in diversification in favour of non food grain crops and livestock products which can generate adequate employment and income for small farms.

Subramanyam and Sudha in their paper titled "Diversification of Small Farms Through Horticulture Crops" examine the potential of horticulture based diversification on small farms in Kolar district of Karnataka. According to them an unremunerative price, lack of appropriate plant varieties and shortage of credit are the main constraints to diversification. The study particularly emphasises that small farms must be protected against price risk due to seasonal glut and perishability of horticultural crops.

The paper titled "Scope for Commercialisation of Small Farm Agriculture" by Varadarajan and Elangovan examines how integrated rural development has bypassed the small and marginal farmers in India. According to the authors, size of farm is not a constraint to diversification. In fact, shortage of capital and size of the market are the main constraints. However, it may be necessary for the small farms to form groups and pool their resources voluntarily to achieve large scale production.

Thus findings of various papers clearly bear out that diversification of small farms in favour of high value crops and enterprises is possible provided we are in a position to remove some technological, infrastructural, institutional and policy constraints. A number of relevant issues were discussed during different sessions of the workshop which could be listed as follows :

Session II : Issues concerning deversification of smallholder agriculture in India

I. What is the nature and extent of diversification of small farms in India in various regions?
II. What is the scope of further horizontal diversification in favour of high value crops like fruits, vegetables, flowers, sericulture, livestock etc?
III. What is the scope of further vertical diversification of small farms, in terms of participation in non-farm activities?
IV. Do small farms enjoy economies of scale for both horizontal and vertical diversification?
V. Whether small farm diversification would be export-led or domestic market-led or both? Whether strategy of small farm diversification would vary according to market accessibility?
VI. Whether it would be necessary to modify the land ceiling laws/tenancy laws for small farm diversification?
VII. Whether consolidation of fragmented holdings of small farms is desirable and possible and whether it would help promote small farm diversification?
VIII. Does diversification necessarily mean growing of a large number of crops and livestock enterprises or can there be a better combination of specialised farming cum diversified farming in which the most productive, albeit more eco-friendly enterprises are selected by each farm?

Session III : Technological potentials and constraints for small farm diversifcation

I. Assess the technological potentials of so-called high value crops *vs* cereal crops in various agro-climatic regions.
II. What are the demonstrated yield and income potentials of new-production technolongy for fruits and vegetables?
III. What are the technological constraints faced by small farms for diversification in favour of high value crops?
IV. What is the status of farm production technology plus processing and marketing technologies for these crops?
V. Assessment of research-extension-training gaps in the context of technolgy generation and technology transfer.
VI. Is the national agricultural research system properly geared to take up the challenge of small farm diversification?
VII. To what extent one can depend on research and development in the private sector?
VIII. How do we synchronise various efforts in the public and private sectors for efficient use of research funds for best results?
IX. To what extent and in which direction reordering of research priorities would be required for diversification?

Session IV : Socio-economic constraints to small farm diversification

I. Do small farms have the necessary ability and attitude for diversification in favour of high value crops?
II. What is the nature and extent of opportunity cost of small farm diversification? Will the opportunity cost differ from one enterprise to another and from region to region? Will it act as a disincentive to diversify?
III. What is the role of relative profitability, market uncertainity, price fluctuation etc?
IV. Whether the so-called high value crops are really of high value from the point of unorganised farmers?
V. Will it not lead to glut and dampen the farm prices and income if all farmers start producing the same crops in a region?
VI. Is there any conflict between private economics and social economics of diversification?
VII. Can there be price protection and procurement policy for fruits and vegetables to induce small farmers to diversify?
VIII. To what extent we can go for subsidising the small farms to induce them to diversify?

Session V : Institutional arrangments for small farm diversification

Lack of adequate institutional arrangments is said to be the major bottleneck

I. How do we overcome the credit/capital constraints on small farms? In the absence of adequate institutional credit facilities, how do we motivate the small farms to take up any new economic activity, particularly if it requires high level of investment?
II. Will privatisation of credit institutions help promote or retard small farms diversification?
III. Whether the existing institutions have enough capacity to finance small farm diversification?
IV. Can the co-operative institutions be revitalized for mobilisation of local resources for the purpose?
V. Assuming that lack of adequate marketing facilities hinders the process of diversification, what kind of institutional marketing arrangements are required to promote small farm diversification? Can agricultural marketing co-operatives be strengthened for the purpose and if so, how?
VI. Can contract farming help promote small farm diversification?
VII. Can export promoting organisation be linked in co-operation with other agencies dealing with small farm diverisification?
VIII. What will be the role of agri-business consortium?

Session VI : Areas of policy intervention by the Government for diversification

I. Can price protection be extended to fruits, vegetables and other crops which are proposed to be selected for diversification?
II. What will be the role of subsidies for promotion of small farm diversification?
III. In view of high variability of income and high risk in the production of some of the so-called high value crops and enterprises, what will be the role of crop insurance?
IV. Is there any need to modify the ceiling laws or tenancy laws for small farm diversification? If that is so, how did smallholder agriculture in Korea, China, Japan and Indonesia witness diversified growth with smaller sizes of holdings? Can we draw any lessons from them?
V. Is there any need to change the policy of technology generation and technology transfer, particularly for defining the role of private sector research and extension and if there could be any complementarity between National Agricultural Research System and private research agencies?
VI. Since infra-structural facilities are grossly lacking in greater part of rural India, can Government augment its public investment in infrastructure, particularly in backward regions? Alternatively, is it true that the present strategy of diversification, based on existing unequal infrastructure facilities will further accentuate regional disparities in development?
VII. Can Government withdraw regulatory measures from the cooperative sector and help promote the real autonomous growth of co-operative organisation for small farm diversification?
VIII. What will be the policy requirement for integration of small farm with non-farm development?

CONCLUSIONS AND RECOMMENDATIONS

1. Small farmers generally practise multi-diversified farming and grow a number of crops even on small acreage and fragmented plots. But such farming does not necessarily yield enough return for the sustenance of small farm families. Therefore, the sustainability of smallholder agriculture would depend on horizontal and vertical diversification involving adoption of a few selected high yielding, high income generating and eco-friendly crop and non-crop enterprises.
2. Non-availability of high yielding plant varieties for some of the high value crops act as one of the major constraints to diversification. Therefore, the challenge of small farm diversification demands concentrated research efforts for appropriate technology

generation keeping in view the demands in domestic and international markets. This may require scientific excellence and greater allocation of research funds in favour of export-oriented crops and non-crop enterprises like fruits, vegetables, flowers, livestock, fisheries, etc. Public and private research efforts should complement each other in this area. Also substantial investment may be required in research on agriculture policy formulation and human resource development, involving the training of scientists, extension workers and farmer leaders on the needs and methods of planned agricultural diversification.

3. Development of appropriate technology for small farmers including drought and pest resistant high yielding varieties and horticultural crops with low gestation period would help small farmers to diversify. Similarly, development and transfer of technologies such as bio-fertilisers, bio-pesticides and organic farming would be helpful for small farm diversification, because of their cost-effectiveness.
4. In view of the highly capital intensive nature of some high value crops, small and marginal farmers may find it difficult to invest in these crops. Therefore, strong industry-agricultural linkage through development of agro-processing units and contract farming would be required to help promote small farm diversification. Besides, institutional facilities of credit by banks, co-operatives and agri-business consortium would be necessary to help promote small farm diversification. Privatisation of institutional arrangements for lending may not be the answer, as these would be guided more by profit considerations rather than the economic needs of small and marginal farmers. However, efforts should be made to promote economically viable and sustainable credit institutions in private, public and co-operative sectors.
5. Development of marketing facilities and provision of remunerative prices for fruits and vegetables are considered essential for diversification. Crops which are of high value today like fruits and vegetables may not retain their relative superiority, if all farmers of any given region start producing the same crops. This will lead to glut in the market and dampen the price and income levels of farmers, unless the farmers have access to local, national and international markets in organised manner. Besides, in most cases, market and price information do not exist for some of the high value, albeit perishable commodities which constrain the diversification. It would be necessary to develop market and market information system for any diversification plan to materialise. Moreover, establishment of rural godowns and their utilisation for both input and output marketing would help promote small farm diversification. Due to price uncertainties, small and marginal farmers often show their aversion to diversification in favour of fruits and vegetables. Therefore, dynamic price and crop insurance policies may need to be evolved for such commodities.
6. Ceiling laws do not necessarily constrain diversification, as small and marginal farmers can participate in diversification and growth through development of contract farming. However, the land lease market would need to be liberalised and activised for facilitating the entry of corporate sector in agriculture and also for enabling people to migrate from agriculture.
7. Development of agro-processing and agri-business would be a necessary condition for promoting small farm diversification. In fact, there is a need for agri-business development in both private and co-operative sectors which will help promote synergistic relationship between farm and non-farm activities. The development of various farm and non-farm activities in rural areas should be based not only on criteria of profit or of income growth, but also it has to be eco-friendly.
8. It may not be necessary for the government to directly enter into agri-business. But government support in promoting infrastructure and proper policy environment would be necessary. It may also be necessary to regulate the prices of patented seeds marketed by multinational corporations in India. The farmers in backward regions do not have access to basic infrastructure of road, transport, linked market in the neighbourhood, cold storage, irrigation and power which are so essential for both horizontal and vertical diversification. In fact, the present strategy of diversification based on existing unequal infrastructural facilities will accentuate regional disparity in development. Therefore, there should be special efforts and increased investment for infrastructural development in backward regions. Efforts have to be made by involving both government and non-governmental organisations in this respect. Also the local

bodies like Village Panchayat, Zila Parishad, Farmers Associations, etc., should concentrate on development of infrastructure which will help promote small farm diversification.

9. All types of lands and locations are not equally suitable for profitable, albeit, alternative farming. Therefore, cluster approach to diversification would be required. The Indo-Gangetic plain regions should concentrate on food production for self-reliance, food security and exports, while the arid and semi-arid zones should emphasise horticulture-led diversification. Moreover, in greater part of high rainfall and irrigated zones, heavy textured soil and poor drainage system stand in the way of diversification in favour of non-rice crops. Even in the dry regions, diversification would depend on soil type, topography etc. Also fragmented plots of small holdings act as a constraint to efficient use of land for diversification, particularly because the farmers are deprived of the necessary economies of scale. Therefore, land and drainage improvement measures would be necessary for agricultural diversification by small and large farmers.
10. Despite the new economic policy which stresses 'globalisation', a good part of the productive activities of small and marginal farmers will not be and ought not to be for a distant market. They will be concerned with local labour working with local resources for local consumption to a great extent. These activities should be given sufficient importance.

    To take care of these activities and their supportive base, an appropriate voluntary organisation of the villagers, particularly the poorer among them, is needed. Such organisation of the village poor should have an important role to play in creating the facilities and the infrastructure required for the local and neighbourhood-oriented activities of the villagers. These could include, supervision of common storage facilities, restoration of tanks and other water reservoirs which have fallen in a state of neglect, maintaining a steady programme of planting trees and taking part in a certain amount of village level planning of matters of common concern for the villagers.

11. The two prevailing marketing systems (one private and the other public) are exploiting the producers as well as the consumers. Taking all farm products into consideration, it can be safely stated that both the systems are not passing on even 50 percent of the prices realized by them from consumers (plus subsidies borne by the public exchequer in case of PDS). There is an urgent need to effectively reduce the margin between the producers and the consumers, which can be done only by forging direct links between them. This should have been done by the cooperatives, but they have failed to do so, except in a few pockets of the country. In rest of the country, cooperatives have been officialised, and lost their true character. While efforts should be made to improve their functioning, the Gram Panchayats which are already statutory bodies, should be recognised as cooperatives and empowered to jointly process and market their produce. The Gram Panchayats should be encouraged and helped to open their Panchayati shops in cities on the lines of Khadi Bhandars to sell their grains, fruits, vegetables, milk, eggs etc., directly to urban consumers. Reduction in the cost of marketing should be the main concern of our planners, if they want to provide relief to consumers, without jeopardizing the interests of producers, or further burdening the public exchequer.

STRUCTURAL CHANGE IN CONSUMPTION AND SMALL FARM DIVERSIFICATION

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This paper examines the structural changes in consumption pattern for food and project the short and long term demand for high value commodities like milk, fruits, vegetables, meat, eggs and fish. The paper also identifies the critical constraints which restrict the process of diversifications.

Structural Change in Consumption

Per capita aggregate cereal consumption for food has declined somewhat over the past three decades, while the consumption of fruits, vegetables, meat, fish, eggs and dairy products have increased. There is no doubt that household income and food prices strongly influence food consumption patterns. There are a number of reasons to think that there may be structural shifts as distinguished from income and price effects (Huang and Bouis, 1995). As populations move from rural to urban areas, the structural shift in consumption pattern can take place as a result of the (i) wider choice of available food in urban markets, (ii) urban residents are exposed to the rich variety of dietary patterns of foreign cultures, (iii) urban lifestyles may prefer the foods which require less time to prepare, (iv) urban occupations tends to be more sedentary and require a lower energy ,expenditure and so a lower calorie intake, (v) urban residents typically do not grow their own food and thus their consumption choices are not constrained (Huang and Bouis, 1995).

While changes in food demand patterns which are not attributable to increases in household incomes and changes in food prices, may first be noticed in urban areas, as structural transformation proceeds to a more advanced level, these same changes in food demand patterns eventually may occur in rural areas as well. At that point, market availability and lifestyles in urban and rural areas become virtually indistinguishable.

An ideal data set for measuring structural shifts in food demand patterns would record foods consumed, prices, income by source and standard demographic information for a large number of families before and after these families migrated from rural to urban areas. Such a longitudinal data set would record this information across two or more generations. Such data set are not available. A next best alternative (not involving observations for the same households over time) would be two national cross-sectional household surveys taken several years apart.

National Sample Survey Organization (NSSO) collects the data on household consumption expenditure at national level in the form of various rounds by adopting sample survey techniques. The cross-sectional data of national sample survey (NSS) of 32nd and 43rd rounds pertaining periods 1977-78 and 1987-88 have been used.

Table 1 and 2 give per capita food consumption levels for 1977 and 1987, dis-aggregated by rural and urban. Urban areas exhibited a more diversified food basket with significantly higher levels of per capita consumption on milk and milk products, fruits and vegetables. Increasing urbanization and widening rural-urban disparity will reduce the demand per head for foodgrains and increase the demand for fruits, vegetables and milk at a faster rate. Between 1977 and 1987, the consumption of cereals per head declined and substituted by milk, fruits and vegetables. The increasing trends in consumption towards high value commodities has generated the high growth in demand for milk, fruits and vegetables.

Demand projections

The consumer demand elasticities given in Appendix 1 have been used in projecting the demand for food under the assumptions that: (i) total expenditure grows at 4 percent, 5 percent and 7 percent per annum; (ii) population grows at 2.0 percent per annum during 1991 to 1995, 1.91 percent during 1995 to 2000, 1.8 percent during the period 2000 to 2010 and 1.7 percent during the period 2010 to 2020 (Appendix 2); (iii) pace of urbanization will be consistent with the recent historical trend; (iv) the triennium average of production ending 1992 is taken as the base year 1991 demand (The share of household consumption in total production is estimated 87.2 percent for milk, 83.5 percent for vegetables, 41.2 percent for fruits. 59.3 percent for meat and eggs, and 35.9 percent for fish. This difference may be due to heavy post-harvest losses at different stages and other uses including exports etc. In the absence of post harvest losses by commodities and also other uses which are not included in the NSS consumer survey, the average production figures for the year 1991 is taken as the base year demand while making the projections of total requirements in the years 2000 and 2020.). The demand for milk, vegetables, fruits, meat, eggs and fish has been forecast for the years 1995, 2000, 2010 and 2020 at constant prices and given in Table 3. The demand includes household consumption, losses, exports and other uses.

Table 1 : Annual Per Capita Food Consumption (kg) in India

Income Group	Rice	Wheat	Coarse cereals	Pulses	Milk	Oil	Veg.	Fruits Meat			Sugar
In 1977											
Rural	86.5	49.4	56.7	8.7	24.6	2.7	24.7	2	.6	2.7	13.5
I	68.9	30.6	57.9	5.1	6.0	1.5	15.8	1	.0	1.4	5.7
II	92.9	44.4	55.3	7.9	15.3	2.4	23.3	1	.4	2.3	9.9
III	101.5	57.4	55.6	10.4	30.5	3.2	29.5	3.0		3.4	15.9
IV	99.8	93.6	57.1	17.0	77.9	5.3	42.6	8	.2	5.7	35.7
Urban	67.6	64.6	14.8	11.7	39.7	4.8	39.7	5	.9	4.8	17.1
I	54.2	45.1	23.6	5.8	8.3	2.0	18.7	1	.4	1.8	7.7
II	68.5	56.8	18.6	8.1	17.4	3.1	26.6	2	.1	2.9	11.1
III	Z6.2	61.7	14.8	11.0	31.6	4.4	35.7	3.9		4.4	15.4
IV	66.7	81.3	8.5	17.0	73.5	7.3	60.2	11	.7	7.6	26.3
In 1987											
Rural	88.1	61.6	29.8	11.5	58.0	4.3	50.8	10	.3	3.3	11.0
I	66.4	41.3	36.8	6.8	10.2	2.0	33.3	3	.0	1.4	4.6
II	87.2	52.3	29.7	9.3	22.3	3.1	41.4	5	.2	2.3	7.2
III	93.4	61.4	28.7	11.0	44.0	4.1	50.4	8	.7	3.1	10.5
IV	98.?	82.1	26.1	16.7	130.0	6.8	70.0	20	.5	5.4	18.6
Urban	68.1	60.4	10.6	12.2	64.9	6.8	66.4	18	.8	4.9	12.3
I	55.0	47.9	17.6	6.7	15.6	2.9	35.4	5	.0	2.8	6.0
II	66.8	54.4	14.5	9.1	32.0	4.5	48.2	9	.0	3.6	8.9
III	71.0	60.5	9.7	12.1	58.4	6.5	65.3	14	.9	4.3	12.1
IV	71.6	70.1	5.5	17.0	116.7	10.4	94.3	35	.8	7.3	17.6

Note: I: Expenditure classes of NSS persons below 75 percent of poverty line.
II: Expenditure classes between 75 percent and poverty line.
III: Expenditure classes between poverty line and 150 % of poverty line.
IV: Expenditure classes above 150 percent of poverty line.

Table 2 :
Change in Annual Per Capita Consumption, India

Items	Rural			Urban		
	1977	1987	Change	1977	1987	Change
(Kilograms)						
Rice	86.5	88.1	+ 1.6	67.6	68.1	+0.5
Wheat	49.4	61.6	+ 12.2	64.6	60.4	-4.2
Coarse cereals	56.7	29C.8	-26.9	14.8	10.6	-4.2
Cereals	192.6	179.5	-13.1	147.0	139.1	-7.9
Pulses	8.7	11.5	+2.8	11.7	12.2	+0.5
Milk	24.6	58.0	+33.4	39.7	64.9	+25.2
Edible Oil	2.7	4.3	+ 1.6	4.8	6.8	+2.0
Vegetables	24.7	50.8	+26.1	39.7	66.4	+26.7
Fruits	2.6	10.3	+7.7	5.9	18.8	+ 12.9
Meat, fish & eggs	2.7	3.3	+0.6	4.8	4.9	+0.1
Sugar	13.5	11.0	-2.5	17.1	12.3	-4.8

In the year 2000, demand for milk works out to about 72-81 metric tonnes (mt), vegetables 82-90 mt, fruits 40-44 mt, meat 3.5-4.3 mt and fish 5.3-6.5 mt. In the year 2020, total demand will reach 126-183 mt for milk, 136-181 mt for vegetables, 68-98 mt for fruits, 6.3 to 12.1 mt for meat and 9.5-18.3 mt for fish.

Table 3 :
Total Demand for Milk, Fruits, Vegetables, Meat and Eggs, and Fish in India

Items	GDP Percentage Growth	1991 (Base year)	1995	2000	2010	2020	Percentage Growth (1995-2020)
			(Million Tonnes)				
Milk							
	4	56.1	62.9	72.4	95.6	126.0	2.82
	5	56.1	64.0	75.3	103.7	142.7	3.26
	7	56.1	66.2	81.3	122.0	182.8	4.14
Fruits							
	4	30.8	34.5	39.6	52.1	68.3	2.77
	5	30.8	35.0	41.1	56.3	77.0	3.20
	7	30.8	36.2	44.3	65.8	97.6	4.05
Vegetables							
	4	64.8	72.0	82.1	105.8	136.0	2.58
	5	64.8	73.0	84.5	112.7	149.7	2.91
	7	64.8	74.9	89.7	127.7	181.1	3.59
Meat and eggs							
	4	2.7	3.0	3.5	4.7	6.3	3.01
	5	2.7	3.1	3.7	5.4	7.8	3.76
	7	2.7	3.3	4.3	7.2	12.1	5.33
Fish							
	4	4.1	4.6	5.3	7.1	9.5	2.97
	5	4.1	4.7	5.7	8.2	11.8	3.75
	7	4.1	5.0	6.5	10.8	18.3	5.32

During 1995-2020, the total demand will grow at the annual compound growth rate of 2.8-4.1 percent for milk and fruits, 2.6-3.6 percent for vegetables and 3.0-5.3 percent for eggs, meat and fish.

Policy Implications '

The growth rate in output achieved during 1980-90 was (4.7 percent for fruits, 5.2 percent for meat, fish & eggs, 5.2 percent for milk, 3.4 percent for vegetables) higher at the margin than the demand growth of these commodities. Faster growth of income results in diversification of the demand pattern with higher growth in non-food grain crops and livestock products like meat, poultry, dairy, aquaculture. The per capita availability of arable land in India is quite low

and declining over time. Diversification towards these high value and labour intensive commodities can provide adequate income and employment to the farmers dependent on small size of farms.

India produces a very wide variety of fruits and vegetables and is the second largest producer in the world. But less than one percent of this production is commercially processed. Due to lack of adequate post-harvest handling facilities and proper infrastructure, post-harvest losses due to spoilage are as high as 25-30 percent of the value of produce. The low performance of the country in export of horticulture produce is attributable to a variety of reasons. Lack of infrastructural facilities coupled with low productivity and high prices of raw materials makes Indian exports uncompetitive in the international market. At present, over 90 percent of the exports in fruits and vegetables and processed horticultural products go to West Asia and East European markets. There is a need to widen the base and have larger basket of exportable products.

India is endowed with a wide spectrum of indigenous fruits, which are categorised as minor fruits. About 27 percent of the fruit production consists of a large number of minor fruits. Most of these are tropical/subtropical in nature and are grown even under adverse agroclimatic conditions. Most of these minor fruits have not undergone any conscious phase of domestication and human selection. Their cultivation is very restricted and they grow mainly wild. India has a vast tract of arid and semi-arid land, and most of the minor fruit crops could be grown in such areas.

Production of milk and its processing continues to be largely restricted to households and to the cottage industry sector until cooperative movement took root. The consumption of liquid milk accounts for about 46 percent of the total production of milk. The remaining 54 percent for conversion to milk products. Of this, the share of the organized sector is less than 10 percent. There is a substantial potential for upgradation of processing facilities. The largest share of milk and milk products is consumed by the domestic market. Export of milk products are almost negligible.

The poultry and meat producing industry in India is largely confined to the unorganized sector. The key constraints that the industry faces relate to lack of organized facilities for rearing meat producing animals and the absence of cold chains. Poultry farming has now become an established activity in the organized sector, although much can still be done to improve yields and quality. The export of meat and meat preparation has increased steadily over the last few years.

Traditionally, India's vast marine and inland water resources have only been tapped by local fishermen to cater to domestic demand. Over the last decade or so, the organized corporate sector has become involved in the preservation and export of coastal fish. But nevertheless, India's fishery resources are grossly under-utilized. There is an enormous potential to increase the output of this sector. In the current liberalization environment, domestic and foreign corporate investments are being encouraged, both for inland farming and for marine fishing. Indian exports have increased steadily both in terms of value and in terms of quality.

Export market's share is rising for livestock and horticultural products and thus it can provide an additional source of future growth. This further emphasizes the need for increasing the supply of these high value products.

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Appendix 1 : Expenditure elasticities by commodities, India

	Rural	Urban	India
Milk	0.458	0.372	0.435
Fruits	0.442	0.360	0.410
Vegetables	0.385	0.253	0.344
Meat, fish & eggs	0.848	0.633	0.773

Source : Praduman Kumar *et al* (1994).
Note : The consumer demand elasticities are estimated based on Food Characteristic Demand System developed by Bouis (1992) which is based on demand for energy, variety, and tastes of foods' is used to derive the income and uncompensated price elasticities [for details see Praduman Kumar and *et al* (1994)).

Appendix 2 : Population projections and annual compound growth rates

	Population (million)			Population growth(%)		
Year	Rural	Urban	Total	Rural	Urban	Total
1987	585.56	190.01	775.57	-	-	.
1991	627.31	216.99	844.30	1.74	3.38	2.14
1995	670.43	243.46	913.89	1.67	2.92	2.00
2000	725.64	278.86	1004.50	1.60	2.75	1.91
2010	839.52	360.65	1200.17	1.47	2.61	1.80
2020	958.58	461.96	1420.54	1.33	2.50	1.70

DIVERSIFICATION OF SMALL FARMS THROUGH HORTICULTURAL CROPS

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The present economic policy of liberalisation has resulted in substantial growth in hitherto neglected fields of agriculture like horticulture through introduction of hybrid seed plant material, huge investment in fruit and vegetable processing sectors, infrastructural facilities and export of horticultural produce (Subramanyam, 1994). The introduction of hybrid seed in horticultural crops like tomato and cabbage has more than doubled the productivity of these crops from hardly 20 tonnes / ha to around 50 tonnes / ha and resulted in not only increasing the production but also the productivity of labour (Subramanyam and Sudha, 1992). The studies have already shown that the horticultural crops in general are labour intensive and introduction of them in cropping patterns will help in increasing the farm incomes (Subramanyam, 1981). As small and marginal farms account for 76 percent of the operational holdings and contribute to a third of cropped area, if we can induce these small and marginal cultivators to grow horticultural crops and adopt the latest technologies by taking appropriate measures, there is a tremendous scope for increasing their income. Horticulture has been recognised as a priority area in the VIII$_{th}$ plan and nearly Rs. 1000 crores is alloted for its development (Subramanyam, 1994).

The present study is aimed at knowing the present status of cultivation of horticultural crops by small cultivators vis-a-vis other categories (medium and large cultivators) through analysis of the cropping patterns, changes in crops grown with reasons, adoption of the latest technologies etc., and suggest measures to enhance their cultivation specially by the small and marginal cultivators.

Data and Methodology

The data for this study was collected through a pre-designed questionnaire from the cultivators located in Chickballpur and Malur taluqs in Kolar District of Karnataka. The total sample comprised of 62 farmers representing the various size groups viz, 40 small (below 2 ha), 16 medium (2-5 ha) and 6 large (more than 5 ha). The data pertains to the year 1992-93. Simple tabular analysis was used as the main statistical tool for this study.

Results and Discussion

Area Allocated to Various Crops

The cropping pattern details presented in Table 1 show that the small cultivators are cultivating their land more intensively than the other two size groups, as revealed by nearly 135 percent cropping intensity as against 117 percent and 115 percent in case of the medium and large size groups respectively. The percentage of area alloted to cereal crops in case of small farms is slightly more than the other two groups, which is expected as food grains for home consumption will be their first priority. In case of other crops, it could be observed that the small cultivators have alloted more area for seasonal horticultural crops, where as the medium and large cultivators have diverted considerably higher area (25 and 31 percent respectively) for perennial horticultural crops compared to the small farmers. This may be due to the reason that the small cultivators cannot afford to block their land permanently under perennial crops. The cultivation of seasonal crops besides offering flexibility, helps in enhancing their income. Therefore, they have diverted area to seasonal horticultural crops instead of perennial horticultural crops. This clearly shows that small cultivators are also aware of the potential of horticultural crops in enhancing their income.

Crop Rotations and Crops Cultivated

The crop rotations followed by the cultivators is presented in Table 2. It could be observed that most popular rotation of the small farms was cereal-vegetable, where as in case of medium and large size groups, the crop rotations were mostly vegetables followed by vegetable and very few have cereals in their crop rotations. Among the cereals also, the small cultivators have grown mostly ragi which is a foodgrain crop, where as medium and large growers have grown maize which is a commercial crop.

Table 1 :
Cropping Pattern followed by different Size of Farms

(% area alloted)

Particulars of crops	Sample size category			
	Small	**Medium**	**Large**	**Overall**
Average size of farm				
1.Cereals (Maize & Ragi)	35.54	35.00	27.09	31.58
2. Pulses	-	-	-	-
3. Oilseeds	-	-	6.90	3.08
4. Horticultural Crops	49.48	56.25	51.95	21.91
a) Seasonal				
Vegetables	38.21	27.92	17.64	25.48
Fruits	8.20	-	1.28	2.29
Flowers	3.07	3.33	1.28	2.36
b) Perennials (Banana, Sapota, grapes & mangoes)	8.89	25.00	31.75	24.64
5. Other Perennials (Mulbery & Eucalyptus)	27.68	18.54	21.32	21.70
Cropping Intensity (percent) (including perennial crops)	121.60	109.79	107.26	111.14
Cropping Intensity (percent) (excluding perennial crops)	134.05	117,34	115.48	120.75

Table 2 :
Crop Rotations followed on different size of Farms

Size Category	Kharif	Rabi	Late Rabi	Summer
A. Small				
1.	Ragi	Fallow	Beans	Fallow
2.	Ragi	Fallow	Radish	Carrot
3.	Beans	Carrot	Potato/Radish	Fallow
4.	Radish	Carrot/Tomato	Tomato/Cabbage	Fallow
B. Medium				
1.	Cabbage Beet root Tomato	Tomato	Ragi	Fallow
2.	Beans	Potato	Carrot/beans	Fallow
3.	Ragi	Beans	Carrot/paddy	Fallow
C. Large				
1.	Beans Maize	Potato	Cabbage Paddy	Fallow
2.	Maize	Potato	Carrot/beans	Fallow
3.	Ragi	Potato	Beans	Fallow

Changes in Farm Enterprises

The details of the changes in the farm enterprises along with the reasons is presented in Table 3 . It could be observed that nearly 64 percent of the sample cultivators have brought about changes in their farm enterprises. Among the different size groups of cultivators, largest number of small cultivators have dropped the horticultural crops (64 percent) followed by medium (42 percent) and large (33 percent) size group. If we count the number of cultivators who have dropped horticultural crops in favour of sericulture/mulbury, the percentage of small cultivators who have dropped horticultural crops increases to 84 percent. As against this very small percentage of small cultivators (hardly 16 percent) have introduced horticultural crops. If we examine the reasons given for deletion of horticultural crops, the unremunerative price and pest and disease problems were the main reasons besides the lack of irrigation facilities.

The unremunerative price was mainly due to the wide price fluctuations due to perishability and seasonal gluts in case of horticultural crops. For example, the wholesale price of tomato during 1991-92 in Bangalore market touched as low as Rs. 72/qtl during the first week of April making even harvesting and transporting of the produce to the market unremunerative. During the off season i.e., summer, during July, the price had gone up to Rs. 1100/qtl for the same produce (Fig.1) As most of the small cultivators have very limited irrigation facilities (water) during summer, they cannot take the advantage of this high price, but at the same time have to face the risk of unremunerative prices during the main season, i.e. rabi.

The second main reason for dropping horticultural crops as given by the cultivators is the pest and disease problem. Most of the hybrids which have become popular' with the cultivators due to their high productivity are also highly susceptible to pests and diseases as compared

to the local varieties. This can be seen from the huge amount spent by the cultivators for plant protection measures for the hybrids. The details of the same are presented in the subsequent section, because of this, some cultivators have dropped growing these vegetables subsequently, as reflected in the high percentage of small growers deleting horticultural crops.

Figure 1 : Weekly Wholesale Price Trend of Tomato - (Banglore Market)

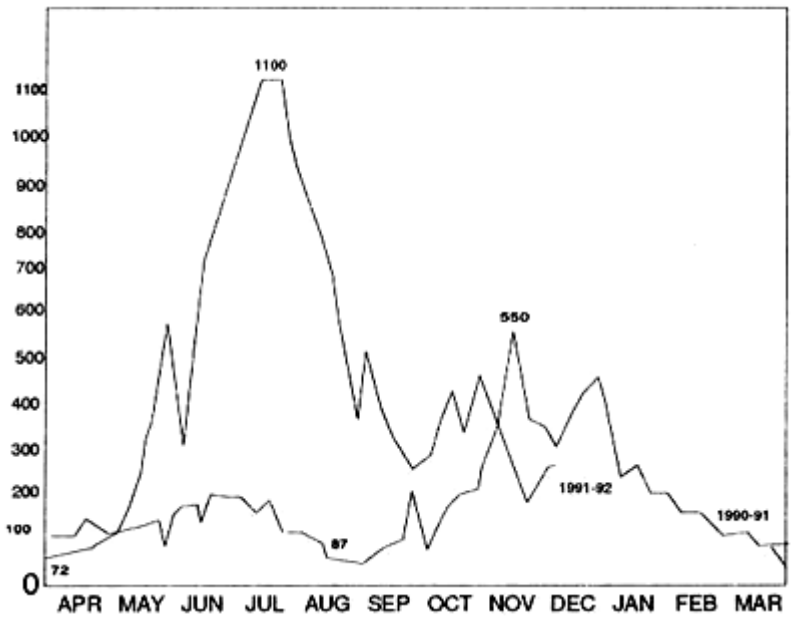

Table 3 : Changes in Farm Enterprise on Different Size of Farms

Particulars of change		Number of cultivators				
		Small	Medium	Large	Overall	Reason
A	Introduction of new crop of enterprises					
1	Horticultural Crops (vegetables)	2 (5)	4 (25)	1 (16.66)	7 (11.29)	Profitability
2	Sericulture/Mulbery instead of hort. crops	5	1	1	7	Assured returns
3	Perennial fruits/flower crops mulbery crops	2	2	--	4	Assured returns
B.	Deletion of horticultral crops	16	5	1	22	1. Lack of water 2.Unremunerative price 3.Pest & disease
	Total number who had undertaken changes	25 (62.5)	12 (75)	3 (50)	40 (64.52)	
	No Change	15 (37.5)	4 (25)	3 (50)	22 (35.48)	
	Total (change + no change)	**16 (100)**	**6 (100)**	**62 (100)**	**(100)**	

Note: Figures in parentheses are percentage

Adoption of New Technology

Table 4 presents the adoption of new technology by various size groups of farms. It could be observed that hardly around 40 percent of the small cultivators could take advantage of the new technology as against 75 percent and 83 percent of medium and large cultivators respectively. From the details of technology adopted presented in Table 5, it could be seen that the hybrids of tomato and cabbage were found to be very popular with the small cultivators as compared to the other two groups. The small cultivators included these two vegetables in their crop rotations, because of the high productivity and returns.

Table 4:
Adoption of new Technology: Size group wise

Sl. No.	Catoegory/ Size	Small	Medium	Large		Overall			
		No	%	No.	%	No.	%	No.	%
1.	Adopters	16	40	12	75	5	83	33	53
2.	Non Adopters	24	60	4	25	1	17	29	47
	Total	**40**	**100**	**16**	**100**	**6**	**100**	**62**	**100**

Table 5 :
Details of Technology Adopted by size of Farm

Sl. No.	Crop	Variety used		Sample farmers		
		Earlier	Present	Small	Medium	Large
1 .	Tomato	Local	Hybrid	6 (37.50)	4 (33)	1 (20)
2 .	Tomato	Improved	Hybrid	- (0)	1 (8.3)	- (0)
3.	Cabbage	Local	Hybrid	2 (12.5)	2 (17.0)	- (0)
4.	Potato	Local	Jalandhar	10 (62.5)	9 (75)	41 (80)
5.	Beans	Local	Sel-9	7 (44)	5 (42)	2 (40)
				16 (100)	**12 (100)**	**5 (100)**

Note : Figures in parenthese are percent to total number of adopters

Costs and Returns Associated with New Technology

The comparison of costs and returns associated with the new hybrid seed technology in case of vegetable crops, tomato and cabbage is presented in Table 6. It could be observed that the cultivation of hybrid seed crops is highly capital intensive requiring more than double the amount compared to local varieties. The increased cost of cultivation in case of hybrids is mainly due to the increased cost of some inputs like seeds, fertilisers, pesticides and special

crop specific operations like staking in tomato. It could be observed that the proportionate cost of seed in total cultivation has increased nearly 6 percent to 9 percent in tomato and cabbage hybrids as against hardly 1 percent in case of the local varieties, which was mainly due to the exorbitant price of Rs. 6000/kg in case of cabbage and Rs. 20,000/kg in case of tomato charged by the private seed companies. The susceptibility of the hybrid crop to the pests' and diseases also resulted in very high expenditure towards plant protection measures as compared to the local varieties. Staking required for tomato hybrid is another item which has contributed about 22 percent to the total cultivation expenditure.

Table 6 : Impact of hybrid seed technology on cost of cultivation (Rs/ha)

		TOMATO		CABBAGE	
S. No	**Items**	**Hybrid**	**Local**	**Hybrid**	**Local**
A. Material Cost					
1)	Seed	1479.5 (5.89)	173.70 (1.44)	3036.65 (9.29)	154.49 (1.39)
2)	FYM	2205.00 (8.77)	3697.40 (30.56)	3941.32 (12.06)	4037.82 (36.50)
3)	Fertilizers	3994.23 (15.89)	1220.69 (10.09)	5067.00 (15.51)	1274.76 (11.52)
4)	Plant protection	2728.00 (10.85)	490.89 (4.06)	10334.00 (31.62)	480.02 (4.34)
5)	staking	5543.05 (22.05)	-	-	-
6)	others	752.39 (2.99)	500.00 (4.13)	1043.90 (3.19)	200.00 (1.83)
	Total Material Cost	**16702.18 (66.44)**	**6082.68 (50.27)**	**23422.87 (11.67)**	**6147.09 (55.57)**
B. Labour Cost					
1)	Human	7957.00 (31.65)	5467.73 (45.19)	8762.00 (26.81)	4562.58 (41.25)
2)	Bullock	481.06 (1.91)	549.00 (4.54)	494.78 (1.51)	351.75 (3.19)
	Total Labour Cost	**8438.06 (33.56)**	**6016.73 (49.73)**	**9256.78 (28.33)**	**4914.33 (44.43)**
C.	Total cost of cultivation (A+B)	25140.24 (100.00)	12099.4 (100.00)	32679.65 (100.00)	11061.42 (100.00)
D.	Gross Returns	66300.00	19152.00	76094.10	18029.00
E.	B C R	2.64	1.50	2.33	1.63
F.	Cost of Production (Rs./qt)	645	885	481	742

The gross returns realised from hybrids was also 2.5 to 3.5 times higher than that for locals thus offsetting the 2 to 3 times increase in the cultivation costs. But, because of the definitely higher returns, associated with hybrids the small cultivators have adopted them on a large scale, despite the high capital requirement.

Credit Needs and Sources of Credit

a) Short term credit :

The sources of short term credit for different size groups of cultivators is presented in Table 7. It could be observed that the commercial banks and cooperative societies are the most popular institutions, irrespective of the size of the farm. The small size group have borrowed the highest amount of Rs. 5,142/ha as against Rs. 4,678/ha and Rs. 4,356/ha in case of medium and large size groups respectively. This clearly shows that the small cultivators need more credit support as compared to the other size groups.

Table 7 :
Sources of Short term Credit : Size group wise

S. No	Sources of Credit	Percent of Borrowers			
		Small	**Medium**	**Large**	**Overall**
1.	Commercial Banks	65 (5457)	64 (5976)	75 (3980)	67 (5307)
2.	Co-operative banks	30 (4607)	21 (1951)	12.5 (1961)	24 (3546)
3.	Primary Land Development Bank (PLDB)	-	-	12.5 (10385)	2 (10385)
4.	Other Organisations	-	7 (2722)	-	2 (2722)
5.	Friends/relatives	5 (3571)	7 (1463)		5 (2517)
	Overall	**100 (5142)**	**100 (4678)**	**100 (4356)**	**100 (4838)**

Note : Figures in parentheses show the amount borrowed/ha per annum

b) Medium and Long term Credit :

For meeting the medium and long term credit requirements, the small cultivators seem to depend more on cooperative institutions like the Primary Land Development Banks (PLDBs) rather than the commercial banks, which are popular with the medium and large cultivators, This may be due to the lengthy procedures and requirement of more securities which the small cultivators cannot fulfil in case of the commercial banks. The medium and large cultivators also enjoy better credit rating with the commercial banks (called as the Green Card holders) compared to the small size growers. This can be observed from the high amount which they could borrow from the commercial banks compared to the small size growers (Table 8).

Table 8 : Source of Medium and Long term Credit : Size group wise

S No.	Sources of Credit	Percent of Barrowers			
		Small	**Medium**	**Large**	**Overall**
1.	Commercial Banks	42.86 (27667)	75 (84333)	100 (114230)	70.59 (85123)
2.	Primary Land Development Bank (PLDB)	57.14 (36500)	25 (48000)	-	29.41 (38800)
	Overall	**100 (3214)**	**100 (72250)**	**100 (114250)**	**100 (71500)**

Note : Figures in parentheses show the average amount borrowed per annum.

Conclusions and Policy Implications

The small size cultivators are aware of the potential of horticultural crops in enhancing their income. Therefore, to take advantage of the new technologies developed in horticultural crops, it is essential to protect the cultivators especially the small farmers from the price risk faced by them due to seasonal gluts and perishability of horticultural crops.

To overcome this price risk, suggested measures such as, linking processing with production and marketing and price support should be undertaken.

For the small size group to take advantage of the new highly capital intensive technologis, adequate credit arrangements should be made.

To encourage the small cultivators to increase their irrigation capabilities and to grow perennial horticultural crops, the commercial banks should be made to give more medium and long term credit to these j category of growers with less security requirements.

Acknowledgement

The Authors are grateful to Sri. V. Dakshinamoorthy, Technical Officer, T-5 for collection and tabulation of data.

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SCOPE FOR COMMERCIALISATION OF SMALL FARM AGRICULTURE

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The crux of agricultural development in India is to maintain a rising level of foodgrain production and a reduction in rural poverty by speedy growth of income and employment. The new seed-fertiliser based technology has helped the farmers achieve the first goal of food security, because priority for foodgrain production is rightly compatible with subsistence orientation of the majority of the farmers - especially marginal and small farmers. In the past, it was believed and in fact verified by several studies that the new technology is scale neutral and the poor would share at least equally with rich in the gains from the technology. This has not happened and poverty persists. It is a paradox that a record foodgrain production of 186 million metric tonnes in 1994-95 coexists with nearly a third of the country's population living below the poverty line. Indeed, the economic inequalities have widened over the years, revealing that integrating capitalist agriculture with welfare goals is more formidable than earlier thought of. One reason is the lack of adequate attention in policies and programmes for agricultural development to the need for rapid commercialization of agriculture. The history of the presently developed economies shows that modernisation, monetisation and integration are the essential ways of agricultural development. The new technology helped modernization. Further, the increasing demand for money - to purchase most of the input off-farm, leads to increasing sensitivity of farmers to relative prices of agricultural commodities and that helped monetization and commercialization. The next step is to ensure the transfer of resources (generated surpluses) -wage goods, raw materials and investible funds - from agricultural development and improve the capacity of fanners to adopt new agricultural technology. Therefore, it would increase the income of the farmers and contribute to creating employment for the landless. This is the process and theory of 'Integrated Rural Development'. The farm size, direction and pace of this transfer are important. Indian experience is that the process has by-passed a vast majority of the producers in agricultural sector and the progress in integration is highly inadequate. While modernisation and monetization have helped agricultural growth - largely in foodgrain production and commercialization on a limited scale, the process has failed to encompass the marginal and small farmers. The paper analyses the causes and consequences of this deficiency in integration.

Marginal and Small Farms

By their numerical strength, the marginal and small farmers form the majority of cultivators in the country as a whole and in Tamil Nadu and Madurai district which form the universe for the present study. The pattern of size distribution of farms is similar - the predominance of marginal and small farms in both number and area operated by them. Compared to all India, their predominance is much greater for Tamil Nadu and Madurai district (Table 1). This served the purpose of this study - namely to understand the scope and constraints for commercialization of the small farms and to identify the policy options therefore :

Data

The study is necessarily based on primary data, because the required information was not available with any source of secondary data. Therefore, a sample of 200 farms was selected in Madurai district by a three stage random sampling method - the stages being CD blocks, villages and farms and by distributing the sample among the villages in probability proportion to the number of farms in each village to the total number of farms in all the 20 sample villages in five C.D. blocks. These sample farms were post-stratified into three size groups

based on this operational area viz., small (< = 2 ha); medium (2-4 ha) and large (>4 ha). By definition therefore, small group included marginal farms and the large group included medium farms and the group of semi-medium in the secondary data corresponded to the medium size group of the sample.

Table 1 :
Number and Operational Area of Farms - Size group wise

Size Group	All India		Tamil Nadu		Madurai . Dt	
	No. million	Area m.ha	No. ' 000	Area' 000 ha	No. ' 00	Area ' 00ha
Small (<=2ha)	74.07 (76.23)	47.75 (29.02)	6780 (87.68)	3790 (48.61)	2816 (88.96)	2051 (56.96)
Semi medium (2-4 ha)	13.25 (13.64)	36.67 (22.28)	649 (8.42)	1778 (22.81)	231 (7.30)	708 (19.66)
Medium (4-10 ha)	7.92 (8.15)	47.14 (28.84)	261 (3.39)	1508 (19.34)	101 (3.19)	580 (16.10)
Large (>10ha)	1.92 (1.98)	33.00 (20.06)	39 (0.51)	720 (9.24)	17 (0.54)	262 (7.28)
Total	**97.16**	**164.56**	**7707**	**7796**	**3165**	**3601**
Per farm	_	1.69	_	1.81	_	1.14

Note : Figure in parenthesis are percentages to the column total
Sources: (i) For all India & Tamil Nadu -Fertilizers Statistics, 1992-93
(ii) For Madurai district-Records of the Joint Director of Agriculture, Madurai

The distribution of sample farms among the size groups and area operated by them are shown in Table 2. The striking similarity between the primary and secondary data for Madurai district in the percentage share of operational area of the three size groups in the total area of all the farms cannot be missed. Consequently the average size of operational area of a farm is 1.15 ha in the sample and 1.14 ha in the data for the district. Thus the sample is adequately representative of the district and allows generalisation of the results. In all the size groups, average area of the farm was closer to the lower limit of the range rather than the upper limit.

Table 2 :
Distribution of Sample Farms-size group wise

Size Group	Total		Total Area		Per Farm Area (ha)		
	No.	%	Ha.	%	Mean	Min	Max
Small (<=2 Ha)	168	84.00	124.49	53.94	0.741	0.04	2.00
Medium (2-4 Ha)	20	10.00	45.40	19.67	2.270	2.20	3.60
Large (>4ha)	12	6.00	60.91	26.39	5.076	4.06	14.00
Total	**200**	**100.00**	**230.80**	**100.00**	**1.15**	**0.40**	**14.00**

Cropping Pattern

The concept of commercialization refers to the increasing share of the marketable surplus in the total farm business income of the farms. This share can be increased by (i) generation of more marketable surplus in subsistence oriented foodgrain crops; (ii) by increasing production of market oriented cash crops and other products (collectively known as high value adding enterprises) and (iii) both. An increase in foodgrain production through improvement in productivity of land and diverting area for the high value adding (HVA) crops or other enterprises will ensure food security and commercialization simultaneously. Therefore the cropping pattern of the farms will show the share of high value adding crops. Groundnut, onion, chillies, sugarcane and cotton are the value adding (cash) crops cultivated by the farmers of the district, while paddy, jowar and blackgram are the food crops raised by them. The share of the non-food crops in the gross cropped area of the farms is shown in Table 3.

In the total gross cropped area of 297.05 ha , cash crops accounted for 64.03 ha (21.56 percent) only showing the farmer's preference to food crops - a sign of subsistence orientation. The share of the food crops in gross cropped area was as high as 90 percent in small farms as compared to 59.75 percent in large farms. Therefore commercialization through production of products for market (cash crops) was very small i.e., less than 10 percent in total area under cash crops. The large farms were just 12 (six percent) in the sample of 200 farms, but their share in area under the cash crops was 53.60 percent. Therefore the commercialization of agriculture would need attention to small farms, to encourage area under cash crops.

Table 3 :
Share of Cash Crops in Gross Cropped Area

Size Groups	No. of Farms	Gross Cropped Area (ha)	Cropping intensity (%)	Area under (ha) Food Crops	Cash Crops	*
Small	168	152.779 (100.00)	122.73	137.68 (90.11)	15.11 (9.89)	23.61
Medium	20	509.00 (100.00	129.95	44.40 (75.25)	14.60 (24.75)	22.80
Large	12	85.26 (100.00)	139.97	50.94 (59.75)	34.32 (40.25)	53.60
Whole Sample	200	297.05	128.70	233.02	64.03	100

Note: Figures in parenthesis are percentages to GCA
* Last column shows percentages to the total area (column total) under non-food crops

Productivity of crops

The average productivity (in kg/ha) of the crops raised in the sample farms is shown in Table 4 for a comparative study.

In jowar , bajra, blackgram and groundnut (rainfed crop), the small farms had the highest productivity. In other crops excepting sugarcane, the productivity of small farms was not significantly different from that in other groups. Only in sugarcane average productivity per hectare was just 101 tonnes/ha as compared to 140 tonnes/ha on large farms. Therefore, productivity was not a serious constraint for commercialisation of small farms if the marketed surplus were not different for the size groups. By the time of enquiry (April '95) the sample

farmers had completed the sale of crops raised in the previous years. Therefore their marketed surplus was estimated and expressed as percentage to total production.

Table 4 :
Productivity of Crops (1993-94)

Crops	Productivity in Kg/ha, in		
	Small farms	Medium farms	Large farms
1. Paddy	3089	2995	3286
2. Jowar	1336	1217	1180
3. Bajra	1205	1110	1070
4. Black gram	786	552	654
5. Groundnut (R)	1332	1280	1295
6. Cotton (R)	249	279	281
7. Onion	820	864	848
8. Chillies	790	827	830
9. Sugarcane (t/ha)	101	115	140

Marketed Surplus

Estimates of average marketed surplus as percentage to production are presented in Table 5.

Table 5 :
Marketed Surplus in Crops Produced

Crops Raised in 1993-94	Marketed Surplus (percentage) on		
	Small Farms	Medium Farms	Large Farms
1 Paddy	54.15	68.00	76.13
2 Jowar	50.20	57.50	96.70
3 Bajra	63.45	89.38	99.85
4 Blackgram	48.74	46.53	47.77
5 Groundnut (R)	100.00	100.00	98.80
6 Cotton (R)	100.00	100.00	100.00
7 Onion	98.70	99.20	100.00
8 Chillies	100.00	100.00	100.00
9 Sugarcane	100.00	100.00	100.00

It is readily seen that small farmers had the lowest percentage of marketed surplus in food crops, with only exception of blackgram, but they had 90 percent of GCA under them. The area under cash crops was just 10 percent but their marketed surplus was 100 percent with one exception of onion where it was 98.70 percent. The inference is that production in small farms is more subsistence oriented than market oriented. This is a constraint for their commercialization.

Livestock

The farmers maintained one or two cows/she-buffaloes, work bullocks, sheep and poultry birds. Income from livestock supplemented the income from crops. But the size of livestock depended upon the availability of family labour to attend them. As members of the family of small farms worked as wage earners off-farm and non-farm, the livestock maintenance was on a small scale and brought very little income to the farms. It was not a commercial activity. This can be seen in the source-wise income of the farms.

Farm income

The income of the farm included income from crops (sale proceeds plus imputed value of produce retained by the family), livestock, off-farm income from wages earned by the members of the family going for work in other farms and income from other sources such as non-farm employment and property income. Estimates are presented in Table 6.

In all the size groups, income from crops exceeded sixty percent, but it was least on small farms. Income from livestock was negligible (0.92 percent) on small farms, about 15 percent on large farms and 21.42 percent on medium farms. The small farms would be able to maintain livestock with the help of straw from grain crops that dominated the crop pattern, but they had not, largely because members of the family went out to work on other farms as shown by the large (35.74 percent) wage income from such works. Large farms had very little family labour and therefore, their attention was mostly on crops and cows and poultry were maintained mostly to meet the home needs. It was the farms in the medium size group that had family labour which preferred maintaining livestock rather than going to work off-farm. Hence, income from livestock had a share of 21.42 percent of gross income, while off-farm wage income was just 1.40 percent. Other sources of income included non-farm employment of family members, properties and other miscellaneous sources. The share of this source increased that too very significantly as the farm size increased. Small farms were seen to be better than the medium farms in their operational efficiency as shown by the gross income/cost ratio and net income. Then operational ability of the farmers is not a constraint for their commercialization.

Table 6 : Income per farm - Source wise

(Rs/Year)

Source	Small Farms	Medium Farms	Large Farms
1. Crops	10488.17 (60.70)	29464.36 (64.89)	78360.44 (63.18)
2. Livestock	159.38 (0.92)	9725.30 (21.42)	18311.16 (14.76)
3. Off- farm wages	6170.50 (35.74)	638.15 (1.40)	-
4. Others	441.25 (2.58)	5574.17 (12.29)	27361.70 (22.06)
5. Gross Income/year	17258.75 (100.00)	45401.98 (100.00)	124038.30 (100.00)
6. Net Income/year	10274.43 (59.53)	23736.87 (52.28)	81275.07 (65.52)
7. Gross Income/Cost ratio	2.47	2.10	2.90

Note: Net income is gross income minus cost of earning it

Commercialization

In most of the recent literature, commercialization is approximated by the relative share of cash crops in the GCA. A more accurate measure of commercialization of farming (as opposed to commercialization of crop production)-especially in the context of a diversified agriculture including livestock and allied activities-is the percentage share of income from the sale of farm products in the total value of production. What did not enter the market would be retained for use on-farm and its value had to be imputed. The estimates of value realised from sales and imputed values of the retained quantities are presented in Table 7.

Table 7 :
Degree of Commercialization Compared for the groups

Sources of Income		Small Farms	Medium Farms	Large Farms
Gross income from	Crops	104.12	29464.36	78360.44
	Livestock	159.38	9725.30	18311.16
	Total	**10647.50**	**39189.66**	**96671.60**
Sale Proceeds from	Crops	3081.41	18768.80	66144.05
	Live-stock	53.15	5115.51	12836.01
	Total	**3134.56 (29.44)**	**23884.31 (60.95)**	**78980.06 (81.70)**
Imputed Value of Retention in	Crops	7406.71	10695.56	12216.39
	Livestock	106.23	4609.79	5475.15
	Total	**7512.94 (70.56)**	**15305.35 (39.05)**	**17691.54 (18.30)**

Note: Figures in parenthesis are percentages to gross income.

The percentage value of farm products sold out to the total value of production was just 29.44 percent on small farms, while the value of retained products accounted for 70.56 percent, thus clearly revealing that small farms were subsistence oriented. In contrast, the share of sales in total value product was 61 percent on medium farms and 82 percent on large farms showing them to be largely market oriented. What would explain this situation? Opinion of the farmers was analysed and it revealed three major causes for their reservation on expanding area under cash crops and lack of interest in cultivation of high value adding horticultural crops such as vegetable, fruit and flower crops. The opinion of the small farmers is presented in Table 8.

Table 8 :
Reasons behind allotting restricted area under high value crops-opinions of small fanners

Reasons	Seasonal Cash Crops		Horticulture Crops		Allied activities	
	No.	%	No.	%	No.	%
Non-availability of credit	97	57.50	21	12.50	87	51.80
No Buyers			86	51.20	56	33.30
Highly Risky	25	14.90	83	49.40	-	-
Huge Investment Not Possible	-	-	120	71.40	-	-
Price is not satisfactory	27	16.10	20	11 .90	-	-

In seasonal cash crops which included groundnut, cotton, sugarcane and chillies, the non-availability of credit was the most important constraint, followed by risk and unfavourable price. In livestock products of dairy, poultry and piggery, non-availability of creditand want of buyers (i.e., non availability of market outlet within their easy reach) were the reasons for limiting the size of those enterprises. In horticultural crops which included vegetables, fruits and onion, the need for making huge investments with production lag and the risk involved due to their bulkiness and perishability and also absence of market were the reasons reported by the farmers, as the constraints. The inability of the farmers to invest, reflected on the internal credit rationing, while their complaint of non-availability of credit would show the external credit rationing. Therefore, credit rationing and unfavourable market emerged to be the two major limiting factors for the commercialization of small farms. Interaction with officials of the commercial banks and Primary Agricultural credit Banks showed that they considered small farms as unviable units even for short term lending, not to speak of long term development credit. This statement was verified by analysing the ability of the farmers to repay the credit by comparing their income and expenditure levels and possible savings per annum (Table 9 and 10).

Table 9 :
Average Consumption Expenditure of Farm Families (Rs/Yr)

Categories	Small	Medium	Large
Food	4857.00 (46.78)	6321.67 (29.76)	12657.82 (19.32)
Education	890.63 (8.58)	2300.11 (10.38)	6360.77 (9.71)
Clothes and Foot-wear	1000.31 (9-63)	2275.68 (10.71)	8563.26 (13.07)
Fuel and Lighting	420.63 (4.05)	965.10 (4.54)	1375.23 (3.00)
Rent & House Maintenance	240.63 (2.32)	1600.44 (7.53)	11952.75 (18.24)
Family & Religious Functions	1075.00 (1035)	1600.44 (7.53)	13075.96 (19.96)
Others	1897.28 (18.29)	3100.63 (14.60)	11530.65 (17.60)
Total	**103.48 (100.00)**	**4678.14 (22.03)**	**65516.44 (100.00)**

Note : figure in parntheses are percentage to the column total

Problem focus

On an average the family of a small farm spent Rs. 10,380 per year, while it was Rs. 21,242 for medium farms and Rs 65,516 for the large farms. At this level of expenditure, there was little scope to reduce the consumption expenditure of a small farm family, which is neatly one half of the medium size group and one sixth of large farms. When this level of expenditure was compared with average annual income of the farms, small farm had1 only a negative saving, while medium and large farms saved nearly 10 percent and 19 percent of their income respectively (Table 10). So, bankers are right that small farms were not viable for credit. Only way for making them viable was to increase their income. It should be further emphasised that any increase in income would be spent to increase consumption first rather than saving, because the marginal propensity to consume is 0.82 (estimated from the sample data). Therefore income would have to raise much more than what was required to remove the presently seen negative savings. To allow for atleast five percent savings, the average income of small farms should raise to Rs. 11,500. This was feasible with change in enterprise mix in favour of cash crops and improving productivity of the crops - both additional investment for which the average small farmer was not credit worthy. The problem is made more serious by two more facts. First majority among small farmers had farms smaller in size than the mean size (Table 2), and thus they are problem farmers. Secondly, there was wide variation in net income from crops and the coefficient of variation of the net farm income was 18.10 percent. This might bring more farmers within the risk net and credit would have a low level of probability of recovery. Therefore a low income - low investment cycle exists and it sustains rural poverty. How to break this cycle and help a cumulative growth path to small farmers? Some policy options are discussed below.

Table 10 :
Income, Expenditure and Savings of Farm Households

Particulars	Small	Medium	Large
Net Income of Farms	10274.43	23736.87	812275.07
Consumption Expenditure	10381.48	21241.77	65516.44
Savings-Total % to Net	-107.05	2495.10	15758.63
income	-1.04	10.51	19.39
Discounted Savings(18%)	N.A.	3685.98	14722.08

Policy options

One way to break the cycle is to make credit available on the basis of prospective income or project based lending. The results of this study clearly show that commercialization of farming significantly contributes to the net farm income. Size of the farm was not a constraint for it; only capital rationing and market size were the real constraint. The crop pattern seen in medium farms are technically feasible and economically viable. Therefore alternate crop patterns may be identified and evaluated for their economic viability with the help of either partial budgets or linear programming technique to maximize aggregate net income of the farms. In the exercise, horticultural crops and allied activities may be the decision variables to be included. With the estimated costs and returns, plans with required level of savings may be identified and commended to the bankers. The advantage of this method is that the identified plans will win the confidence of both farmers and the lenders. Its major limitation is the cost and time involved in the exercise.

A second option is to encourage collective action such as group farming or cooperative farming, wherein farmers pool in their resources voluntarily to achieve larger scale of operation. Even medium size group farms were the net positive savers. Therefore, such a collective action is feasible. This is the approach suggested by Parthasarathy when he argues for alleviating poverty by a process of institutional reforms. Past experiences in institutional reforms such as cooperatives, regulated markets and C.D. blocks place a heavy discount on this strategy. However, institutional reforms in the past were attempts to impose institutions on the farmers who never developed a sense of partnership in them. This weakness may be overcome by educating and guiding farmers to organise themselves rather than inviting them to join a sponsored institution. With this new approach, it is likely that cooperatives may emerge to be a practical way, of course with much of the present bureaucratic control discarded. It is of course a long term prospect.

A third option is the marketisation of the farm sector, with continued subsidy on inputs to the marginal and small farmers. This is consistent with the New Economic Policy which places faith on liberalization and invisible hand. However, the basic condition for such a policy to succeed is the presence of perfectly or near perfectly competitive conditions in the market. Such a condition does not exist and it will take a very long time to integrate farmers into the system. The required process of adjustment will ruthlessly eliminate poor and less organised and institutional cannibalism may be inevitable and that makes the process both painful and anti-thesis of liberalization for social uplift of the weaker sections- one being the small farmer. Therefore only a combination of the above options will succeed. It must be recognised that as a social group, farmers are averse to collective action, unless the provocation is very strong. They also resist any imposition of institutions on them. However, if they have to survive in a liberalised economy, there is no alternative for an effective organisation for collective action. Only recently there is some sign of lobbying among farmers. Exploiting this trend, they should be helped to evolve their own organisation. This will be the real remedy to the small farmers'

problems. Yet, they have to be helped with project based lending for joint borrowing by a group of small farmers. All these efforts would be cost effective if planning is from below.

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BACKWARD AGRICULTURE - A CAUSE OF INDIA'S POVERTY

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The biggest challenge facing India's policy makers is the persisting high incidence of poverty. One of the reasons for the high incidence of poverty in India is its backward agriculture, whose productivity per hectare and per capita is amongst the lowest. The low per capita production is not only due to huge population, but also due to low productivity, which is only 64 percent of the world average.

The productivity potential of Indian agriculture has been amply demonstrated in Punjab, where it is nearly equal to those of developed countries. If India attains the productivity level already achieved in Punjab, the national income of India would be more than double of what it is today. Taking into consideration the vast untapped potential of Indian agriculture, the pool of unutilized scientific knowledge and the eagerness of Indian farmers respond to opportunities, neither Indian agriculture should remain backward, nor our people should remain almost the poorest in the world. Quite often, low productivity of Indian agriculture is attributed to small size of landholdings. In Japan, Korea and Taiwan the average size of holding is nearly the same as in India, but their incomes per hectare and per worker are several times more than ours.

The Decisive Factor

Among the many factors which determine productivity in agriculture, the most decisive one is the kind of "social support" which agriculturists get from the rest of the society. Social support emanates from a sense of gratitude towards agriculturists who provide the most essential requirement of mankind. This, however, is not quantifiable are therefore not comparable amongst various countries of the world. Hence a new concept, which takes into account only monetary transfers has bee developed. This is called, "Producer's Subsidy Equivalent" PSE. The can be defined, as payments received by agriculturists, in excess of what they would have received, if the Government had not intervened in free marketing of agricultural produce. PSE includes direct and indirect payments by Government and also increased payments to farmers b consumers, made inevitable by imposing ban on import of cheaper farm products from abroad. The U.S. Department of Agriculture in their publication entitled GATT & Agriculture" has reported the average PSE for 17 countries, for a period of 5 years from 1982-86. The highest PSE (plus 70 percent) was in Japan, followed by S. Korea, Mexico, E.E.C and Canada. In U.S.A. it was above 25 percent. It means that in these countries, farmers received 25 to 70 percent more than what they would have received under conditions of free trade. In four countries, viz Pakistan, Nigeria, India and Argentina, PSEs were negative. In India it was below 18 percent. It means farmers in India received 18 percent less than what they would have received, if the Government had not intervened in free trade. This has been arrived at after deducting from the total losses suffered by farmers due to Government interventions and considering the amounts spent by Government for providing to farmers input assistance and infrastructural support. It is significant that in all the countries, in which PSEs were found to be negative, productivity of agriculture was much below the average of the world. In other words, wherever farmers have been exploited, agriculture has remained backward. It is not necessary to plead for subsidy to farmers in India, comparable to what their counterparts are getting in the developed countries. But anti-farmer interventions by the Government in free marketing of farm products, must now be stopped. Unless this is done, profitability, savings and capital formation in the farm sector will remain low and potentials of Indian agriculture unutilised.

The following quotation from Economic Survey, 1994-95 is quite instructive. "Gross investment in real terms (at 1980-81 prices) in agriculture has stagnated. It was Rs. 4,636 crore in 1980-81 and Rs. 4,617 crore in 199^2-93 (actual). The total gross domestic formation declined from 18 percent in 1980-81 to 9 percent in 1992-93. The decline in real capital formation in agriculture in the public sector is more perceptible, as it has come down to Rs. 1,065 crore in 1992-93 compared to Rs. 1,796 crore in 1980-81. Private sector real investment in agriculture has increased in absolute terms from Rs 2,840 crore in 1980-81 to Rs.3,552 crore in 1992-93, though its share in total gross capital formation has declined significantly during the period. This decreasing share of private investment in the total gross capital formation seems to suggest that the agricultural sector is relatively less attractive for private investment as compared to other sectors of the economy. This suggests a need to strengthen incentives for attracting more private investment into agriculture."

Small Holdings

The average size of small holdings, measuring less than two hectares, is 0.6 hectare and the annual income required to support a family above the poverty level is now estimated to be Rs. 12,000. Therefore, the crucial question is: Can a land-holding of 0.6 hectare generate an annual income of more than Rs.12,000 ? The reply to this question is both "No" and "Yes". Income from farming does not depend only on the size of the farm, but on the capital invested on it, both in monetary terms and in technological know-how. Many small farmers in developed countries are earning many times more than what most land holders of 18 acres are earning in India. No doubt, glass-house is an extreme example. But there certainly is the possibility of earning an annual income of more than Rs. 12,000 from 0.6 hectares of land, provided the farmer gives up conventional farming i.e., production of grains and takes to horticulture and animal husbandry. Fortunately, the Government does not intervene in marketing of fruits, vegetables and animal products. Hence their prices have risen to about the same level, as the prices of all commodities. While the terms of trade are against producers of grains, that is not so, in case of producers of fruits, vegetables and animal products. One can surely earn net profit of more than Rs.12,000/- annually from a holding of 0.6 hectares by producing fruits, like banana, papaya, guava, lemon, mango, litchi, grapes, and vegetables like hybrid brinjal, tomato and cabbage. Plant propagation and seed production are even more rewarding. Animal husbandry, poultry keeping, goat keeping, pisciculture and dairying are no less profitable. These enterprises can also be combined. But for success in these specialised lines of agriculture, lot more capital, expertise and infrastructural facilities are required. To enable small farmers to take specialized farming, certain systemic changes need to be made. The are briefly stated below:

Institutional Credit

Institutional credit at present is advanced either on the basis of seasonal needs of conventional farming or of the value of land owned by a farmer. In case of small farmer, the value of land is naturally less, but his credit needs will be more if he takes to animal husbandry, poultry or fishery. Similarly, his repayment period will have to be longer, if he takes to production of fruits. Therefore, institutional credit will have to tailored according to the needs of small farmers.

Area Specific Programme

There is no lack of techniques of production, even for dryland and small farms, which can generate more incomes and employment in villages. But these cannot be adopted by small farmers, unless the necessary services to support these enterprises in the form of backward and forward linkages are first provided. Rural India will remain poor so long as (1) new techniques of farm production are not adopted more widely, (2) adequate capital in the form of loans for adoption of new techniques is not provided and (3) efficient marketing arrangements for the produce are not made which reduce the cost of distribution. All these will have to be provided simultaneously in a package and not in a haphazard manner.

As it will not be possible to provide all the different services needed to support the different enterprises, it is advisable that farmers in every development block of the country be asked to select one cash crop or enterprise most suited to their area. After this decision has been made, every assistance - technological, financial and managerial - should be provided for that particular crop or enterprise through co-operative or panchayati effort. The NDDB has done a commendable job in providing all the facilities to milk producers of Gujarat. Similar facilities need to be provided for promotion and production of horticultural and animal husbandry products and in course of time, also for promotion of agro-processing industries and export of such products.

Model Farmer Scheme

To promote the above area-specific programme, it is necessary to promote participatory extension strategy. For this, it is suggested that at least one model small farmer be selected in each village with a population of more than 500. The model farmer should be educated upto high school and own land less than 2 hectares. His selection should be made strictly on merit. After selection, he should be trained at Government cost at a research institute for a period of time, considered necessary to train him in the use of the latest techniques of production for that crop or enterprise, which has been selected for his particular area . But mere training will not suffice, as it has been repeatedly proved that knowledge without capital is not of much help. Therefore, the model farmer should also be equipped, at Government cost, with whatever is necessary to enable him to apply the techniques of production, which he has learnt. The amount spent on equipping the model farmer with improved animal and tools of production should be realised from him in 25 yearly equal instalments, calculated at a concessional rate of interest. These model farmers, if properly trained, are likely to prove far more effective in dissemination of the new methods of intensive farming than the village level workers. Farmers learn more by seeing what their neighbours are doing than by listening to lectures. These model farmers will serve as pioneers of intensive farming as well as links between researchers and users of research. This scheme will enable about 3 lakh rural youth to earn a decent living, not at Government cost but through training and their hard work. Whatever the Government spends initially on their training and equipment, will have to be realized from them later on.

The model farmers, if trained and enabled to produce improved seeds and plants, will also effectively meet the shortages of these inputs in the country which Government agencies have so far failed to do. The model small farmers can also be trained in artificial insemination of cows and plant protection to render these services to their neighbours.

Reorientation of Agricultural Research

Agricultural research institutions should now focus their research efforts on increasing the overall productivity of marginal and .small farmers. They should also pay more attention to dryland as well as low land farming. So far, efforts have been mainly directed to obtain maximum production under the most favourable conditions. It is one thing to increase productivity on large farms through optimum use of modern inputs and quite another to make small farms profitable under difficult conditions. In India, 80 percent of the cultivators operate less than two hectares of land and majority of them also do not have adequate irrigation facilities. It is towards them that the researchers should now direct their attention. Plant breeders should aim to evolve varieties which are better suited to face environmental stresses such as drought, flood, salinity and diseases. Also more attention should be given to bio-fertilization of soil and regenerative agriculture.

Mechanisation of Small Farms

It is a mistaken notion that it is neither possible nor desirable to mechanise small farms. Japan, a more densely populated country, with average land-holding no bigger than ours, has fully mechanised its agriculture with great success. Before mechanisation in Japan, it used to take 1600 to 2000 manhours to produce 4.7 tonnes of rice on one hectare of land. After

mechanisation, it takes only one third of it to produce 5.2 tonnes of rice on the same one hectare of land. Even in India, an energy survey in Punjab has revealed that human and bullock energy is several times costlier than energy produced by a diesel engine or an electric motor.

Production cost of farm products cannot be reduced except through mechanisation, which does not necessarily require the use of big machines. For small holdings, small machines are available at reasonable prices all over the world, except in India. In order to minimise the drudgery of small farmers, increase the efficiency of inputs-use and save farmers' time for enabling them to take up income-augmenting supplementary enterprises such as dairying, goat keeping and sericulture, the use of modern time-saving farm implements of appropriate size needs to be promoted, either by duty-free import of such implements from countries like Japan and South Korea or by subsidising their purchase for small farmers. The use of small mechanised tools by small farmers who do not exploit labour, does not reduce employment, but only adds value to the working hours and that is exactly what is needed to lift them above the poverty level.

Need for a Third Marketing Channel

The greatest hurdles in the path of progress of farmers are the two prevailing marketing systems - one private and the other public both of which are exploiting the producers as well as the consumers. Therefore, there is need for a third marketing channel, through either revitalisation of the existing co-operatives or empowerment of the Gram Panchayats to act as co-operatives.

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The productivity potential of Indian agriculture has been amply demonstrated in Punjab, where it is nearly equal to those of developed countries. If India attains the productivity level already achieved in Punjab, the national income of India would be more than double of what it is today. Taking into consideration the vast untapped potential of Indian agriculture, the pool of unutilized scientific knowledge and the eagerness of Indian farmers respond to opportunities, neither Indian agriculture should remain backward, nor our people should remain almost the poorest in the world. Quite often, low productivity of Indian agriculture is attributed to small size of landholdings. In Japan, Korea and Taiwan the average size of holding is nearly the same as in India, but their incomes per hectare and per worker are several times more than ours.

The Decisive Factor

Among the many factors which determine productivity in agriculture, the most decisive one is the kind of "social support" which agriculturists get from the rest of the society. Social support emanates from a sense of gratitude towards agriculturists who provide the most essential requirement of mankind. This, however, is not quantifiable are therefore not comparable amongst various countries of the world. Hence a new concept, which takes into account only monetary transfers has bee developed. This is called, "Producer's Subsidy Equivalent" PSE. The can be defined, as payments received by agriculturists, in excess of what they would have received, if the Government had not intervened in free marketing of agricultural produce. PSE includes direct and indirect payments by Government and also increased payments to farmers b consumers, made inevitable by imposing ban on import of cheaper farm products from abroad. The U.S. Department of Agriculture in their publication entitled GATT & Agriculture" has reported the average PSE for 17 countries, for a period of 5 years from 1982-86. The highest PSE (plus 70 percent) was in Japan, followed by S. Korea, Mexico, E.E.C and Canada. In U.S.A. it was above 25 percent. It means that in these countries, farmers received 25 to 70 percent more than what they would have received under conditions of free trade. In four countries, viz Pakistan, Nigeria, India and Argentina, PSEs were negative. In India it was below 18 percent. It means farmers in India received 18 percent less than what they would have received, if the Government had not intervened in free trade. This has been arrived at after deducting from the total losses suffered by farmers due to Government interventions and considering the amounts spent by Government for providing to farmers input assistance and infrastructural support. It is significant that in all the countries, in which PSEs were found to be negative, productivity of agriculture was much below the average of the world. In other words, wherever farmers have been exploited, agriculture has remained backward. It is not necessary to plead for subsidy to farmers in India, comparable to what their counterparts are getting in the developed countries. But anti-farmer interventions by the Government in free marketing of farm products, must now be stopped. Unless this is done, profitability, savings and capital formation in the farm sector will remain low and potentials of Indian agriculture unutilised.

The following quotation from Economic Survey, 1994-95 is quite instructive. "Gross investment in real terms (at 1980-81 prices) in agriculture has stagnated. It was Rs. 4,636 crore in 1980-81 and Rs. 4,617 crore in 199^2-93 (actual). The total gross domestic formation declined from 18 percent in 1980-81 to 9 percent in 1992-93. The decline in real capital formation in agriculture in the public sector is more perceptible, as it has come down to Rs. 1,065 crore in 1992-93 compared to Rs. 1,796 crore in 1980-81. Private sector real investment in agriculture has increased in absolute terms from Rs 2,840 crore in 1980-81 to Rs.3,552 crore in 1992-93, though its share in total gross capital formation has declined significantly during the period. This decreasing share of private investment in the total gross capital formation seems to suggest that the agricultural sector is relatively less attractive for private investment as compared to other sectors of the economy. This suggests a need to strengthen incentives for attracting more private investment into agriculture."

Small Holdings

The average size of small holdings, measuring less than two hectares, is 0.6 hectare and the annual income required to support a family above the poverty level is now estimated to be Rs. 12,000. Therefore, the crucial question is: Can a land-holding of 0.6 hectare generate an annual income of more than Rs.12,000 ? The reply to this question is both "No" and "Yes". Income from farming does not depend only on the size of the farm, but on the capital invested on it, both in monetary terms and in technological know-how. Many small farmers in developed countries are earning many times more than what most land holders of 18 acres are earning in India. No doubt, glass-house is an extreme example. But there certainly is the possibility of earning an annual income of more than Rs. 12,000 from 0.6 hectares of land, provided the farmer gives up conventional farming i.e., production of grains and takes to horticulture and animal husbandry. Fortunately, the Government does not intervene in marketing of fruits, vegetables and animal products. Hence their prices have risen to about the same level, as the prices of all commodities. While the terms of trade are against producers of grains, that is not so, in case of producers of fruits, vegetables and animal products. One can surely earn net profit of more than Rs.12,000/- annually from a holding of 0.6 hectares by producing fruits, like banana, papaya, guava, lemon, mango, litchi, grapes, and vegetables like hybrid brinjal, tomato and cabbage. Plant propagation and seed production are even more rewarding. Animal husbandry, poultry keeping, goat keeping, pisciculture and dairying are no less profitable. These enterprises can also be combined. But for success in these specialised lines of agriculture, lot more capital, expertise and infrastructural facilities are required. To enable small farmers to take specialized farming, certain systemic changes need to be made. The are briefly stated below:

Institutional Credit

Institutional credit at present is advanced either on the basis of seasonal needs of conventional farming or of the value of land owned by a farmer. In case of small farmer, the value of land is naturally less, but his credit needs will be more if he takes to animal husbandry, poultry or fishery. Similarly, his repayment period will have to be longer, if he takes to production of fruits. Therefore, institutional credit will have to tailored according to the needs of small farmers.

Area Specific Programme

There is no lack of techniques of production, even for dryland and small farms, which can generate more incomes and employment in villages. But these cannot be adopted by small farmers, unless the necessary services to support these enterprises in the form of backward and forward linkages are first provided. Rural India will remain poor so long as (1) new techniques of farm production are not adopted more widely, (2) adequate capital in the form of loans for adoption of new techniques is not provided and (3) efficient marketing arrangements for the produce are not made which reduce the cost of distribution. All these will have to be provided simultaneously in a package and not in a haphazard manner.

As it will not be possible to provide all the different services needed to support the different enterprises, it is advisable that farmers in every development block of the country be asked to select one cash crop or enterprise most suited to their area. After this decision has been made, every assistance - technological, financial and managerial - should be provided for that particular crop or enterprise through co-operative or panchayati effort. The NDDB has done a commendable job in providing all the facilities to milk producers of Gujarat. Similar facilities need to be provided for promotion and production of horticultural and animal husbandry products and in course of time, also for promotion of agro-processing industries and export of such products.

Model Farmer Scheme

To promote the above area-specific programme, it is necessary to promote participatory extension strategy. For this, it is suggested that at least one model small farmer be selected in each village with a population of more than 500. The model farmer should be educated upto high school and own land less than 2 hectares. His selection should be made strictly on merit. After selection, he should be trained at Government cost at a research institute for a period of time, considered necessary to train him in the use of the latest techniques of production for that crop or enterprise, which has been selected for his particular area . But mere training will not suffice, as it has been repeatedly proved that knowledge without capital is not of much help. Therefore, the model farmer should also be equipped, at Government cost, with whatever is necessary to enable him to apply the techniques of production, which he has learnt. The amount spent on equipping the model farmer with improved animal and tools of production should be realised from him in 25 yearly equal instalments, calculated at a concessional rate of interest. These model farmers, if properly trained, are likely to prove far more effective in dissemination of the new methods of intensive farming than the village level workers. Farmers learn more by seeing what their neighbours are doing than by listening to lectures. These model farmers will serve as pioneers of intensive farming as well as links between researchers and users of research. This scheme will enable about 3 lakh rural youth to earn a decent living, not at Government cost but through training and their hard work. Whatever the Government spends initially on their training and equipment, will have to be realized from them later on.

The model farmers, if trained and enabled to produce improved seeds and plants, will also effectively meet the shortages of these inputs in the country which Government agencies have so far failed to do. The model small farmers can also be trained in artificial insemination of cows and plant protection to render these services to their neighbours.

Reorientation of Agricultural Research

Agricultural research institutions should now focus their research efforts on increasing the overall productivity of marginal and .small farmers. They should also pay more attention to dryland as well as low land farming. So far, efforts have been mainly directed to obtain maximum production under the most favourable conditions. It is one thing to increase productivity on large farms through optimum use of modern inputs and quite another to make small farms profitable under difficult conditions. In India, 80 percent of the cultivators operate less than two hectares of land and majority of them also do not have adequate irrigation facilities. It is towards them that the researchers should now direct their attention. Plant breeders should aim to evolve varieties which are better suited to face environmental stresses such as drought, flood, salinity and diseases. Also more attention should be given to bio-fertilization of soil and regenerative agriculture.

Mechanisation of Small Farms

It is a mistaken notion that it is neither possible nor desirable to mechanise small farms. Japan, a more densely populated country, with average land-holding no bigger than ours, has fully mechanised its agriculture with great success. Before mechanisation in Japan, it used to take 1600 to 2000 manhours to produce 4.7 tonnes of rice on one hectare of land. After

mechanisation, it takes only one third of it to produce 5.2 tonnes of rice on the same one hectare of land. Even in India, an energy survey in Punjab has revealed that human and bullock energy is several times costlier than energy produced by a diesel engine or an electric motor.

Production cost of farm products cannot be reduced except through mechanisation, which does not necessarily require the use of big machines. For small holdings, small machines are available at reasonable prices all over the world, except in India. In order to minimise the drudgery of small farmers, increase the efficiency of inputs-use and save farmers' time for enabling them to take up income-augmenting supplementary enterprises such as dairying, goat keeping and sericulture, the use of modern time-saving farm implements of appropriate size needs to be promoted, either by duty-free import of such implements from countries like Japan and South Korea or by subsidising their purchase for small farmers. The use of small mechanised tools by small farmers who do not exploit labour, does not reduce employment, but only adds value to the working hours and that is exactly what is needed to lift them above the poverty level.

Need for a Third Marketing Channel

The greatest hurdles in the path of progress of farmers are the two prevailing marketing systems - one private and the other public both of which are exploiting the producers as well as the consumers. Therefore, there is need for a third marketing channel, through either revitalisation of the existing co-operatives or empowerment of the Gram Panchayats to act as co-operatives.

SUSTAINABILITY OF SMALL PRODUCER UNITS THROUGH COOPERATIVES - LESSONS FROM SEVERAL CASE STUDIES

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Section I: Introduction

It does not require any fresh evidence to point out that a large number of people living precariously near or below the poverty line originate from the classes of landless rural workers and small and marginal farmers. How to make them viable and bring them back to the mainstream of development is the subject-matter of this paper. The paper, based on eight case studies, argues that there is no alternative to forming genuine cooperatives of small producers and a thorough re-engineering of the existing cooperative structure. The main lessons from the case studies are summarised in the final section.

Section II: Case Studies

Case 1 : The Share-croppers of English Bazaar. West Bengal (1992)

The implications of the lack of an appropriate organisation which can supply the critical inputs for modern agricultural practices at reasonable costs to weaker sections like sharecroppers and small and marginal farmers can be seen with the help of this example from the 'barind' areas of the district of Malda in West Bengal. Assuming that the sharecropper is a purchaser of 59 water for 'boro' (i.e., summer paddy), his cost and returns at 1992 prices would look as follows:

Item	Rs. per acre
Cost of labour	800
Hiring of equipments like plough	100
Seed cost	100
Fertilizer & manure	200
Pesticide	30
Water charges	450
Rent of land (@25 % of gross value of production)	520
Total cost	2200
Gross value of output of 18 maunds/acre of paddy @ Rs. 1 1 5/- per maund	2070
Net loss	130

The implications of the above-stated example are as follows: The tenant's residual earning is Rs.800 less Rs.130, i.e., Rs.670, which means he gets less than the stipulated market wage on family labour, and that too is possible as long as the landowner does not claim anything

more than the legally stipulated crop share (i.e., 25% of gross produce). Obviously, the cost of non-labour inputs (Rs.880) far exceeds the implicitly assumed (in law) 25 percent of the value of gross produce. If the landlord claims no less than 25 percent, the tenant must stand to lose, unless through an organised effort of the tenants, for example, through a cooperative society, some economies can be achieved in the procurement of equipment services, seeds, fertilizers, pesticides, irrigation etc. If the sharecropper owns both a shallow tubewell and a pumpset, his water charges would drop down to only the cost of fuel and minor repair cost of the tubewell and the pumpset. But if he is having only the tubewell or the borewell usually encountered in this part of the district of Malda, still he has to hire a pumpset at Rs.300/- for the whole 'bow' season from the owners of these equipments, besides incurring an additional expenditure of Rs.70 to 80 on fuel.

Case 2 : The Social Forestry Extension Centre of Bhagawantapur (1991, revisited 1995)

During 1972-77, large tracts of infertile land in about 25 moujas around Bhagawantapur (in District of Midnapore in West Bengal) were vested under the West Bengal Land Reforms Act and distributed to the landless scheduled caste community of this area who used to work as wage labour on fertile lands located close to the river Shilabati. For about 10 years these people tried but failed to grow anything beyond nursery beds of kharif paddy on such lands, and as a result these people could not pay back their loans for genuine reasons. Seeing this situation, Mr. Sunil Ghosh, an active social worker along with about 8-9 associates of this area came forward to form an informal committee to help these 200-250 families in generating something out of their land. In this endeavour they were actively assisted by a number of officials of the Forest Department, who not only tried to convince these owners of infertile land about profitability of farm forestry over crop cultivation, but also provided some token incentives, besides free distribution of Eucalyptus plants. The smooth growth of the Eucalyptus plants did not interfere with the routine activities of their owners-mostly daily wage earners, and created a strong demonstration effect which induced even a large number of ryots of this area to have Eucalyptus plantation on their infertile lands. Encouraged by the progress of work of this informal club, the Forest Department constructed a small building to facilitate gathering and mutual discussion among the club members. This club then came to be known as the 'Social Forestry Extension Centre' of Bhagawantapur. Within 6-7 years' time, these people reaped their first harvest. These landless households were now in a position to repay their old debt.

It is at this stage, Sunilbabu tried to do a few more things by checking exploitation by outside merchants. Also one range officer, Mr. Gopi Ballabh Roy, had taken keen interest. But after his departure, there were local conflicts and consequently people got rid of whatever plantations they had, as they are being promised irrigation by their political bosses. True, there is a Primary Agricultural Cooperative Society (PACS) functioning in this village. But it is not at all in a position to coordinate and support the farm forestry activities of the local people and enable them to earn the maximum value on their produce.

Case 3 : Taldangra Adivasi Large-sized Multi-purpose Cooperative Society Limited (1991)

The Taldangra Large-sized Multi-purpose Cooperative Society (LAMPS), located at the block headquarters of Taldangra in the district of Bankura of the state of West Bengal was established in 1986. Currently, the society is covering an area of 349.7 square kms. stretching over 45 villages which are all Intensive Tribal Development Project (ITDP) villages with cent percent tribal population. The Society has expanded more than 5 times in terms of membership and annual turnover during 1985-86 to 1990-91. Most of the land under this LAMPS is cultivable, though irrigation continues to be a severe bottleneck. Interestingly, none of the cropping activities is being directly or indirectly assisted by this LAMPS. Marketing of agricultural inputs and outputs constitute only a minor component (1.48 percent) of the total turnover of Ks.60.17 lakhs of the society in 1990-91.

The major business activity of the society is collection of kendu leaves and sal seeds from the government protected forests with permission from the Forest Department (contributing 88 percent in the society's turnover in 1990-91). Even there, no serious efforts have been made to achieve cost reduction, productivity increase or value addition. The society tried to produce plates out of sal leaves but in the absence of various cost reduction strategies to beat the large number of private entrepreneurs in this area, it had to give up.

Given the high incidence of inactive membership as well as non-membership of the organisation, apparently consequent upon the failure of the society to provide sufficient incentives to the members as opposed to the non-members, on the one hand, and the low 'centrality' of this organisation to the members' needs as well as to the resource endowments of this region, on the other, it is doubtful that sufficient collective action would automatically be forthcoming in the coming years to carry it forward and bring it closer to success.

Case 4 : The Pioneer Farm Forestry Cooperative Society of Banskopa, West Bengal (1991)

The society has been the outcome of an initiative taken by Mr. Kisori Mohan Sinha Mahapatra, an 'ayurvedic' medicine practitioner and a secondary school teacher of Panchmura High School in the district of Bankura in West Bengal, who after some initial hesitations, started plantation of Eucalyptus on his waste land on the advice of some officials of the State Forest Department. This led to a strong demonstration effect and as a result, a larger number of local people began to participate in a five year plantation programme by developing a non-registered Pioneer Social Forestry Association under the leadership of Kisoribabu. After the five year plantation (under World Bank support) was over, the association was registered as a farm forestry cooperative in 1987. The purpose of the newly formed society was to popularize farm forestry on non-cultivable land and to augment the income of the members through building up of business around farm forestry.

The society has done plantation on 794 hectares of land till 1991. The 12 villages so far covered by the society have nearly 60 percent waste land and almost 50 percent of the local population are Santals. Almost all the landless households of these areas have been in possession of some amount of vested waste land given under 'patta' (i.e., a deed). Given the quality of land, the fanners were not able to grow any regular food crop or vegetable profitably. It is at this point, the official interest was combined with the collective action generation capability of some local leadership in order to achieve a shift from crop production to farm forestry. The rough cost-benefit analysis for Eucalyptus plantation which these people worked out is as follows:

The total cost of one acre of plantation (from site preparation to harvesting) during 7 years of gestation period was Rs.5,560. They expected to receive a gross income of Rs.35,640 from one acre of plantation, thus leaving a net income of Rs.30,080 in 7 years which turned out to be Rs.4,297 per acre per year, and which was a considerably better performance I than achieving a low yield of either paddy or one coarse cereal once in 3 to 4 years.

So far the society has not gone beyond the core activity of planting | Eucalyptus on uncultivable land and helping the tree-growers with technical information and getting their incentive benefits and harvesting permits f collected from the respective government departments. The society is yet to integrate production with marketing currently done by individual tree growers, and thus to play a direct role in marketing and value-addition of its products. Moreover, given the background of the tribal members and the availability of other local resources, there exists enormous potential to diversify the society's activities towards bee-keeping, rabbit-rearing, dairying, production of palm sugar and poultry.

The very fact that Kisoribabu commands a lot of respect and influence in the locality and yet he has not started hobnobbing with the politically powerful elements nor allowed himself to be used as an instrument of the political machinery, has been posing a number of hurdles to the day to day functioning, of the society and constraints the future growth of his society in the current political climate of West Bengal.

Case 5 : The Grape-Growers of Solapur, Maharashtra (1992)

The villages of Nanaj, Karambha and Boramoni located at a distance of 15, 10 and 30 kms., respectively, to the south of the Solapur town, are ideal for growing grapes which require dry arid regions and humid atmosphere. Anab-e-shahi and Thomson Seedless are the most popular varieties grown in this area.

From the cropping pattern of the representative grape growers, it emerged that both types of farmers - large and small, in order to achieve full utilization of their lands, cultivate a variety of crops ranging from the lowest irrigation intensive crop jowar to the highest irrigation intensive crop -sugarcane. The representative large farmer, Mr. Nanasaheb Kale, seems to have utilised his several dug wells and the drip irrigation system to put -as much as 84 percent of his gross cropped area under grapes. In the remaining area, he grows jowar during rabi and some green vegetables along with jower during kharif season. Given his affluence, risk-bearing capacity and also the relatively low rate of return on jowar, it is important to see why this farmer goes, in for grapes rather than sugarcane or vegetables like onion or tomato. The small grower puts two hectares under jowar in both the seasons, 0.4 hectares under onion in both the seasons and allocates 0.4 hectares under grapes and 0.8 hectares under sugarcane. It is important to see in this case why he prefers to hold a portfolio of the three crops - grapes, sugarcane and onion rather than going in for any one of these three crops.

It is seen that the large farmer enjoys the highest net return per hectare on grapes (about Rs.62,000/-), which far exceeds the net return on onion (about Rs.26,000 and about Rs.40,000, respectively, for kharif and rabi) or the net return on tomato (varying from Rs. 4 1,000 to 46,000 approximately) or the net return on sugarcane (Rs.30,000). So, the representative large farmer - Mr. Nanasaheb Kale has put the maximum amount of land under grapes. The representative small farmer, Mr. D.B. Gaikwad, on the other hand, derives a net return of Rs. 17,600 from grapes, Rs. 23,700 from onion and Rs. 1 1 ,200 to 16,200 from tomato. Naturally he has put the maximum area under sugarcane and then diversified his cropping structure by distributing the rest of the irrigated land between grapes and onion.

Development of a grapevine involves a huge amount of capital investment. For example, Mr. Kale made an initial investment of Rs. 5-6 lakhs in mid-60's to develop his present grapevine. Moreover, farming operations involve employment of hired labour by both types of farmers though the incidence of hired labour is considerably greater for the large farmer. Given non-availability of casual labour at appropriate times, these farmers employ some permanent labourers at an annual cash wage of Rs.6-7 thousand plus perquisites in the form of clothes and other goods in kind in case of good performance and good harvesting. These permanent labourers are supplemented by casual labourers in periods of peak activities. In order to ensure year round activities for these permanent labourers as well as for the family labourers (especially in the cases of small farmers), these farmers often choose to produce seasonal crops even though those seasonal crops generate lower returns. Allotment of small parcels of land to crops like onion and tomato enables the farmer also to meet his consumption needs from his own farm. Therefore, holding of a portfolio of crops by the small farmer of grapes, Mr. Gaikwad has many possible explanations including the advantages of risk diversification.

Case 6 : The Vegetable Growers of Pune-Kumbharia, Gujarat (1992)

For a long time the black cotton soil of Surat has contributed to the growth of cotton on a large scale and of a variety of organisational and industrial structures based on cotton. However, over time the pride of the place went to banana as the main crop until a serious virus problem led to its decline. This factor as well as the availability of canal irrigation have led to the current supremacy of sugarcane in the cropping pattern. Paddy has never been very significant, the area under it seems to be on a continuous decline. Banana, on the other hand, has been displaying in recent times some signs of revival, though it is unlikely to dislodge sugarcane, especially because of the successful operation of sugar cooperatives in South Gujarat enabling a large magnitude of value addition in sugarcane and ensuring a high as well as steady price of sugarcane to its producers. Because of the proximity to the market and active support of cooperatives and other organisations, growth of vegetables especially as an

inter-crop to banana and sugarcane in the surrounding villages of the Surat city has received a tremendous encouragement over the last 2-3 decades. This has happened in response to the strong market incentives which either pre-existed or have been created in this particular context. How the regulated Sardar market as well as the fruit and vegetable cooperatives of this area have been promoting certain seasonal vegetable crops like cabbage and cauliflower is the subject of discussion in this case.

Both cabbage and cauliflower require sandy loam, medium black and fertile soils for best results. The sowing time is between August and November and they require approximately ten to twelve irrigations during 3.5-4 months of the cropping period. Thus given the scientific requirements for growing cabbage and cauliflower, the surrounding areas of the Surat city seem to be ideal for growing vegetables and cabbages during the post- kharif season. There is no doubt that the price risk associated with horticultural crops (as measured by C.V. of weekly wholesale prices in 1990-91 which is 40.42 and 43.89 percentage, respectively for cabbage and cauliflower) are enormous specially in comparison to sugarcane which is being processed by the cooperative sector and for which the cooperatives have been maintaining steady prices. However, when cabbage and cauliflower are grown as intercrops alongside the main crops of either banana or sugarcane, the fanner is less likely to be guided by the separate measures of risk (namely, C.V) associated with production of only cabbages or only cauliflowers. In this situation, the joint return as well as the combined risk on cabbages/cauliflower and banana/sugarcane seem to be the crucial determinants.

As expected, the large grower spends proportionately more on hired human labour and also on pesticides than a small grower, whereas the small grower spends proportionately more on interculture. The last mentioned factor seems to be playing a crucial role in achieving a higher yield rate of both cabbage and cauliflower by the small grower. As a result, the net return over cost 'C' is higher for this small grower than for the large grower.

Case 7 : The Mulkanoor Primary Cooperative Credit Society, Andhra Pradesh (1994)

This society having jurisdiction over fourteen villages came into being on July 27, 1956. While the society started initially with shortterm credit to farmers as the only activity, over time it added in several others including full-fledged banking activity, input distribution and rice milling-cum-marketing.

Agriculturists and persons pursuing allied agricultural activities and having a minimum of 0.5 acre of land, who are residing within the area of operation of the society are entitled to A-class membership with voting rights against purchase of a minimum share of Rs. 100. Government and bonafide credit-worthy agriculturists and protected tenants (including those who are selected for loans under IRDP, DRDA etc.) are also eligible for membership, though the proportion of the latter category of members is relatively less.

Out of a total of 5500 individual A-class members, only 1000 have become members as beneficiaries of IRDP and DRDA loans. The society strictly enforces one norm that membership shall be terminated unless the society's services are being used, and as the society covers almost all the basic agricultural activities within its area of operation, it is easy for it to check whosoever is not using its services. The paid-up share capital of individual members as on March 31, 1994 is Rs. 9.13 million. The society has consistently avoided share capital contribution from the government. It has augmented the share capital contribution of individual members through the stipulation that the lending limit to a member is only ten times his share capital contribution, subject to the usual restrictions of government and the National Bank (NABARD).

The society has an elected board. All the board members are elected, but the by-laws have reserved some minimum number of seats for members belonging to backward classes and women members. Elections are seriously contested in this society, as it does not believe in unanimous selection. The board members have 3 year terms and there is no restriction on re-election. As the elections are supposed to be conducted by the office of the Registrar of Cooperative Societies (RCS), it has created problem in the past. The matter went to the court,

the society won the battle and the bylaws were modified appropriately to rule out recurrence of such incidents.

The society started initially with lending activities, but during 1982-83, a cost-benefit analysis performed by the NGO, 'Samakhya', pointed out these societies could barely break even with a mere lending activity in spite of good management practices. This study highlighted the need for processing and marketing activities especially in rice, which is the most important crop grown by nearly 80 percent of the farmers in this area -mostly small and marginal farmers. This feature together with the fact that alternate crops like maize, pulses, cotton, sunflower, groundnut, chilli and even sugarcane are not profitable either due to low-lying nature of the land or due to higher production and marketing risks of these other crops, seem to have urged the society to achieve both vertical and horizontal diversification of activities over time.

The society collects a stipulated thrift amount (5 percent) out of every fresh loan, which is held as compulsory deposit until the borrower ceases to be a member and on which an annual 14.5 percent to 15 percent interest is paid. Like a regular commercial bank, it takes various forms of deposits - current, savings, recurring, fixed and special Sahakar deposits, on which the interest paid is as high as 15 percent per annum. The society pays regular dividend on member's share capital. While loans are given to members in the form of cash and kind as per the stipulations of the National Bank (NABARD), the members are free to repay their loan proceeds in a combination of cash and kind (namely, paddy). In fact, the society encourages repayment in the form of paddy. The villages are given additional incentives to repay loans promptly. Because of the regular monitoring of loans by type and especially due to quarterly internal auditing system, the society has been able to contain default on loans well within a limit of 5 percent of the outstanding amount.

Case 8 : Warnanagar Cooperative Complex, Maharashtra (1993)

Warnanagar, located in district Kolhapur, Maharashtra owes its socio-economic development to Late V.A. alias Tatyasaheb Kore. It was in the year 1951 when the price of 'jaggery' went below even the cost of sugarcane cultivation and the farmers of this region in utmost disgust had to burn their crop. At this time, the progressive farmers of this area under the visionary leadership of Late Tatyasaheb Kore came forward to establish a cooperative sugar factory which came into picture in 1955. The society was established not just as a profit-making concern for the cane growers only but was conceived as a nucleus of all round development of its area of operation. As a result, a number of growth-oriented activities were initiated later on as displayed in Table 1.

The producer-members of the factory are the cane growers who are spread over 66 villages within a radius of 15 kms from the factory. More than 80 percent of the members are marginal farmers having less than 2 acres of land under sugarcane. The successful operation of the factory for the last three decades has generated remarkable spread effect in the area of operation. As a result, the membership of the factory rose from 1821 in 959-60 to 14,394 by the end of 1991-92. The factory has been maintaining a high order of technical efficiency in its working since inception. Against an average recovery rate between 9.59 to 10.23 percent for all sugar factories in India, the average recovery rate of the Warana Sugar Factory is 12 percent. The cane price paid by the factory to its producer-members has always been higher than the government specified rate. For example, the factory has paid Rs. 30.37 crores in 1991-92 to its members for cane supplied, of which Rs. 5.39 crores was in excess of the amount payable as per government rates. The employees are given 20 percent bonus and 10 percent incentive payment. The high returns given by the factory has resulted in a remarkable rise in the area under cane cultivation. In 1959-60, the area under cane cultivation was 2666 acres which has risen to 16,904 acres in 1991-92.

Table 1 :
Portfolio of Activities of Warana Cooperative Complex

I. Business Activities

(A) Core activity

1 . Sugar Factory

(B) Activities started as a result of diversification

2. Poultry Cooperative

3 . Warana Cooperative Bank

4. Paper Factory

5. Industrial Alcohol Plant

6. Milk Society

7. Consumer Store

8. Labour Cooperative

9. Manila Griha Udyog activities

(C) Peripheral

10. Agriculture Development Department
    (a) Soil Testing Laboratory
    (b) Guidance to cultivators

11. Rental service of Tractors, Sprayers and Machines

12. Lift Irrigation Scheme

13. Nursery for supplying planting materials to farmers

II. Welfare activities

14. Staff Quarters

15. Hospital

16. Education Society
    (a) Primary Schools
    (b) Science, Arts and Commerce College
    (c) I.T.I, and Engineering College

17. Village Library

18. Gobar Gas Plant

19. Camps on Family Planning, Eye Testing and Dental Problems

20. Community Marriages

21. Rural Development Trust for
    (a) Construction of Roads
    (b) Sanitation

22. Gymnasium

23. Childrens' Orchestra

Sugar being an agro-industry is closely linked with agriculture. An independent agricultural department is set up within the society to execute the agricultural development programme. The department guides the cultivators in the agricultural operations to improve the quality and yield of crop by modern and scientific methods of cultivation. The factory has established an experimental seed farm where seeds of important crops are multiplied and supplied to the cultivators. The farmers are encouraged to plant fruit trees by providing them quality seedlings at subsidised rates. In order to develop the extent of irrigation, a crucial input for sugarcane, the society constructed three storage weirs on Warana river with its own funds. Further lift irrigation schemes on cooperative basis are encouraged by providing finance, technical knowledge and managerial help.

In order to reap the advantages from economies of scope, by-product industrial development was felt necessary and as a result a pulp and paper manufacturing plant based on bagasse, a by-product of sugarcane factory, was set up in 1983. Similarly, to utilise the molasses, another by-product of sugar factory, an industrial alcohol plant was started in 1989.

The dairy and poultry cooperatives are two other milestones among the achievements of the Warana Cooperative Complex. In order to become self-sufficient in financing of all kinds of developmental activities, the Warana Cooperative Bank came into being in 1966. With the help of expertise from national and international cooperative bodies, the first modern departmental store of rural India was set up in 1978 with special emphasis on the requirements of the rural population.

Section III : Lessons from the Case Studies

In order to extract useful lessons out of the eight case studies narrated in the preceding section, it is necessary to answer the following three interrelated sets of questions:

1. Whether and how far are the common programmes of land reforms like distribution of vested land under ceiling laws in favour of landless people as well as small and marginal farmers and registering the names of sharecroppers in order to give legal protection to them against eviction, coupled with certain measures to make some small amounts of credit available to the beneficiaries of these reform measures, capable of generating sustainable development for these people?
2. If the commonly understood programmes of land reforms and even poverty alleviation measures are not enough to sustain the landless and land-poor farmers in the country, what are the supplementary measures necessary?
3. Even though cooperatives of poor farmers are looked upon as panancea by almost everybody, why is it the case that such cooperatives are few and far between in this country? What exactly are missing in most of the cooperatives?

While English Bazaar and Bhagawantapur (Cases 1 and 2) provide classic cases of the tragedy of narrowly viewed land reforms, Taldangra and Banskopa (Cases 3 and 4), in spite of good intentions of the founders, display the problems of loosely defined cooperatives. The Solapur case (Case 5) highlights the 'trickle-down' benefits to small farmers flowing from non-profit organizations of basically large and affluent farmers. Pune-Kumbharia (Case 5), Mulkanoor (Case 7) and Waranagar (Case 8), which were not started as an exclusive organization of small producers in spite of their predominance, portray viability and long term success of small producer units. While in the first four cases the small farmers are struggling for their sustainability in spite of leftist government ruling in West Bengal since 1977, the other four cases display not only viability but also diversification of small producer units. The striking feature is that while appropriate institutional setup is missing in the West Bengal cases, it is the pressure of suitable organization which has spearheaded the process of sustainability and diversification in the other cases. Another striking feature of the last four cases is the similarity in approaches towards designing of organisations, even though no one had acted in consultation with one another. With this simple characterisation of the eight cases narrated above, we now turn to answering the three basic questions raised at the beginning of this section.

Tragedy of Land Reforms

From the very early days till today, the equity objective of land reforms seems to have played a much bigger role than the objective of growth in shaping the nature and details of land reforms. It has resulted in looking upon land reforms as probably the most attractive vehicle for altering the existing ownership and control structure of probably the most vital among the traditional assets namely, land, with the ultimate goal of generating gainful employment and reducing rural poverty.

The other way of looking at land reforms - namely, to promote it as a vehicle for augmenting productive efficiency and value addition, though not altogether unknown in the literature or in the profession, seems to have always been overshadowed by the disproportionately high enthusiasm for achieving equity in the distribution of this basic asset for generation of wealth, especially in the agricultural sector. This over-enthusiasm seems to have been responsible for developing a narrow view of land reforms. This narrow view centering around altering ownership /control structure of land alone, seems to have hardly gone beyond enforcing in principle the elimination of intermediary rights on land through zamindari abolition, distribution of surplus and vested land to landless and land-poor people through ceiling laws, regulating the terms and conditions of tenancy through tenancy legislations and at most consolidation of scattered and fragmented land holdings. Notwithstanding how seriously these moderate reform measures are being implemented, land reforms in this country seem to have never been properly integrated with a much broader package of agrarian reforms so as to overcome the imperfections in the market for all tangible or intangible inputs of production, which are complementary to land. As a result, the requisite level of infrastructural and institutional facilities for generation and adoption of appropriate technology seems not to have been forthcoming in most states, thus making meagre supply of these resources mostly ineffective and disproportionate to the needs, besides robbing land reforms most of its power to generate results.

Relevance of Cooperatives or Cooperative-like Organisations

A Cooperative organisation of member-producers is necessary for maximizing the rate of return on member-farmer activities in a 'second best' world where the markets for the produce are largely imperfect, the farmers have very limited alternative choice of crops, and they are incapable of confronting the input risk, output risk and marketing risk because of their inadequate access to the markets for various complementary inputs like irrigation, credit, agro-processing facilities, extension and even information. A genuine cooperative of farmers is expected to build up the necessary backward and forward linkages, - the functions the regular market system is often incapable of performing, in order to maximize the producer's share in the consumer's rupee.

More precisely, the scope for cooperative action arises when the input, production, agro processing, marketing sub systems display certain unfavourable characteristics as listed below:

1. When production is undertaken by a large number of scattered and small farm holdings, each having only small quantity of marketable surplus, a producers' cooperative can procure supplies at lower transaction cost through suitable backward linkages and can make such units viable through pooling.
2. When the market for the crop under consideration is highly imperfect (sometimes coupled with the fact that the farmers have limited choice of crops), a cooperative can insulate the farmers from the vagaries of the market.
3. When non-availability of inputs in adequate quantity, at standard quality and at reasonable price is a problem, or when there is poor interface of farmers with technology and extension, resulting in low yield with high risks, a cooperative through suitable backward linkages can insulate the farmers from input risk and/or output risk.
4. When there is (a) high perishability of raw materials calling for instant agro-processing, (b) high seasonality and thus need for storage of the raw materials for prolonged agro-processing, and (c) bulky raw materials highlighting the need for

reducing volume and/or weight through agro-processing, a cooperative with storage and agro-processing facilities can strengthen the bargaining position of the farmers.

5. When it is difficult to assess the quality of raw materials on the spot, a cooperative through pooling can offer a credible contract to the farmers for supplying their raw materials and thus save the farmers from exploitation by unscrupulous traders. Unless the technology for primary processing is highly sophisticated and complex requiring specialised skills for comprehension and management, a farmer-owned and farmer-managed organization will find it easier to handle agro processing. Moreover, the higher the share of raw materials in total cost of the product, a producers' cooperative would have a larger stake as well as a greater say in the control and management of activities.

Mismanagement of Five 'M's in Cooperatives

Unfortunately, due to serious mismanagement of one or more of the five 'M's - namely, Mission, Membership, Manpower, Management and Money, most of the cooperatives in this country are no different from either charitable organisations permanently on the payrolls of the government exchequer or loss-making public-sector units. What is needed is a professional approach on the above-stated five major dimensions in the following manner:

1. Redefine and reinterpret the cooperative principles with possibly constitutional safeguards but without violating the fact that a cooperative society is an organization exclusively of the members, by the members and for the members (Mission & Membership aspect).
2. Have continuous interface with the scientific and technological developments so as to bring about on time the necessary technological and institutional changes including management practices within cooperatives. For this purpose, professionalise members, leadership, management as well as employees by exposing them regularly to modern, scientific, technological and management practices (Manpower aspect).
3. Redefine the duties, obligations and powers of the Management Committee (i.e., the Board) so as to permit its democratic and independent functioning vis-a-vis the office of the Registrar of Cooperative Societies (RCS) (Management aspect).
4. Redefine and professionalise the roles and approaches of higher-tier organizations and also of the promotional agencies like National Bank for Agriculture and Rural Development, National Co-operative Development Council and National Dairy Development Board as per the requirements of the changing time and environment (Management aspect).
5. Build up financially independent cooperative societies by

    a. adequately emphasizing the role of members' capital,
    b. by encouraging societies to generate bankable projects and
    c. by restricting the role of government share capital and loans in a phased manner (Monetary aspect).

In order to bring about the necessary changes, it is important to create enough pressures both inside and outside of the system for having an enabling legal environment for cooperatives so that they can function without loss of autonomy and can get rid of outside influences/interferences. It is professional approach towards the five 'M's, whose presence or absence explains successes and failures in the cases described in this paper.

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AGRICULTURAL DIVERSIFICATION AND SMALL FARM DEVELOPMENT IN WESTERN HIMALAYAN REGION

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The Western Himalayan Region which covers entire states of Jammu and Kashmir and Himachal Pradesh and 8 districts of Uttar Pradesh Hills is an economically underdeveloped and ecologically fragile region of the country. The region constitutes 3.61 percent of reporting area, 2.20 percent of human population and 3.77 percent of livestock population of the country. Due to high proportion of area under forest, pasture, grazing and waste lands, only 18 percent area is put under cultivation. Per capita net sown area in the region is 0.109 hectare compared to 0.166 ha at all India level. Small and marginal holdings below 2 hectares, constitute more than 85 percent of total holdings in the Western Himalayan Region. Crop pattern in the region is dominated by traditional and low productivity crops which occupy about 99 percent of the crop area (cereals 92%), providing basic livelihood for vast majority of the population. The scope to raise employment and income through industrialisation is very little because of ecological reasons and poor infrastructure.

Due to the domination of traditional crops and their stagnating and low productivity coupled with low availability of per capita net sown area, the income and employment at small farms are not adequate. The situation is worsening over time due to increase in population and due to non-availability of other sources of employment and income. However, the region is endowed with certain climatic advantages which offer numerous opportunities for production of a variety of high value horticultural crops to augment income and employment. The present study examines the scope for raising income and employment for various categories of land holdings by diversification through off-season vegetable cultivation. It also analyses the impact of infrastructural, institutional and socio-economic factors on crops diversification through the vegetable crops. The costs, returns and marketing pattern of vegetable crops are examined according to farm size categories to study their implications for small farm development. The analysis is based on grassroot level information covering 298 farm households in mid-hill zone of the state of Himachal Pradesh.

Importance of Off-season Vegetables

Fruits and vegetables have been the traditional route for agricultural diversification in the Western Himalayan Region. Whereas fruit cultivation has been adopted in a big way in the temperate belt, the same does not appear to enjoy any comparative advantage in non-temperate belt. Moreover, the fruits being grown in the non-temperate belt are losing market to substitute fruits grown in the plains. Within horticulture, diversification through off-season vegetables seems to possess great potential in most of the areas in both temperate and non-temperate belts of Western Himalayan Region. This region has an easy access to growing and vast consumer markets in Delhi and economically prosperous green revolution areas of North India. Climatic conditions in many parts of Western Himalayan Region are suitable to produce crops like tomato, peas, beans, cabbage and capsicum in summer season (April to October) when these crops are not grown in the plains. The price advantage makes it worthwhile to incur high production cost and transport off-season vegetables to distant consumer markets. There are many small pockets throughout the Western Himalayan Region which have attained economic progress by diversification through off season vegetables cultivation.

Simple, Data and Study Area

Out of the three sub-regions comprising Western Himalayan Region, Himachal Pradesh has made remarkable achievements in socio economic progress of its people though transformations brought about in agriculture and horticulture. Therefore, the field study was conducted in Himachal Pradesh to draw pertinent inferences from the experience of areas advanced in vegetable cultivation. Multi-stage purposive sampling procedure was followed to select sample units at grassroots level (Further details about sample framework, data and the study area can be seen in 'Agricultural Diversification in Himachal Pradesh: Potentials and Prospects' Vol. 2, Institute of Economic Growth, Delhi, Computer-Script.). The sample was drawn from four panchayats in Solan block of Solan district as this district and the block represent success story of vegetable diversification. The four sample panchayats represent different levels of agricultural diversification as determined by their access to various infrastructural facilities. Sample of about 75 farm households was drawn from each of the four panchayats following cluster sample approach. The survey work was carried out during December 1993 to February 1994 and the reference period was November, 1992 to October, 1993.

The informations on salient features of the sample panchayats are presented in Table 1 .

Dharot and Deothi panchayats are located at roadheads at a distance of 8-1 1 km from local market. These two panchayats enjoy the best advantage to transport produce to outside markets. About half of the cultivated area is under irrigation command in these two panchayats. Deothi is well diversified through vegetable crops since long and the producers in this panchayat have acquired high skill in production and marketing of off-season vegetables. Dharot has come on road map in 1991. Bhojnagar is most underdeveloped area among the sample panchayats. It neither has easy access to local market nor to motorable road. The vegetable produce for sale is carried on human back to roadhead by climbing up distance of 1-6 kms, which entails immense labour. Farmers in Kotho enjoy access to local market but they have to incur some carriage costs to take the produce to roadhead for sale in outside market. Irrigation facility in Kotho is very scanty. Therefore, area allocated to vegetables during Rabi season is highly dependent on early winter rains.

Results and Findings

Due to low availability of cultivable land in hilly areas, the size of land holdings is generally small and there is preponderance of marginal land holdings in the total holdings. About 95 percent farm households cultivate less than 5 acres of land and are thus small farmers according to the institutional classification followed in the country. If we follow the institutional classification of small, medium and large farmers in our case, there would be few farmers in medium and large size categories and the comparison according to the size class would not be meaningful. Therefore, to have a meaningful comparison and to study the implications of agricultural diversification according to size of farm in a relative sense, the size classes were selected as : (i) upto 1 acre (designated as marginal farmers), (ii) between 1 to 2 acres (designated as small farmers) and (iii) more than 2 acres (other farmers). Their distribution is shown in Table 2.

Table 1 :
Accessibility of Infrastructure and Other Facilities, Commercial activities and other Relevant Information in respect of Sample Panchayats in Solan District.

Particulars	Dharot	Deothi	Bhojnagar	Kotho
1 . Distance from district headquarters (kms)	8	13	26	5
2. Nearest regulated agric. market	Solan	Solan	Solan	Solan
3. Distance from nearest market for selling milk:	Solan	Solan	Solan	Solan
By road (kms) By pavement (kms)	8 -	11 -	26 -	3-6 1-4
4. Nearest motorable road	Solan-Dharot link road	Solan-Bilaspur State highway	Kumarhatti-Nahan state highway	Solan-Rajgarh state
Distance from sample area (kms)	0	0	1-6	1-3
5. Nearest artificial insemination centre Distance (kms)	Dharot 0	Deothi 0	Dharampur 14-20	Solan 3-6
6. Nearest fruit nursery Distance (kms)	Nauni 23	Nauni 25	Nauni 39	Nauni 9-13
7. Nearest commercial bank branch	Chambaghat (Solan)	Deothi	Bhojnagar	Solan
8. Number of private shops	10	20	12	18
9. Cottage and other industries	Welding unit (1)	Sandmines (8) Sawmills (5)	Limefurnace (1) Dhoop mfg. unit (1)	Raisin unit (1)
10. Rabbit/pisoiculture/apiculture/ mushrom unit	0	0	0	0
11 .Percentage of pucca houses in total houses	51	80	15	64
12. Development schemes launched in past five years	Soil cons. Irr. tank	Lift irri. water tank	Irri. tank	Irri tank
13. Temperature: Max. (°c) Min: (°c)	34 4	34 -2	35 -2	32 -
H. Altitude (feet)	4410	4100	4000	4674

Table 2 :
Structure of Land Holdings for Sample Households in Solan Block.

(Area in acres)

Size class and particulars Aggregate	Dharot	Deothi		Bhojnagar	Kotho
1. Number of holdings:					
Marginal	35	32	21	32	120
Small	25	18	27	27	97
Other	15	25	27	14	81
All	75	75	75	73	298
2. Percent distribution of holdings:					
Marginal	46.66	42.66	28.00	43.83	40.26
Small	33.33	24.00	36.00	36.98	32.55
Other	20.00	33.33	36.00	19.17	27.18
3. Average size of cultivated holdings:					
Marginal	0.73	0.77	0.73	0.73	0.76
Small	1.48	1.52	1.70	1.53	1.57
Other	3.26	4.03	3.61	3.77	3.55
All	1.49	2.03	2.12	1.61	1.81

Diversification pattern and its production and marketing aspects have been studied by undertaking inter-panchayat and inter-size class comparisons. The sample panchayats do not differ significantly with respect to climate but they differ with respect to access to infrastructure. Therefore, inter-panchayat comparison reveals the impact of infrastructural and institutional factors on diversification and related aspects.

Factors Affecting Diversification through Vegetables

The area allocated to vegetable crops in different panchayats and farm size categories is presented in Table 3. There are significant variations in area under vegetable crops across farm size categories, according to irrigation availability and across panchayats due to variation in access to road and markets. The variation in area under vegetables in the samples from four panchayats was caused by the interacting influences of irrigation, infrastructure like roads and agricultural markets and some factors related to the development process itself. We would now discuss how these factors have shaped the crop diversification in the four panchayats. An attempt has also been made to find out why in Deothi only 36 percent area was put under vegetable crops despite having 53 percent of crop area under irrigation, while in Bhojnagar proportion of gross irrigated area under vegetables was 3-4 times lower than the other panchayats?

It was expected that the area having access to irrigation would be largely put under vegetable crops which are of high value and are more paying. It was also expected that availability of irrigation would enable deviations in growing seasonal vegetables to take advantage of high price in the lean period. Results of field study show that vegetable crops were grown on more than 2/3rd of irrigated and less than l/5th of unirrigated cropped area. There were significant variations from these averages in case of individual panchayats because of influence of other factors.

In Dharot panchayat, about 90 percent of irrigated crop area was used for vegetable cultivation. Marginal farmers in this panchayat allocated less than 2 percent irrigated area to crops other than vegetables. In Deothi, vegetables were grown on 66 percent of irrigated crop area. The share of vegetables in gross irrigated area of sample households in Deothi panchayat was 73 percent at marginal holdings, 71 percent for small holdings and 60 percent for other holdings.

In Bhojnagar, irrigated area under vegetables constituted one-fifth of gross irrigated area. Only one marginal farmer in the sample from this panchayat enjoys irrigation facility and he did not grow vegetables on irrigated land. Small farmers put 78 percent of gross irrigated area under vegetable crops and other farmers raised vegetables in 14 percent of irrigated crop area. Vegetable crops dominated irrigated area in Kotho, accounting for about 81 percent. Four marginal farmers who had access to

irrigation in Kotho, raised vegetables on 24 percent of the irrigated area, while the farmers in small and other categories allocated 69 and 100 percent of irrigated area to vegetables.

On unirrigated land, vegetables were grown on about 36 percent area an Dharot and Kotho and on 5.1 and 2.6 percent area in Bhojnagar and Deothi. Expecting Kotho, unirrigated area put under vegetables cultivation showed a sharp fall with the increase in farm size (Table 3).

Table 3 :
Area under vegetables and crop intensity on irrigated and unirrigated lands.

Panchayat and size class	Total Crop Area Irri. (%)	Share of veg. in Irri. Area (%)	Share of veg. in Unirri. Area (%)	Share of veg. in TCA (%)	Crop intensity(%)		
					Irri.	Unirri.	Total
Dharot							
Marginal	38.19	98.40	49.09	67.92	191	173	180
Small	57.33	84.71	35.19	63.58	183	162	173
Other	53.75	92.73	21.33	59.71	161	127	144
All	50.50	90.38	36.56	63.73	177	154	165
Deothi							
Marginal	63.53	73.42	6.04	48.85	178	151	167
Small	55.68	71.46	5.51	42.23	131	150	139
Other	48.00	59.90	0.77	29.15	136	115	124
All	53.16	66.12	2.64	36.39	144	126	135
Bhojnagar							
Marginal	0.71	-	12.09	12.01	-	185	184
Small	4.04	77.78	4.91	7.86	138	197	184
Other	21.41	14.24	3.62	5.89	168	161	163
All	13.36	20.62	5.14	7.21	164	176	174
Kotho							
Marginal	4.64	23.81	37.67	37.03	191	193	193
Small	6.42	69.05	28.66	31.26	140	159	157
Other	11.59	100.00	39.67	46.67	263	140	148
All	8.15	81.29	35.32	39.06	204	157	160
Aggregate							
Marginal	28.74	80.86	30.43	44.92	183	179	180
Small	25.61	79.20	17.00	32.93	158	173	169
Other	30.60	58.03	14.28	27.67	156	141	145
All	28.61	68.85	18.51	32.91	160	158	159

The share of vegetables in total crop area, irrigated plus unirrigated, was 64 percent in Dharot, 39 percent in Kotho, 36 percent in Deothi and only 7 percent in Bhojnagar. Excepting in Kotho, percent of area put under vegetable crops decreased significantly with increase in size of land holding.

The factors affecting crop diversification through vegetables in the study region can be grouped in two categories. The factors having primary importance are a) access to irrigation and its reliability, b) nearness to motorable road and c) proximity to marketplace where produce can be sold. The factors of secondary importance are structure i of land holdings and the level of socio-economic development of the panchayats and households.

As for the nearness to marketplace is concerned, Kotho is enjoying the best locational advantage. The producers in this panchayat find no difficulty in selling even small quantity of produce as it does not involve much time to take the produce to nearby Solan town. The sample area in Kotho is located at a distance of 1-4 km by pavement, which is more or less levelled. Irrigation is the major constraint in this panchayat. In case of normal and timely rainfall, tomato in Kharif and peas in Rabi season are cultivated even on large unirrigated area, besides the irrigated area. As the year 1992-93 was a good rainfall year, more than one third unirrigated area here was put under vegetable crops. Due to the nearness to market

centre, farmers in Kotho are not discouraged to produce small lots of marketable surplus. The farmers here would put any size of area under any commercial crop of high value without worrying much about several aspects of marketing.

Bhojnagar is placed in a most disadvantageous position with respect to all infrastructural factors. The roadside markets and the motorable road are available after climbing upward a distance of 1-6 km depending upon the location of the household. This imposes a very heavy labour time requirement to transport vegetable produce grown by the sample households for sale purposes. Thus, only that much area is put under tomato cultivation, the produce of which can be carried to roadhead by using own family labour, because cost of using hired labour for this purpose is prohibitive, considering the value of the produce. This is the reason why only 20 percent of irrigated area in Bhojnagar was put under vegetables.

Tomato and capsicum were the only vegetable crops grown in Bhojnagar. Their production was taken in rainy or monsoon season. The produce is sold at roadside to the private traders who operate during the season when sufficient number of farmers would bring their produce for sale. Some farmers, expressed that they were keen to grow peas when there was good rain in winter but they cannot do so because of serious marketing problems. The private traders do not procure and buy vegetables except in the tomato season because of low marketed 'surplus of vegetables in other seasons. Thus, due to the distance from road and non availability of market at a nearby place, farmers in Bhojnagar were discouraged from growing vegetables.

After the construction of pucca road to Dharot few years back, all infrastructural provisions related to agricultural diversification and development have become more favourable to Dharot panchayat as compared to Deothi panchayat. Distance between market centre in Solan town and Dharot is lower than the distance between Solan and Deothi. Irrigation facility was also better in Dharot as compared to Deothi due to higher area under perennial sources of irrigation. The provision of road to Dharot panchayat has provided further incentive to fully exploit its vegetable potential to which the farmers have shown a vigorous response. Due to lag in development as compared to Deothi and lower adult literacy related to that, more adult family workers were available in Dharot (3.75 workers per household as compared to 3.19 in Deothi) to undertake labour intensive off-season vegetable cultivation. Moreover, size of cultivated holdings in Dharot was lower compared to Deothi and ratio of farm workers to cultivated land was 2.51 per acre in Dharot and 1.57 in Deothi. Therefore, both infrastructural and socio-economic factors were in favour of putting higher area under vegetable cultivation in Dharot, relative to Deothi.

The major reason for putting large percent irrigated area under vegetables and growing vegetables only on 3 percent of unirrigated area in Deothi lies in the practice of growing vegetables in off-season period which is a highly paying proposition. Deothi panchayat has long back diversified in favour of vegetables and farmers here have acquired knowledge and skill to grow vegetables by suitably altering the production period to realize higher price. The producers in this panchayat generally schedule supply and market arrivals when the prices are at the peak. The intention of the producers in this panchayat is not to maximise area under vegetables, but to maximise their income. The farmers in Deothi are found to be so specialised that by putting lower area under vegetables they earn more income (see Table 6) than the other . sample farmers because of price differential (The farm gate price of tomato realised by the sample farmers was Rs. 4. 67 /kg in Deothi, Rs. 3.91 in Kotho and around Rs. 2.25 in Bhojnagar and Dharot. Similarly in case of peas, Deothi farmers received Rs. 4.19/kg,; whereas farmers in Kotho and Dharot got Rs. 3.92 and Rs. 3.69 as farm gate price.). Another reason for lower than expected are a under vegetable crops in Deothi is that higher the deviation of vegetable crop from normal season, more would be the irrigation requirement of the area put under off-season vegetables. Thus, with the same amount of irrigation, off-season vegetable cultivation can be taken on a lesser area compared to other vegetables, especially because the perennial source of irrigation was limited in Deothi.

Aside from changing production period, getting high price for vegetables requires sale in appropriate markets like Delhi in the case of tomato. Both these tasks put heavy demand on family labour as these involve lot of decision making and cannot be left to be done by hired labour. Producing vegetables in off-season requires a lot of care and many specialised operations to protect the crop from adverse climatic effects and insect and pest attacks. Similarly, sales in the distant markets require timely picking, grading, packing and transport and related logistics. All these tasks constrain farmers in Deothi to put less area under vegetable crops. It is due to production of vegetables in highly off-season period and proper marketing that per acre net returns in Deothi were higher than that in Kotho and Dharot where vegetable cultivation was done on higher percent of crop area compared to Deothi (Table 6).

The negative association between farm size and percent area under vegetables seems to be due to the limits imposed by availability of family labour in expanding area under vegetables. Labour use in vegetable cultivation is significantly higher than the labour use in other crops (Annexure 2) and there are peak periods like picking, harvesting, marketing when demand for family labour shoots up. As the farm size increases, the availability of family labour per acre of cultivated area decreases. The sample data

also show that actual area under vegetables, per adult family worker available to work at farm, was more at households in higher farm size category and less at smaller farm size category. This shows that the pressure of demand on family labour for vegetable cultivation and for other crops was already more at higher farm size category and low at smaller size category. Therefore, due to higher availability of family labour per acre of cultivated area, farmers having lower farm size put more area under high labour intensive crops compared to households having higher farm size.

In the sample area from Bhojnagar panchayat, where vegetable produce was carried on human back to a long distance for its sale, availability of family labour was an important determinant of area allocated to vegetables. Marginal farmers in this panchayat, though did not have the facility to irrigate even one percent area, were growing vegetables on 12 percent of crop area. On the other hand, the bigger farm size holders having facility to provide irrigation to about 21 percent of area put only 6 percent of area under vegetables because of constraint on availability of family labour to undertake the carriage of vegetable produce to distant roadhead.

The inverse relation between farm size and percent area under vegetable crops, did not hold in Kotho panchayat which is situated in the vicinity of Solan town. We could not find a satisfactory answer as to why Kotho differed from other sample villages in respect of relation between farm size and proportion of area put under vegetables.

The crop pattern (area under important crops) on irrigated and unirrigated lands is presented in Annexure 1.

Economics of Vegetable Production

Tomato is the most important vegetable crop in the area. It was grown by 95.3 percent sample households and occupy 12.73 percent of total crop area. Share of tomato in total area under vegetable crops was about 40 percent. Size category wise input use, output and return from vegetable crops are studied by taking tomato as the representative crop. Crop economics for tomato under irrigated and unirrigated conditions is presented in Table 4 and 5 for those categories where number of cases was more than five.

Irrigated Farms

Tomato cultivation at irrigated farms shows that there was a mixed pattern in use of inputs related to farm size in various panchayats. Use of farm yard manure, fertilizers and family and total labour was higher at holdings above 2 acres compared to the holdings below 2 acres (Table 4). Bullock labour use was higher at marginal and small size holdings compared to other holdings. Expenditure on plant protection material was highest at the other farms in Dharot panchayat and at marginal farms in Deothi panchayat.

Table 4 : Farm Size category-wise Input use, Output and Return from Tomato under Irrigated Conditions in Various Panchayats in Solan Block, 1992-93

Particulars		Dharot		Deothi			Bhojnagar		
		Marginal	Small	Others	Marginal	Small	Others	Small	Others
1	Seed Cost Rs	980	775	926	1006	862	1008	2614	2734
2	FYM Quintal	89	108	126	213	256	269	23	25 I
3	FYM Value Rs	1184	1792	2096	3718	4442	4475	386	398
4	Fertilizer Kg	294	233	261	195	211	186	0	0
5	Fertilizer Value Rs	839	720	987	381	383	417	0	0
6	Plant Protection Cost	4796	4325	6213	3548	2833	3343	1727	1813
7	Stakings Quintal	56	57	61	55	54	59	55	53
8	Family Labour Hrs	2206	2314	2574	1799	1746	1880	788	1088
9	Hired Labour Hrs	677	509	559	391	307	339	151	229
10	Human Labour Hrs	2883	2823	3133	2190	2053	2219	939	1317
11	Wage Rate Per Hr	3.25	3.25	3.50	4.25	4.25	4.38	3.75	3.75
12	Mech. Labour Cost Rs	0	0	0	0	0	0	0	0
13	Bullock Labour Hrs	58	51	43	75	74	61	120	158
14	Bullock Wage Rate/Hr	13.63	12.88	13.75	12.50	12.50	12.00	12.50	12.50
15	Packg/Mkg/Tpt Cost Rs.	18898	19100	24511	13320	10585	13189	145	150
16	Other Cost Rs.	0	100	0	0	0	7	0	0
17	Main Product Qtl	136.12	140.00	186.38	96.38	87.82	112.40	90.45	73.75
18	Sale Price Rs/Qtl	398	452	439	654	641	633	219	249
19	Farm Gate Price Rs/Qtl	259	316	308	511	520	515	217	247
20	By Product Qtl	0.00	0.00	1.06	0.00	0.00	0.40	1.82	2:19
21	By Product Price Rs/Qtl	-	-	200	-	-	167	159	147
22	TVP at Farm Gate Price price Rs.	35235	44183	57617	49269	45643	57977	19947	18548
23	Imputed Cost of Unpaid Items Rs.	11343	11623	1361	13957	14097	14918	5406	7306
24	Int on Working Cap Rs.	358	343	432	369	355	378	221	259
25	Dep on Fixed Assets Rs.	653	653	653	653	653	653	653	653
26	Int on Fixed Cap Rs.	1150	1150	1150	1150	1150	1150	1150	1150
27	Cost A1 Rs.	10614	9226	11759	8551	7321	8023	7280	8287
28	Cost B1	11267	9879	12412	9204	7974	8676	7933	8940
29	Cost B2	15047	13699	17314	11868	10091	11314	7962	8970
30	Cost C1	18437	17401	21419	16849	15395	16902	10887	13019
31	Cost C2	22216	21221	26321	19513	17512	19540	10917	13049
32	Net Return (Rs.) Over:								
	a) Cost A1	24620	34958	45859	40718	38323	49954	12667	10261
	b) Cost B1	23967	34305	45206	40065	37670	49301	12024	9608
	c) Cost B2	20188	30485	40303	37401	35553	46663	11985	9578
	d) Cost C1	16798	i 26783	36198	32420	30249	41075	9059	5528
	e) Cost C2	13018	22963	32196	29756	28132	38438	9030	5498
33	Labour Productivity	3.76	4.82	5.25	5.29	5.23	5.97	5.67	3.76
34	Capital Productivity	3.32	4.79	4.90	5.76	6.23	7.23	2.74	2.24
35	Sample Size	20	16	13	27	17	24	8	13

Table 5: Farm Size category-wise Input use, Output and Return from Tomato under Unirrigated Conditions in Various Panchayats in Solan Block, 1992-93

Particulars		Dharot	Bhojnagar			Kotho		
		Marginal	Marginal	Small	Others	Marginal	Small	Others
1	Seed Cost Rs	845	3176	2645	234	1864	1820	1373
2	FYM Quintal	72	28	33	21	152	122	68
3	FYM Value Rs	1207	418	534	368	2811	2255	1655
4	Fertilizer Kg	176	0	13	0	148	111	114
5	Fertilizer Value Rs	455	0	26	0	371	285	405
6	Plant Protection Cost	52	2412	2579	1639	1736	1217	2042
7	Stakings Quintal	43	56	53	53	75	56	44
8	Family Labour Hrs	1983	1758	1433	938	2867	2173	1991
9	Hired Labour Hrs	415	415	322	190	663	541	551
10	Human Labour Hrs	2398	2172	1755	1128	3530	2714	1991
11	Wage Rate Per Hr	4.13	3.75	3.75	3.75	5.00	4.63	4.88
12	Mech. Labour Cost Rs	0	0	0	0	0	0	0
13	Bullock Labour Hrs	46	273	183	147	55	45	32
14	Bullock Wage Rate/Hr	14.25	11.00	11.50	12.50	13.25	13.00	12.75
15	Packg/Mkg/Tpt Cost	15517	165	173	122	1029	853	428
16	Other Cost Rs.	C	0	0	0	0	0	0
17	Main Product Qtl	116.21	78.24	81.05	61.67	76.33	61.88	46.90
18	Sale Price Rs/Qtl	357	245	228	208	364	388	459
19	Farm Gate Price Rs/Qtl	224	243	226	206	350	374	451
20	By Product Qtl	0.00	2.35	2.37	1.67	2.17	2.03	1.55
21	By Product Price Rs/Qtl	---	146	147	159	162	149	136
22	TVP Farm Gate Price	26015	19355	18648	12948	27088	23467	21363
23	Imputed Cost of Unpaid items Rs.	11749	11567	9222	6430	21194	15396	11764
24	Int on Working Cap	148	364	309	229	389	07	358
25	Dep on Fixed Assets	653	653	653	653	653	653	653
26	Int on Fixed Cap Rs.	1150	1150	1150	1150	1150	1150	1150
27	Cost A1 Rs.	4513	11162	9527	7420	9061	7373	7920
28	Cost B1	5.66	11815	10180	8073	9714	8026	8573
29	Cost B2	8270	11847	10214	8098	1119	8917	8659
30	Cost C1	13347	18407	15553	11589	24049	18076	15593
31	Cost C2	16451	18440	15588	11614	24254	18247	15679
32	Net Return (Rs.) Over:							
	a) Cost A1	21502	8193	9122	5527	18207	16094	13442
	b) Cost B1	20849	7540	8469	84874	17374	15441	12789
	c) Cost B2	17745	7508	8434	4850	17169	15270	12704
	d) Cost C1	12668	948	3095	1359	3040	5391	5769
	e) Cost C2	9.64	915	3061	1334	2834	5220	5684
33	Labour Productivity	2.63	2.38	2.83	3.06	1.53	1.87	2.20
34	Capital Productivity	5.76	1.73	1.96	1.74	2.99	3.18	2.78
35	Sample Size	9	17	17	11	30	22	8

Yield, total value of output and net return per acre were higher at the other farms in Deothi and Dharot, while in Bhojnagar small farms showed better performance compared to the other size categories. Input use and yield in Deothi and Dharot panchayats which have access to road was significantly higher compared to the sample farms in Bhojnagar located away from market and roadside. Net return from tomato production was many times higher in the villages located around roadside compared to the distant villages. Farm gate price realised by Deothi and Dharot farmers was 1.5 to 2.25 times the price of tomato obtained by Bhojnagar farmers.

Demand for off-season vegetables like tomato produced in Himachal Pradesh comes from outside states. Vegetable growers in Deothi and Dharot which are located around pucca road enjoy the advantage of transporting their marketable produce to markets in Delhi, Punjab and Haryana which fetches attractive price. The second reason for high price obtained by Deothi and Dharot farmers is the adjustment in crop growing season to get output in most tomato scarce period. Deothi farmers, who are in the business of vegetable production since long time, have almost perfected the technique of producing vegetables in off-season.

On the other hand, Bhojnagar farmers have to carry the saleable output to a distance of 1-6 km involving steep slope; this causes heavy cost in terms of labour time and the net farm gate price reduces to quite low level. At the roadhead, the produce is purchased by private traders who operate there for few days when there is enough marketed output. Irrigated area in Bhojnagar is small and the output from this area is neither sufficient to attract private traders to buy it at the nearest roadhead nor it is economic for the producers to transport the produce to market. Therefore, irrigated farms also have to synchronise their crop production with the vegetable production in rainfed area - on which vegetables are produced in monsoon season. Thus the advantage of high price for tomato in early season cannot be availed by the irrigated farms in the areas not having easy access to road or market.

Input use as indicated by cost A, and use of family labour in irrigated tomato crop was inversely related to farm size. Yield, value of output and net return per unit of area were significantly higher for marginal and small farms than for other farms. This shows that the production performance under irrigated conditions at the land holdings of the size below 2 acres is better compared to the other holdings.

Unirrigated Farms

Effect of infrastructure on productivity and profitability was quite sharp under unirrigated production also. Per acre value of output (TVP) of tomato in Kotho panchayat was Rs. 5 to 8 thousand higher compared to Bhojnagar, though yields were higher in Bhojnagar. The reason was that Kotho panchayat was located nearby the agricultural market in Solan town due to which Kotho farmers realised 50 to 120 percent higher farm gate price compared to Bhojnagar farmers.

Differences in input use, output and return from tomato cultivation due to irrigation can be observed by comparing corresponding figures in Table 4 and 5.

Based on performance of tomato crop it can inferred that size of farm is not a constraint to diversify through off-season vegetable cultivation. Rather, under irrigated conditions performance of lower sized farms was better compared to higher sized farms. As we have observed earlier from Table 3 there were large variations in crop intensity across farm size categories. In such situations production performance is better indicated by aggregate of all crops per unit of net cultivated area.

Crop Economics per Unit of Net Cultivated Area

Economics of aggregate crop production per unit of net cultivated area according to size classes is presented in Table 6. The estimates based on net cultivated area are better indicator of economic performance of aggregate crop production, as they take into account the difference in performance due to crop intensity. Per acre use of purchased as well as home produced inputs was highest at marginal farms and lowest at farms having more than 2 acres of cultivated holdings in all the panchayats. Even the use of hired labour was highest at marginal farms. The most important factor underlying this kind of trend was percent of total crop area put under vegetables cultivation, which showed inverse relation with farm size (Table 3).

Table 6 : Input Use, Output and Returns from Aggregate Crop Production per Acre of NSA: Farm Size Category-wise, Solan Block

	Particulars	Dharot			Deothi			Bhojnagar			Kotho		
		Marginal	Small	Others	Marginal	Small	Others	Marginal	Small	Others	Marginal	Small	Others
1	Seed Cost Rs	2013	2064	2017	882	629	471	958	606	406	892	695	542
2	FYM Quantity Qtl.	116	94	80	171	142	100	51	36	17	151	90	63
3	FYM Value Rs	1735	1454	1333	2948	2439	1652	812	590	282	2811	1608	1235
4	Fertilizer quantity	187	148	137	168	145	91	55	54	29	103	59	61
5	Fertilizer Value Rs	505	397	417	319	260	200	92	104	46	246	148	163
6	Plant Protection Cost Rs	2066	1866	1577	1827	1130	934	532	307	146	573	459	592
7	Stakings Quantity Qtl	25	25	19	35	25	16	60	7	4	26	15	12
8	Family Labour Hrs	1500	1417	1125	1356	1092	777	799	482	338	1791	1125	837
9	Hired Labour Hrs	264	147	165	176	69	100	0	0	9	308	207	177
10	Human Labour Hrs	1764	1563	1290	1531	1161	877	799	482	338	1791	1125	837
11	Wage Rate Rs. Per Hr	5	5	5	4	4	4	4	4	4	5	5	5
12	Mech. Labour Cost Rs	11	4	13	0	0	0	83	14	9	44	40	20
13	Bullock Labour Hrs	81	69	55	105	87	61	246	97	58	78	57	40
14	Bullock Wage Rate/Hr	13	13	13	13	13	12	11	12	13	13	13	13
15	Packg/Mkg/Tpt Cost Rs	7578	6163	5405	5162	3723	2775	147	144	102	611	503	673
16	Other Cost Rs.	0	0	0	0	0	1	0	0	0	0	11	0
17	Main Product Qtl	74.56	62.83	55.89	48.86	37.78	30.39	24.94	18.84	11.63	36.29	23.67	23.75
18	Sale Price Rs/Qtl	397	458	454	628	615	604	308	329	362	369	414	452
19	Farm Gate Price Rs/Qtl	295	360	358	522	516	512	302	321	353	352	293	424
20	By Product Qtl	8.21	8.33	7.83	15.98	10.68	10.27	11.64	10.44	8.59	8.45	6.13	9.24
21	By Product Price Rs/Qtl	118	110	115	67	84	72	90	93	%	128	140	93
22	TVP Farm Gate Price	22983	23520	20880	26598	20401	16309	8573	7017	4931	13856	10152	10914
23	Imputed Cost of unpaid items	10293	9403	7695	10193	8301	5771	6490	3559	2245	11032	6813	4963
24	Int on Working Cap Rs.	272	231	216	252	183	138	161	87	52	222	147	123
25	Dep on Fixed Assets Rs	1175	930	726	415	321	201	102	70	90	849	303	635
26	Int on Fixed Cap Rs.	2069	1606	1236	939	674	448	210	170	227	1603	604	1209
27	Cost A1 Rs.	10165	8543	7864	8726	6347	4753	5422	2941	1797	8164	5167	4702
28	Cost B1 Rs.	12225	10149	9101	9664	7022	5200	5633	3111	2024	9768	5771	5911
29	Cost B2 Rs.	16822	14853	13277	14984	1102	8462	7347	4515	3010	12539	7801	8094
30	Cost C1 Rs.	19724	17233	14726	15595	11799	11109	2940	3906	2907	4088	4381	5003
31	Cost C2 Rs.	24320	21937	18902	20915	15879	11861	10344	6320	4243	19723	12251	11290
32	Net Return (Rs.) Over:												
	a) Cost A1 Rs.	12827	14976	13016	17872	14054	11557	3151	4076	3134	5692	4985	6212
	b) Cost B1 Rs.	10758	13371	11780	16934	13379	11109	2040	3906	2907	4088	4381	5003
	c) Cost B2 Rs.	6161	8667	7604	11614	9299	7847	1226	2502	1921	1317	2351	2820
	d) Cost C1 Rs.	3259	6287	6154	11003	8602	7710	-56	2100	1674	-3096	-69	1807
	e) Cost C2 Rs.	-1337	1583	1978	5683	4522	4449	-1771	696	688	-5867	-2099	-376
33	Cost A1 Rs. per Qtl.	130	131	135	171	161	149	191	135	129	207	200	182
34	Cost C2 Rs. per Qtl.	312	336	324	411	402	373	364	289	304	501	474	438
35	Paid Production cost as of Cost A 1	58	59	62	44	37	43	31	35	36	40	46	46
36	Marketed surplus	89	87	87	86	84	86	69	59	52	81	78	84
37	Labour Productivity	2.61	3.01	3.24	3.97	2.02	4.25	2.86	3.89	3.89	1.60	1.86	2.69

Except Deothi panchayat, marginal farmers were in disadvantage in having access to irrigation (Table 3). But the hard working farmers used to bring water in buckets from distant places to meet water requirement of vegetable crops during the stress period. In this way, the marginal farmers offset to some extent the disadvantage they have with respect to irrigation, and put higher percent of area under vegetable crops as compared to other categories. Furthermore, marginal farmers in Dharot, Kotho and Bhojnagar made best efforts to overcome the irrigation constraint by using more human labour, higher quantity of other inputs and more use of bullock labour to prepare fine soil structure. As a result of these factors, value of total output per unit area was highest at marginal farms and lowest at other categories, except one case in Dharot where small farms recorded somewhat higher TVP than marginal farms.

In Deothi, where marginal farmers have advantage over other categories in access to irrigation, TVP per acre of net sown area for them was 30 percent higher than for small farmers and 63 percent higher than the TVP at other farms having holdings above 2 acres. The increase in TVP per unit of NCA over TVP per unit of TCA, was highest in the case of 'marginal' farm category and lowest in the case of 'other' category. The increase in TVP due to crop intensity at marginal farms varied between 63 to 93 percent in various panchayats.

The net return over cost Al was Rs. 12,827, 14,976 and 13,016 per acre of NCA at marginal, small and other farms in Dharot and Rs. 17,872, 14,054 and 11,557, respectively, in Deothi. The net return in Bhojnagar and Kotho for the three farm size categories was Rs.3151, 4,076, 3,134 and Rs.5,692, 4,985 and 6,912 for the respective categories (Table 6).

In Dharot, marketed surplus as percent of total output was 89 percent for marginal and 87 percent for small and other farm size category, in Dharot. In Deothi, marginal and other farmers sold 86 percent and small farmers sold 84 percent produce. In Bhojnagar, marketed surplus ranged between 52 to 69 percent, the highest being at marginal farm size. In Kotho, sales comprise 81 percent of production at marginal farms, 78 percent on small and 84 percent on other farm category. This shows that marketed surplus per unit of area at marginal farms was either higher or same as at the bigger farm size categories in most cases, though the common Indian experience is that proportion of marketed surplus in total production is either near to zero or very small at smaller size farms, and it increases with the increase in farm size. Our findings show that if there is, incentive, marginal farms can supply same or even higher percent of production to the market as the large farmers. In our sample, incentive was provided by crop diversification through vegetable crops which are produced with purely commercial considerations for sale in the market. Since the marginal farmers allocate

higher proportion of cultivated area under vegetables, the share of vegetables in total output was also higher, which resulted in higher percent of marketed surplus in output compared to other farm size categories.

Sale pattern of Vegetables

The sample farms disposed off their marketed surplus of vegetable crops at many places namely village roadside market, nearest agricultural market, Delhi market and various markets in Punjab and Haryana state (Table 7). Bhojnagar farmers who neither have easy access to road nor to any market sold their entire surplus at the nearest roadside market irrespective of the size of the holdings. Sample farms in Kotho, which were located at a distance of 1-4 km. from the local market and 1-3 km. from road preferred to sell most of their produce in local market. Size wise, marginal and small farmers ventured to sell about 2 percent produce in Delhi market whereas other farmers sold 20 percent produce in Delhi Market.

Table 7 :
Panchayat-wise and Farm Size Category-wise sale pattern of vegetables by Sample Households, Solan Block.

Panchayat size Class	Percent Sale			
	Village Roadside Market	Solan Market	Delhi Market	Punjab & Haryana Market
Dharot				
Marginal	15.8	6.4	46.0	31.8
Small	13.3	7.8	53.6	25.2
Other	7.9	11.0	34.4	46.7
Deothi				
Marginal	0.3	15.8	83.8	0.0
Small	0.0	11.3	88.7	0.0
Other	0.0	9.7	81.1	9.3
Bhojnagar				
Marginal	100.0	0.0	0.0	0.0
Small	100.0	0.0	0.0	0.0
Other	100.0	0.0	0.0	0.0
Kotho				
Marginal	0.0	98.6	1.4	0.0
Small	0.0	97.8	2.2	0.0
Other	0.0	78.2	20.3	1.5

Deothi farmers sold 83-90 percent produce in markets outside the state and remaining quantity in Solan market. About 78-81 percent produce from Dhrot panchayat was sold in Delhi and the neighbouring states. In Dharot and Deothi, small and marginal farmers sold only slightly higher proportion of their produce in roadside and local market compared to other farms. Size of holding in these two panchayats did not impose any constraint to market output to distant markets.

The sales pattern of vegetable crops in various panchayats show that it was not size of holding but access to infrastructure like road and market which determine marketing behaviour or the vegetable producers. In the areas where vegetables were produced by large number of growers and there was easy access to transport, small lot does not cause any problem to transport produce to remunerative markets. Where there are large number of producers the option to share common truck for transporting the produce is very easily available and forthcoming.

Income and Employment Implications of Diversification Through Vegetables.

The estimates of labour use in vegetables and other crops, for aggregate of all panchayats, were used to study the employment implication of shift in crop pattern at block and district level (Table 8). The calculations reveal that one percent shift in area from other crops to off-season vegetables would lead to 1.20 and 1.60 percent growth in existing level of labour employment depending on whether the shift takes place in irrigated or unirrigated area. The average of the two would be close to 1.60 percent due to higher share of unirrigated area in total crop area.

Table 8 : Percent increase in Labour Employment Due to One percent Shift in Area From Other Crops to Vegetables.

Type of Area	% increase	
	Solan Block	Solan District
Irrigated	1.20	1.60
Unirrigated	1.60	2.85

The employment growth would be higher in areas other than Solan block because area under vegetable cultivation in Solan block was highest among all blocks of the district. When the estimates were extended to district level, it was found that one percent shift in irrigated area from other crops to vegetable crops would result in 1.60 percent growth in existing level of employment. The increase for unirrigated area worked out to be 2.85 percent. These estimates show the potential of diversification through vegetable crops on 'onfarm' employment opportunities. Another dimension of labour use in vegetable cultivation is that it reduces seasonality in labour use because the peak time of labour requirement of vegetable crops differ from the peak labour demand in most of the other crops.

The impact of shift in crops pattern, in favour of vegetables, on ' net income was quite sharp (Table 9). The net return from vegetable cultivation was 2 to 23 times higher than other crops under irrigated conditions and 3 to 40 times higher under unirrigated conditions.

Table 9 :
Percent Increase in Net Return Due to One Percent Shift in Area in favour of Vegetable Crops.

Type of Area	% increase	
	Solan Block	Solan District
Irrigated	4.06	6.12
Unirrigated	3.42	4.25

A one percent shift in area from other crops to vegetable crops in a district like Solan was estimated to lead to around 6 percent increase in net return from existing cropping pattern under irrigated conditions and around 4 percent increase when the shift in area takes place on unirrigated land.

Policy Implications

Agricultural diversification through vegetable crops has a huge potential for employment and income generation in Western Himalayan Region. Vegetable cultivation, due to its labour intensive nature, is more beneficial for marginal and sub-marginal holdings where family labour availability per unit of land is higher compared to bigger size holdings. This is the reason that percent of area shifted to vegetable crops increase with the decrease in farm size in the vegetable growing area. Our findings based on micro level investigations reveal that in case of commercial and higher profitability enterprises, farm size is not a constraint for production and marketing. The study shows that it is not correct to assume that marginal and small farmers do not have sufficient land to put under commercial crops after allocating land to foodgrains to meet the family needs. It was found that where economic incentive is available, farmers allocate area based on relative profitability irrespective of the foodgrains requirement of family which can be easily met through purchases.

There is a strong evidence that it is not the farm size, but infrastructure like access to motorable road, market and irrigation which determine the extent, success and profitability of diversification through high paying crops like off-season vegetables. Promotion of enterprises like off-season vegetables would go a long way in generating productive employment and income in the hill areas in Western Himalayan Region where size of holdings and per capita arable land are very small and traditional crops with low productivity are not capable of providing sufficient income and employment to the population dependent on agriculture sector.

Acknowledgement

The paper is drawn from the larger study "Agricultural Diversification in Himachal Pradesh : Potentials and Prospects", 1995, Institute of Economic Growth, Delhi, (computer-script). I am grateful to Prof. B.D. Dhawan for reading the draft of this paper.

Annexure I : Cropping Pattern and Diversification Index According to Irrigation Status at Sample Farms, Solan Block Unit: Percent of TCA

Crops	Dharot		Deothi		Bhojnagar		Kotho		Total	
	Irri.	Unirri.	Irri.	Unirri.	Irri	Unirri.	Irri.	Unirri	Irri.	Unirri.
Wheat	0.24 (2.94)	8.18 (9.06)	11.33 (26.57)	35.53 (73.43)	34.46 (9.98)	47.97 (90.02)	4.52 (1.55)	25.42 (98.45)	10.14 (11.09)	33.57 (90.76)
Maize	7.63 (1638)	39.84 (8361)	18.95 (28.85)	53.05 (71.15)	26.55 (8.76)	42.66 (91.24)	10.97 (2.70)	35.13 (97.30)	15.49 (13.03)	41.47 (8697)
Barley	1.45 (9.27)	14.56 (90.73)	1.27 (22.22)	5.05 (77.78)	0.00 (0.00)	0.00 (0.00)	3.23 (7.44)	3.56 (92.56)	1.27 (11.57)	3.30 (88.43)
Paddy	000 (0.00)	0.00 (0.00)	0.85 (100.00)	0.00 (0.00)	16.10 (39.86)	3.75 (60.14)	0.00 (0.00)	000 (0.00)	2.85 (43.05)	1.51 (56.95)
Pulses	0.00 (0.00)	0.74 (100.00)	0.11 (3.85)	3.00 (96.15)	0.00 (0.00)	0.26 (100.00)	000 (0.00)	0.52 (100.00)	0.04 (2.13)	0.81 (97.87)
Ginger	18.54 (93.30)	1.36 (6.70)	0.00 (0.00)	0.00 (0.00)	056 (0.00)	0.00 (0.00)	0.00 (0.00)	0.13 (100.00)	6.80 (92.10)	0.23 (7.90)
Peas	3708 (65.25)	20.20 (34.75)	23.08 (9499)	1.38 (5.01)	0.00 (0.00)	0.00 (0.00)	23.23 (12.88)	13.95 (87.12)	24.57 (57.26)	7.36 (42.74)
Tomato	22.18 (73.49)	8.18 (26.51)	33.51 (98.29)	0.66 (1.71)	15.62 (33.73)	4.79 (66.27)	33.55 (18.84)	12.83 (81.16)	26.66 (59.97)	7.14 (40.03)
Beans	1.70 (43.75)	2.23 (5625)	0.00 (000)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	15.48 (19.43)	5.70 (80.57)	1.67 (24.44)	2.07 (75.56)
Capsicum	667 (72.43)	2.73 (27.57)	5.24 (100.00)	000 (0.00)	2.26 (66.67)	0.17 (33.33)	3.23 (13.26)	1.87 (86.74)	5.16 (66.69)	1.03 (33.31)

Note : Figures in parentheses indicate distribution of total area under crop between irrigated and unirrigated land

Annexure II : Input Use, Output and Returns from Important Crops per Acre of TCA in Irrigated and Unirrigated Area, Solan Block

Particulars		Tomato		Peas		Capsicum		Cauliflower		Maize		Wheat	
		Irri.	Unirri	Irri.	Unirri	Irri.	Unirri.	Irri.	Unirr	Irri.	Unirri	Irri.	Unirri.
1	Seed Cost Rs	1095	1897	892	455	959	1262	888	800	171	160	197	156
2	FYM Quantity Qtl.	182	83	75	65	120	82	236	180	9	17	52	36
3	FYM Value Rs	3026	1571	1211	1244	2053	1707	3788	2900	146	290	869	649
4	Fertilizer quantityKg.	195	93	90	35	147	121	285	122	78	54	23	6
5	Fertilizer Value Rs	483	260	219	90	355	325	681	296	152	108	53	15
6	Plant Protection Cost Rs	3628	2082	915	237	1736	1517	5404	1700	0	0	449	11
7	Stakings Quantity Qtl	56	76	37	15	0	0	0	0	0	0	0	0
8	Family Labour Hrs	1320	1545	909	602	1015	1077	1237	1255	325	284	216	169
9	Hired Labour Hrs	126	176	156	120	20	221	82	600	20	40	46	31
10	Human Labour Hrs	1446	1721	1064	723	1034	1297	1319	1855	345	324	262	201
11	Wage Rate Rs. Per Hr	5	5	5	5	5	5	5	5	5	18	19	18
12	Mech. Labour Cost Rs	1	22	0	0	0	0	0	10	0	4	7	28
13	Bullock Labour Hrs	69	93	62	45	66	118	80	64	40	38	46	39
14	Bullock Wage Rate/Hr	13	13	13	13	13	12	13	13	13	51	52	52
15	Packg/Mkg/Tpt Cost Rs	12967	2281	507	383	9529	4403	353	515	37	69	17	39
16	Other Cost Rs.	13	7	0	0	25	0	20	0	0	1	0	0
17	Main Product Qtl	112.51	71.34	26.97	16.19	65.86	44.09	2.11	1.40	8.83	6.14	5.99	3.12
18	Sale Price Rs/Qtl	525	341	429	414	438	336	31267	30000	380	380	452	445
19	Farm Gate Price Rs/Qtl	410	309	410	390	293	236	31099	29632	376	369	449	433
20	By Product Qtl	0.45	1.75	9.33	2.40	2.29	10.09	0.00	1.20	12.06	7.45	8.08	4.89
21	By Product Price Rs/Qtl	160	149	97	116	155	150	-	108	51	66	150	142
22	TVP at Farm Gate Rs	46177	22294	11970	6588	19660	11926	65472	41615	3943	2758	3903	2045
23	Imputed Cost of Unpaid Items Rs.	10175	10216	6363	4719	7726	8280	10664	9822	2199	7350	7275	5711
24	Int on Working Cap Rs.	304	246	149	99	189	229	381	295	33	101	150	107
25	Dep on Fixed Assets Rs.	260	260	260	260	260	260	260	260	260	260	260	260
26	Int on Fixed Cap Rs.	496	496	496	496	496	496	496	496	496	496	496	496
27	Cost AI Rs.	10280	8380	5178	3537	6498	7815	12824	9993	1360	3606	5198	3805
28	Cost BI Rs.	10777	8876	5675	4033	6994	8311	13321	10490	1856	4102	5695	4302
29	Cost B2 Rs.	20012	13335	8069	5351	10926	10696	26415	18813	2645	4654	6475	4711
30	Cost CI Rs.	17053	16336	10044	6937	11839	13415	19185	16601	3407	9209	9743	7350
31	Cost C2 Rs.	26288	20795	12438	8255	15771	15800	32279	24924	4195	9761	10523	7759
32	Net Return (Rs.) Over:												
	a) Cost A1 Rs.	35897	13914	6792	3051	13162	4111	52647	31622	2583	-848	-1295	-1760
	b) Cost B1 Rs.	35400	13418	6296	2555	12666	3615	52151	31125	2086	-1344	-1792	-2257
	c) Cost B2 Rs.	26165	8959	3902	1237	8734	1230	39057	22802	1298	-1896	-2572	-2666
	d) Cost C1 Rs.	29124	5958	1927	-349	7821	-1488	46287	25014	536	-6452	-5840	-5305
	c) Cost C2 Rs.	19889	1499	-468	-1667	3889	-3874	33193	16691	-252	-7003	-6621	-5714
33	Cost A1 Rs. per Qtl.	91	116	177	209	97	155	6092	7116	130	483	599	806
34	Cost C2 Rs. per Qtl.	233	288	426	488	235	313	15332	17747	400	1307	1212	1643
35	Paid Prod, cost as Cost A 1	57	61	54	39	49	53	58	57	31	28	30	20
36	Marketed surplus	99	100	93	100	98	100	100	100	15	1	38	4
37	Labour Productivity	6.72	2.68	2.34	1.89	2.98	1.94	10.47	4.61	2.40	0.47	0.80	0.57
38	Capital Productivity	4.68	2.87	2.51	1.96	2.93	1.69	5.22	5.72	2.28	0.84	0.83	0.56

INTEGRATING SMALL FARMERS WITH MARKET PROBLEMS AND PROSPECTS

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Introduction

Due to the unprecedented expansion of rural population from 298 million in 1951 to 629 million in 1991, the per capita land availability has shrunk. The predominant feature of structural change in agriculture is the increase in number of marginal holdings of below one hectare, without proportionate increase in the area operated by them. The only redeeming and commendable feature of agrarian change is that land is not getting concentrated in the hands of a few land owners (Ballabh and Sharma, 1991). These also are reflections of inadequate absorption of labour in non-agricultural rural and urban sectors. The organised sector has limited capacity to absorb the rural labour, even if it provides double the employment by year 2000 to its 266 million employment in 1987-88 (Parthasarathy, 1994). The major part of the rural labour force will have to be absorbed within rural areas in agricultural and non-agricultural activities induced by agricultural growth and incomes.

Several innovative approaches have been suggested to overcome the twin problems of poverty and unemployment in rural areas. One of these approaches is to provide small and marginal farmers adequate support to make them vibrant and instrument of growth through value addition and diversification. The available literatures reveal that small farmers were more productive than their larger counterpart in the pre-green revolution period. This inverse farm size-productivity relationship weakened in the post-green revolution period (Walker, *et al,* 1990). More recent evidences atleast in some areas, suggest that the inverse farm size-productivity relationship reestablishes over a period of time (Reddy, 1993). Given efficiency and viability of small farms, it is puzzling that the economic status of small farmers does not differ much from that of agricultural labourers. That is, even when small farmers achieve increase in production efficiency, they are unable to improve their economic condition. The value addition and diversification are sought to bring out these economic changes to small farmers. To achieve these goals, the Small Farmers Agri-business Consortium (SFAC) has been created. The primary objective of SFAC is to extend the benefits of modern agribusiness to small farmers and create employment and income generating opportunities in rural areas through diversification and commercial orientation.

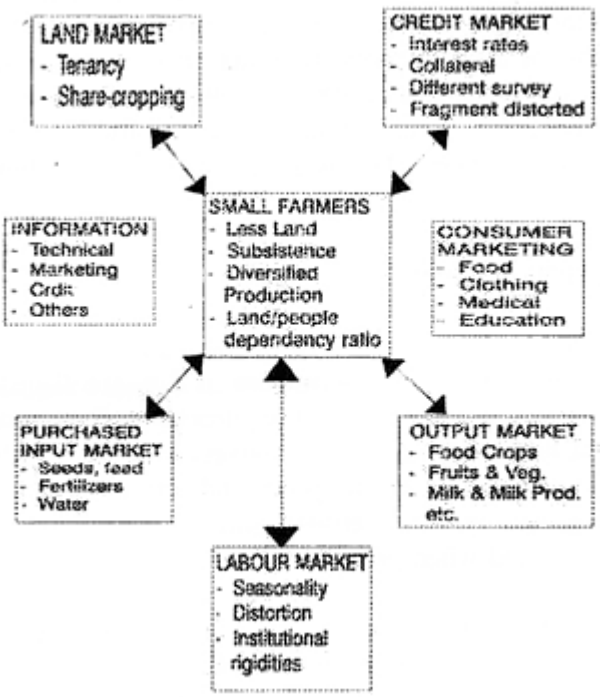
The objective of this paper is to assess the requirements for the success of such an approach as illustrated by a case study conducted in Valsad district of Southern Gujarat. The paper is organized in the following manner : In Section II, we discuss the conceptual framework of small farmers organization. Section III provides a brief description of the study region; Section IV covers the methodology of the study. The results are presented in Section V and the final section deals with the summary and policy implications.

Conceptual Framework

The growing number of small farms and declining average size of operational holdings indicate the weakness in their access to critical production resources. Therefore, they are operating at a lower equilibrium. Several studies indicate that small farmers encounter entirely different set of problems in both input and output markets due to their unique characteristics. The input markets include, land, labour, credit, information and technology and purchased inputs. They also face the consumption market in addition to the output market. To bring them to a high level of equilibrium, we need to understand the constraints in various markets. In Figure 1, we depict the interaction of small farmers with various markets. It should be noted

that the small farmers are not a homogenous group, but in general, the problems faced by them have some common features.

Figure 1 :
Interaction of Small Farmers with Various Markets



Land Market

Small farmers operate small fragmented holdings. The lease market is generally not favourable to them. Often, inefficient and distorted rural land market works against the interest of small farmers. Economies of size and scale are limited due to imperfections in the land market.

Input and Service Market

Modernization of agricultural production process leads to dependence on purchased inputs. Due to higher dependency on purchased inputs and low absolute income, they are usually unable to save sufficiently for investment which in turn lead to low total output. This situation is further accentuated by imperfections in the credit market where, small farmers end up paying higher interest per unit of credit. Collateral based lending policies of the organized lending institutions discourage borrowings for production or seek private money lenders for help. Similar problems arise in accessing rental market for machinery, transport and other services, information, technology, prices and market intelligence. Interlocking of input and output markets also have resulted in exploitation of small farmers. This is a vicious cycle of the low level equilibrium.

Product and Consumption Market

Small farmers usually produce diverse goods and services to meet the family requirements. Marketable surpluses, if any, are disposed off immediately after harvest to meet the cash requirements when prices are generally depressed and often to specific buyers who have provided credit. There is limited market for all goods and services produced by small farmers

in the vicinity. In contrast, quite often, they buy goods and services in lean period when prices are generally higher.

The discussion is suggestive of the complex socio-economic activities and relationships. Therefore, the nature, degree and the complexity of the problems faced vary among the farmers, regions and markets. Several alternatives are available within each market for small farmers. Critical evaluation of the alternatives is important in deciding a profitable set to determine the overall profitability of the small farms. Nevertheless, the broad view of rural market is valid point of departure f for identifying, designing and implementing programmes for improving the economic status of small farmers. Understanding of the constraints in various markets is the first step towards raising the equilibrium level.

Profile of the Study Area

The population of Valsad as per the 1991 census, was 21.74 lakhs. The density of population is 269 people per square kilometre. Rural population constitutes 79.6 percent of the total population. About 3 percent of the total population is schedule caste and 54 percent schedule tribes. The literacy level was 55 percent. Labour force in agriculture accounted for 9.6 percent (Table 1).

Table 1 :
Salient Features of Valsad District and Gujarat State

	Particulars	**Valsad**
A.	**Demographic**	
1.	Population 1991 (in lakh)	21.74
2.	Density population (person per square km)	267
3.	Proportion rural population (percent)	79.4
4.	Literacy (percent)	54.57
5.	Proportion of agricultural labourer (percent)	9.6
6.	Proportion of schedule caste	3.03
7.	Proportion of schedule tribe	54.35
B.	**Land Use**	
1.	Total geographical (in lakh ha)	5.3
2.	Area under forest (percent)	23.8
3.	Net sown area (percent)	57.1
4.	Net irrigated area (percentage of NSA)	23.6
C.	**Distribution Operational Landholding (1985-86)**	
	Total number of holdings	162117
	Total Area (ha)	238349
	Proportion holding < 2 (percentage)	84.02
	Percentage area operated by holdings < 2 ha	40

Climate of Valsad district falls under dry sub-humid receiving the highest rainfall in Gujarat averaging 1800 mm per year - well distributed over the *kharif* season. The district is well endowed with water resources - both surface and ground water. The major sources of irrigation are canal and wells in the district. Net irrigated area is 69,913 hectares which is 23.6 percent of the net sown area. The soils are fertile, low in nitrogen and phosphorus and high in potash. Soils of the hilly region are shallow, highly erosive, whereas in the mid-plain they are mostly levelled. In coastal plain, the soils are salt affected.

About 43 percent of the total geographical area is net cultivated. Paddy, sugarcane, small millets *(khodra* and *nagli), val* and *tur* are the major crops of Valsad. *Kharif* is the main cropping season, Rabi crops -cereals, pulses and oil seeds - are grown to a limited extant. The cropping pattern in Valsad has undergone a noticeable change since the 1960's. While cotton, ragi, sugarcane, jowar, wheat and groundnut were the predominant crops of the sixties, the cropping pattern has shifted in favour of rice, sugarcane and horticultural crops in the nineties. The area under cereals and pulses has been declining in recent years. Land productivity in Valsad is highest in the State of Gujarat. Given the decline in acreage under cereals and pulses, much of the increase in productivity seems to come from high value crops like fruits and vegetables. (Hiremath *et al* 1994).

Methodology

As mentioned, Valsad has rich soil and abundant water. These factors provide comparative advantage in production of several agricultural commodities. Through the process of elimination, we chose fruit and fisheries as lead sector in the district which has potential to develop for small farmers agri-business consortium. Following criteria were used for selection of fruits and fisheries as lead sector : (i) expected growth; (ii) potential to generate surplus; (iii) potential for export; and (iv) opportunities for involving small and marginal fajmers. Within horticulture, mango and *chikku* cultivation were more promising. Therefore, this study remain restricted to these two fruits.

Primary horticulture data was collected using two instruments. First, a structured questionnaire was used to elicit information regarding pre and post-harvest problems, marketing related issues among others. A sample of 71 small and marginal farmers engaged in horticulture were interviewed. The sample consisted of 36 farmers who were members of cooperatives and 35 non-members. Second, an open - ended questionnaire was used to elicit information from Government, nongovernmental and private sector institutions. Much of the information was qualitative in nature and it helped us understand the roles and functions of the various institutions, their linkages if any and also build a broad perspective.

Officials institutions, like agro-processing industries were interviewed to access their opinion. To identify issues related to processing industries, ten processing industries within the district were visited. While some of them operated with single product, most of them in recent years seem to have shifted to multi-product processing. To obtain information regarding marketing, nine fruit and vegetable commissioning agents scattered over the district were interviewed.

To identify issues related to fisheries, 32 primary cooperatives, 61 traditional fishermen and three agents were contracted. Financial institutions were also contacted to elicit their view point. It should be noted that unlike in horticulture, the fishermen's interviews were not structured. These interviews were conducted in groups and issues that emerged during the discussions were revalidated, through multiple approaches and discussion with different groups of people.

Results and Discussion

The results from horticultural survey and fisheries are presented in this section. The horticultural survey includes survey of farmers, cooperatives, agricultural produce marketing committees and agro-processing industries.

Horticulture (Fruits)

The survey of farmers was conducted to identify the constraints during various stages of production and marketing. The survey revealed that availability of labour during all stages of operations was a critical constraint. It is somewhat surprising to us since small farmers have high land man ratio. In depth probing, however, revealed that the opportunity cost of labour within the district is very high, since many workers move out to industries in Surat, Bombay and other areas. Insect pest incidence, irrigation, natural calamities, marketing channels, low prices and lack of technical knowledge were the constraints identified in the order presented. Details appear in Table 2.

Table 2 :
Major Production and Marketing Problems Faced by Fruit Growers

A.	**A Production Problems**	
(i)	Non-availability of good planting material	Almost all
(ii)	Variability in production	53
(iii)	Insect-pest incidence	Almost all
(iv)	Labour availability	44
(v)	Technical knowledge	45
B.	**Marketing Problems**	
(i)	Low price	33
(ii)	Delayed payment	29
	Total no. of farmers interviewed	**71**

Almost all farmers reported non-availability of good planting material. The variation in yield also influenced the decision of farmers whether to grow fruit trees or not. In general, farmers who are members of cooperatives receive higher return than the farmers who are not. Of late, *chikku* cultivation has been increasing. Farmers who are members of cooperatives generally have higher acreage under *chikku* compared to non-members. According to some of them, there are less risk with *chikku* than mango crop. The cooperative also provides assured marketing for *chikku.* In case of mango, market is competitive and therefore even those who are not members of cooperatives receive equally good prices and 28 percent of cooperative members sold their mangoes in open market. This implies that cooperatives are unable to provide distinctive advantage to their members. This primarily happens due to rigidities in pricing by cooperatives. Often, cooperative management do not respond to changing market conditions.

Chikku is more perishable than mango. Therefore, it needs to be transported within 36-48 hours of harvest to terminal destinations. Cooperatives have evolved innovative mechanisms by providing incentives (Rs. 100 - 500) to truckers for ensuring their produce reaching terminal markets like Delhi on time. Members of management committee of the cooperative were of the opinion that delays cost them heavily as the consignment has to be sold at throwaway prices. These services are neither provided by private traders nor it is. within the capacity of individual producers. Hence, *chikku* is preferred to be marketed through cooperatives.

There are several services demanded by farmers from their cooperative organisations including credit (especially during the gestation period), higher prices, soil testing facilities, extension services, transport facilities from the farm gate to the cooperatives. At present,

although cooperatives provide services like input supplies, spraying services and marketing of output, they do not provide plucking and post-harvest services. These constraints need to be mitigated in order for the farmers to achieve high level of production and profits.

On the other hand, me survey of four fruit cooperatives revealed a different set of issues. For example, the farmers' produce do not comply with the quality parameters including delays in delivery and insufficient quantities that are brought to the cooperative. Cooperatives also have experienced delayed payments of loans. Since most cooperatives do not own their own transport facilities, they depend on private transporters who, by creating artificial shortage of vehicles demand high price especially during the peak of the season. Octroi/taxes, road blocks by police, spoilage in transit, delayed delivery to terminal destination are the constraints these organisations face. Although in recent years, the demand for fresh and processed horticultural products has grown, because of the strict quality requirements these cooperatives have not been able to meet the quality parameters. When chips are down, the cooperatives are outsmarted by private trade.

The commission agents operating in APMC yards face problems similar to cooperatives. However, working capital shortage and storage were ranked high on the constraint list. Other problems include lack of grading, packing, processing, transport, timely payments and quality of the produce. Survey of processing industries indicated the problems of quality, premature harvest of fruits and vegetables, ignorance of quality standards for export, problems in grading, high cost of packaging material and to some extent spoilage in handling and working capital shortage.

Fisheries

Resource Potential

Valsad has a great potential for development of inland fisheries in tanks and ponds, reservoirs, dams and rivers. According to the available resources statistics, there were 4,131 hectares of tanks and ponds and 1,122.92 hectares of reservoir for both culture and capture fisheries. At present, the annual fish production from these water bodies is about 805 metric tonnes (MT) which could be further stepped up to about 2 to 3 thousand MT in the next 3 to 4 years (Hiremath *et al* 1994).

There are three major dams, Kaliya (318 hectares) and Juj (356 hectares) in Bansda taluka and Maduvan (4368 hectares) in Dharampur taluka where fishing is contracted by District Tribal Officer (DTO) and District Fisheries Department assisted with fish seeds stocks which are mainly imported from Maharashtra and Kerala. There are substantial number of tribal fisherfolks fishing in these dams.

There are 1,698 village freshwater ponds and tanks occupying 4,131 hectares of water spread over the district. Majority of these ponds are seasonal in nature and are used by the villagers for various purposes including irrigation, drinking water for cattle, washing and cleaning.

A primary survey, recently conducted by the Department of Fisheries, shows that only 20 percent ponds are used exclusively for fish farming. The fisheries potential of these ponds is largely underdeveloped and under-utilized. The present fish yield per annum from these ponds is below 200 kgs per hectare. Further, the Department of Fisheries estimated that Valsad has over 20,235 hectares of brackish-water areas that could be harnessed for prawn/fish farming, provided the necessary infrastructure such as finance, construction technology, seed and feed and trained manpower is developed. Presently, only 146 hectares are under culture. Brackishwater prawn farming on scientific lines has begun recently largely due to the focus of GFCCA towards prawn farming and development of 5 model farms at 5 key locations.

Fish Marketing

Although no details are available on marketing of fish, our discussions with officials and field observations suggest that a large share of fresh fish catch is consumed within the district itself. The remaining quantity moves to various markets within the state (Surat, Baroda and Bharuch) and during peak seasons to Bombay. A large proportion of the dry fish produced in the district is sold to commission agents based at Bombay and Surat. Dharampur and Vansda-talukas dominated by tribals are main markets for dry fish.

The intermediaries involved in distribution and marketing of fish consist of agents, retailers, vendors, wholesalers, transporters, etc. The fish is brought to wholesale markets by merchants for auction halls in towns, where it is sorted by weight. If a fish weighs more than two kilograms, it is sold separately. There are two systems of auctioning, (i) auction by lots without weighing and (ii) auction by lots after weighing. Auction generally takes place early in the morning and fisherfolk receive the amount after deduction of commission charges.

The commission agents, wholesaler-cum-commission agents and wholesalers do not sell directly to consumers except to bulk buyers such as hotels, restaurants and hostels. They sell to retailers and vendors who come to the wholesale market and purchase fish. Retailers sell fish either from their shops or through temporary sheds created on footpaths or open places. Vendors sell to consumers at their door steps. It was observed in all markets that most of the retailers and vendors were women. Both wholesale markets and retail markets are very unhygienic and except for consumers who are used to buying fish, others do not like to enter these market places.

Commercial banks have been providing credit to individuals and NCDC to fishery cooperatives since 1974. Much of the credit provided is towards the purchase of operational inputs such as boats, nets and engines and to a limited extent for developing infrastructural facilities -landing and berthing for fishing boats and vessels. The vital activity of purchasing of catch from the fisherfolk rests with the commission agents, who pay comparatively low prices. The private agents cum moneylenders advance money, to the fisherfolk during the off season who in return, mortgage their catch to merchants whose agents operate from the catch landing points (Hiremath *et al* 1994).

There are 34 primary fisheries cooperatives mainly located in Dharampur and Bansada taluka and have the maximum members from the tribal community. Non-tribal cooperatives are mainly located in fishing villages along the sea-coast.

In general, the constraints faced by fishermen were nonavailability of quality feed and seed, lack of hatcheries, high cost of construction of ponds (in brackishwater), depletion of fish stock in traditional fishing grounds, use of village ponds for non-fishing purposes, lack of jetties and bunkering facilities and exploitation by commission agents, auctioneers and other middlemen.

The general criteria for lending and the terms and conditions followed by the banking institutions are based on their experience in the field of agriculture credit and not specifically tailored to fisheries, despite substantial differences in the two sectors. For agricultural credit, security for bank loans is not a problem since land owned by private farmers, in general, is accepted as mortgage. But in fisheries, since the majority of ponds belong to the revenue department and are leased out to farmers on a short or long term basis, the fish farmers cannot mortgage the public ponds. In the absence of mortgage, banks are reluctant to advance any loans.

Possibilities

Fisheries development in Valsad faces both opportunities and challenges. To ensure livelihood security to resource poor farmers by income and employment generating activities, the first pressing concern of resource poor fisherfolk, fishing in inshore waters and estuaries

is the gradual decline in catch per unit effort. Trawling was not seen as the reason for low catch as seen elsewhere. In their view, "those who own the trawl boat do not do fishing in inshore waters. Since they belong to same community (Tandel), they respect the common property arrangements in inshore water and estuaries". The prime concern of resource poor fisherfolk was thus to persuade the industrial units located along the coast to construct efficient effluents treatment plants.

The second concern was poor return to their catch. Commission agents continue to buy their fresh and dried catch at very low prices. In some fishing villages, primary cooperative societies kept private traders off as long GFCCA supported them by marketing their (surplus) catch. But in the 1980's when GFCCA closed down its district society, most of the primaries were at the mercy of private traders. It was widely felt that many of the (marketing) constraints involved actions that are not only expensive but also beyond the capability of a single cooperative to handle. Thus, what is needed is an institutional mechanism strong enough to handle, preserve, transport and retail fish so that cooperative system may take over these functions.

Due to favourable Gujarat government policies, particularly on land lease for brackishwater prawn farming, and growing domestic and international demand for prawns, a large number of (non-fishing) business are diverting their investment in potential pockets of the district. Valsad has 20,235 hectares of potential brackish water area available for development. Observations from field suggest that due to high initial cost and limited technical knowledge in brackishwater prawn farming, resource poor families are unable to capitalize on the available opportunities. After consultation with various resource poor families, it was apparent that these constraints can be overcome by practising group farming.

Discussion with people fishing in reservoirs suggest that the productivity is very low. The average productivity of large reservoirs (dams) is only 30 to 40 kgs per hectare, while in small reservoirs (village ponds) it is 150 to 200 kgs per hectare due to poor stocking and management practices. We found that in all 3 large reservoirs -Madhuvan, Juj, and Kaliya- there was multiple agency involvement between the fisherfolks and final consumer. The irrigation department owns the dam, the Fisheries department owns the fishing rights, cooperatives fish and GFDC (earlier used to) market the catch. This has created bureaucracies in control and administration by increasing the number of intermediaries resulting in over-exploitation, poor stocking rates, excessive poaching, lack of proper supervision and poor productivity. Currently, only 20 percent ponds are used for pisciculture. In addition, the present royalty system in practice seems to have failed to provide incentive for adequate stocking, management and control. Empowering the beneficiaries by a long term lease policy would provide an incentive to fisherfolks to manage the reservoir on sustainable basis.

Summary and Conclusion

Our study of mango and chikku growers and fishermen represents several common feature and contrast regarding small farmers. Chikku and mango producers in Valsad face labour constraints at several stages inspite of low land-man ratio; and linkage with market system and producers cooperative. However, the producers cooperative is unable to always provide distinctive advantages to their members and when open market is favourable, producers prefer to dispose of their produce through open market. In contrast, chikku marketing cooperatives have provided consistently better services to their members. The cooperatives are also not able to provide input credit and technological information. The cooperative as an organisation, however suffers from poor quality material, low volume and high transportation etc. In contrast to chikku and mango growers, the fishermen mostly disorganised, unable to compete with modern fishing technology, poor availability of credit, are left at the mercy of commission agents and middle men. Although the fishermen appear to be a cohesive community, they appear to have poor entrepreneurial capacity and they are not used to deal with the government bureaucracies.

To overcome constraints, these small producers need an organisation capable of mitigating their constraints. Studies elsewhere have shown that small farmers are willing to take higher risk provided transaction costs associated with acquisition of resources is mitigated (Ballabh and Sharma, 1989). Transaction costs and risk can be minimized by providing single window service covering input, information, output markets. The organizational structure for providing these services could assume the form of a corporation, joint stock company, cooperative or partnership. It could be a formal or an informal organization.

Any organization created provides collective goods/services. There are transaction costs associated with mobilization, persuation and negotiation in various markets. Once created, this organization requires management inputs which is again a collective good. Experience suggests that small farmers lack the capacity to produce this collective good. When 'exclusive' organizations were created through external support, they have not been sustainable when external support was withdrawn. The sustainability and viability of an organization depends not only on the centrality of purpose, but also on the volume of business it can muster, Thus, for example, an organization exclusively of small farmers may not succeed for not generating sufficient volume of business to be economically viable and sustainable. On the other hand, an organization that actively seek business from large farmers may succeed. This necessarily involves a trade-off in terms of control of the organization. The second form of organization appears to be more pragmatic than the first. In any case, a collective approach is preferred as it tends to minimize individual risk, while the total risk may remain the same (part of the risk being borne by the organization). In addition, such organisation should be capable of serving purposes which are of interest to their members. The challenge, therefore, lies in creating such vibrant organisation.

Acknowledgements

This paper draws heavily from a report, "Small Farmers Agribusiness Consortium, Valsad District" submitted to M.S. Swaminathan Research Foundation, Madras. We gratefully acknowledge the help received from the foundation.

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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).

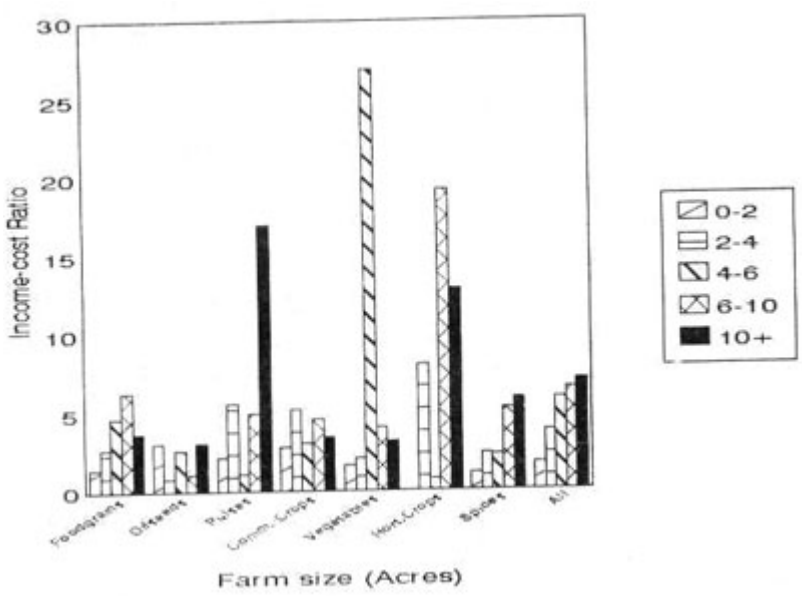
In vegetable cultivation, farms in the size group of 4 to 6 acres has the comparative advantage, as compared to their counterparts. The farms in the largest size group have comparative advantage in the cultivation of pulses, oilseeds, spices and also horticultural crops (in terms of net return). Since 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.

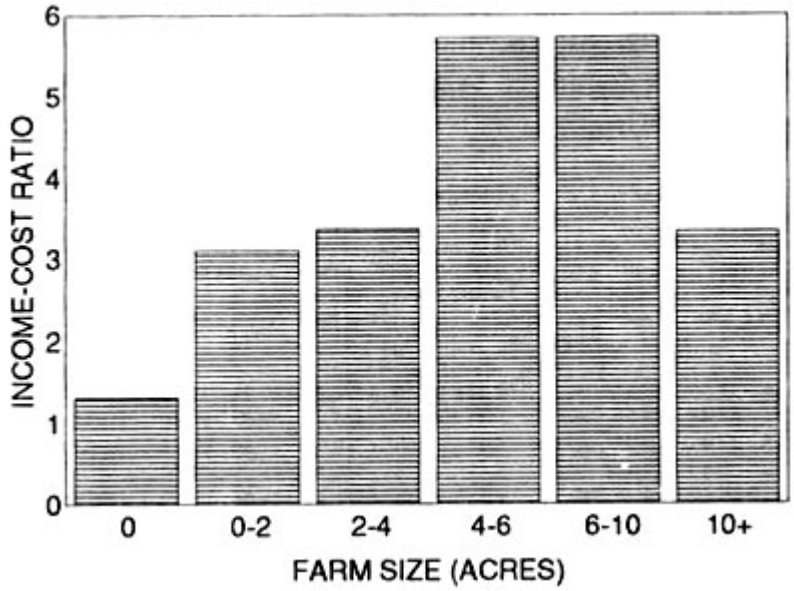
Table 8 : Net Return and Income-Cost Ratio in Livestock Enterprise

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.

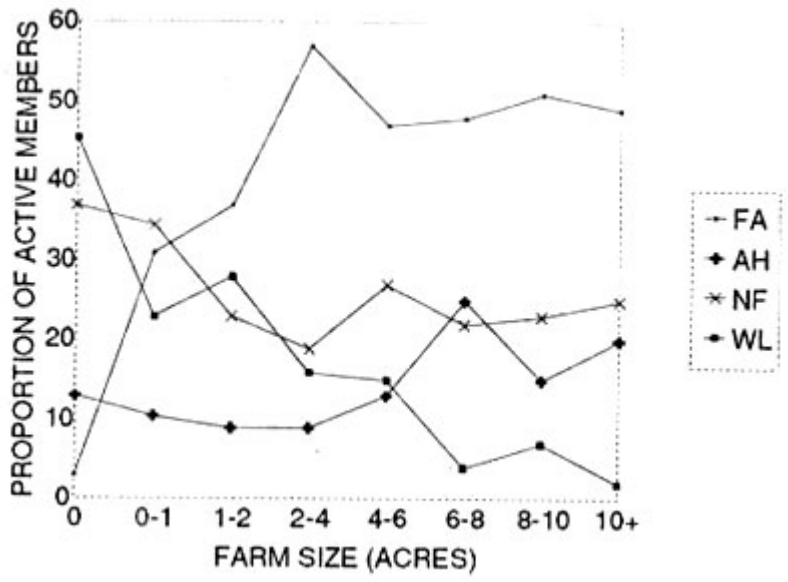
Occupational Diversification

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

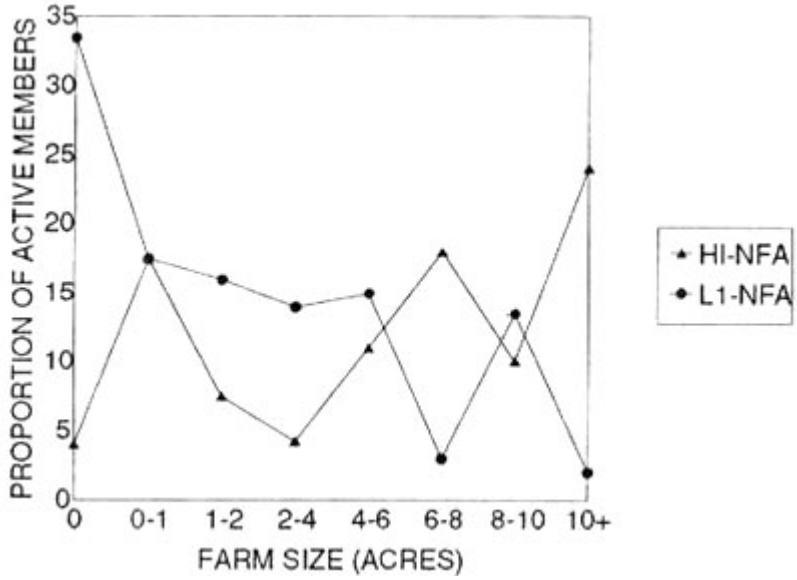


Notably, wage labour participation, though confines mostly to landless and smaller farm groups, is still positive even for larger farm groups. This is due to the fact that large but rainfed farms often rely on wage employment as way of either supplementing limited farm income from their crop sector or 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.

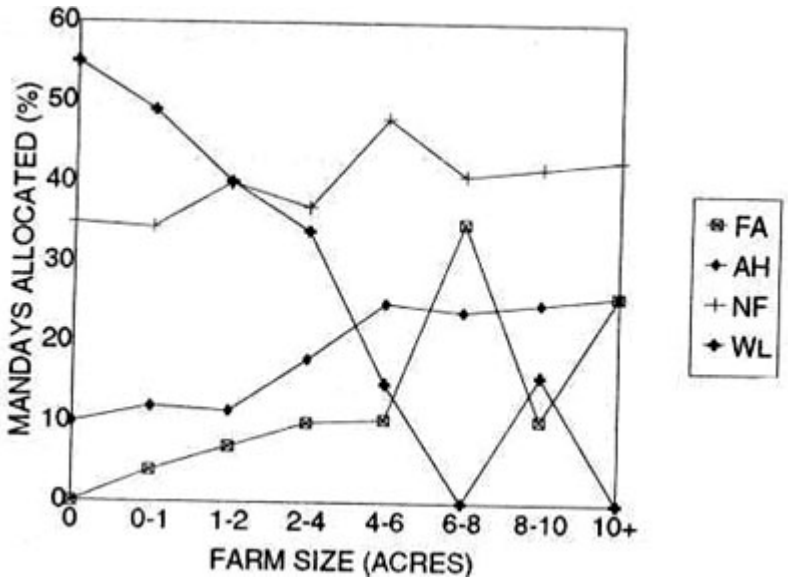
While the mandays devoted to livestock-related activities include the time spent in livestock maintenance and fodder collection, the mandays devoted to crop sector is nothing but the family labour of households spent on their own farms in various farming operations. (This does not, however, include the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



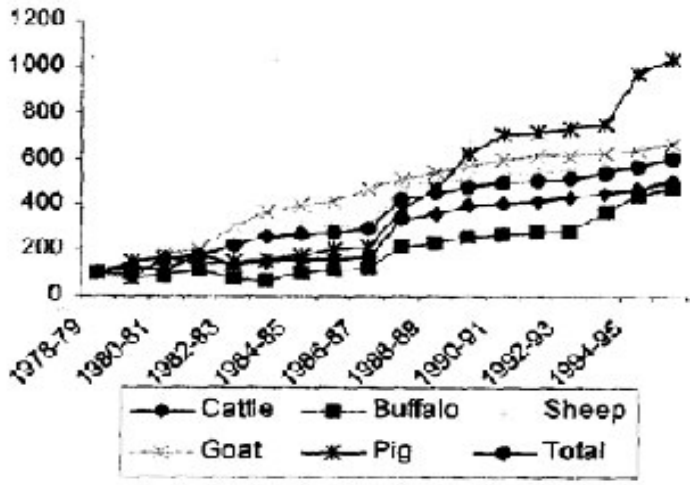
Although household with no or less land and cattle do participate especially in lower order non-farm activities, the generally lower level of their education, skill, and financial status tend them more towards wage labour than towards non-farm activities. Whenever some of these households are in a position 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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AN INVESTIGATION INTO SMALL FARM DIVERSIFICATION : SOME CASE STUDIES IN WEST BENGAL

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Agriculture plays a vital role in Indian economy contributing about 31 percent to the net domestic product and providing a source of livelihood to two thirds of our population. Farming in India being subjected to vagaries of weather, is a risky occupation, especially where agriculture is pre-dominantly in small farm sector with more than 3/4th of the holdings below two hectares. The laws of inheritance and succession coupled with the pressure of population have resulted in progressive marginalisation of holding size over the last two decades. The situation with regard to the preponderance of small and marginal farms in the densely populated state of West Bengal is worse than any other state and becomes a cause of concern. Between 1970-71 to 1985-86, the number of marginal farms (less than 1 ha) increased by 72 percent (from 2528,000 to 4343,000), forming 71 percent of the total farm households in the state. During the same period, the number of small farms registered an increase of 25 percent (from 942,000 to 1,175,000) accounting for 19.2 percent of the total farm families. Thus, the number of small and marginal farms taken together has increased by 59 percent during the period from 1970-71 to 1985-86. Thus, ninety percent of farm households in West Bengal have land holding less than two hectares. The households occupy about 64 percent of the operational area in the state, registering an increase of 18 percent during the period of one and a half decade. It is estimated that about one-third of the population of the state belongs to marginal farm households category, whereas the small and the marginal farms combinedly account for nearly 45 percent of the state's population.

Economists, planners, policy makers and development analysis often argue that small and marginal farms are not economically viable and under the existing technological and socio-economic environment, they cannot provide adequate income to an average family necessary for a reasonable standard of living. If so, what are the alternatives? If past experience is any guide, the prospect of such diversion does not seem to be very bright. Therefore, it is pertinent to ask: Is there any scope for increasing their income from farming itself by optimal choice of enterprises and efficient allocation of available resources with diversification involving high-value crops? More specifically, can the income of these apparently non-viable farms be raised by switching the emphasis from low-value subsistence-oriented cereal crops to high-value commercial crops like vegetables, fruits and other enterprises such as livestock, dairy, poultry, etc.? There are suggestions that these small and marginal farms can increase their income, if they diversify their activities to include high-value and value-added crops/commodities for which there is growing demand both in the national and the international markets. The assumption underlying the suggestion is that the producers have no production constraints and more importantly, they have a free access to markets and receive a fair share in consumer's process for their produce. Furthermore, a definitional problem arises because of the difference in the perception of the consumers and processors on the one had and the producers, on the other, regarding the "high-value" commodity when market imperfections galore. In other words, a commodity may not be a high-value one from the point of view of both the consumer and the producer.

Diversification has several connotations. It may mean the cultivation of number of different crops requiring different inputs at various points in time. It may also mean a number of varieties of the same crop and finally it connotes a combination of enterprises such as crops, fishery, livestock, poultry, etc. A farm diversifies its activities not only to increase income and employment but also to reduce risk of various types. However, the fulfilment of the objective

of increasing income and employment depends on the choice of crops and enterprise-mix determined largely by the agro-climatic conditions, resource endowment and the socio-economic situation of the individual farmer.

Normally, as farm size decreases, the cropping pattern gets more and more intensified, diversified and oriented to high-value crops, in order to maintain, if not increase income level and also to guard against risk. Theoretically, smaller the farm size, higher is the tendency to diversify. The criterion of risk reduction is more relevant to small/marginal holders whose risk bearing ability is very low. The converse is also true as farm size increases, i.e., large farms tend to specialise.

The objectives of the present paper are : (1) to analyse the extent of diversification followed on a selective number of small and marginal farms, as case studies, (2) To work out costs and returns associated with crops, particularly high-value vegetable crops, raised on these case farms, (3) to examine the price spread between the producer and the consumer, and finally, (4) to identify the constraints and problems and to suggest measures to overcome them.

In keeping with the above objectives, twelve small and marginal farms were selected purposely in the Bolpur-Sriniketan Development Block of West Bengal. Input and output data petainining to all the crops grown on these case farms during the agricultural year 1994-95 were collected through survey method.

The extent of diversification of individual case farms has been studied by construction of Diversification Index (DI) as follows:

$DI = \Sigma Xi^2 / (\Sigma X_i)^2$ where X_i is the area under i^{th} crop.

It may be noted that a lower value of the Diversification Index means a higher level of diversification. Correlation between the extent of diversification and the net return per ha of holding size of the case farms has been calculated.

Table 1 gives the cropping pattern of the case farms. It may be seen that the Farm Nos. 3,8 & 12 are marginal ones (less than 1 ha). The rest of the case farm 1 grows the maximum number of crops (12), followed by Farms 2 & 5(each of which grows ten crops. Farm No. 3 grows only three crops. The cropping intensity varies from 118 percent (Farm 6) to 171 percent (Farm 12), Percent of gross cropped area under cereals (paddy & wheat) varies from 86.03 (Farm 9) to 58.25 (farm-12) while the proportion of gross cropped area under various types of vegetables ranges from 88.8 percent (Farm 2) to 41.75 percent (Farm 12). Despite some degree of variability, Table 1 shows that a larger proportion of the gross-cropped area is put under cereals/foodgrains, due mainly to insure food security. The Diversification Index ranges from 0.473 (Farm 7) to 0.263 (Farm 12) implying that, of all the case farms, Farm 7 is the least diversified and Farm 12 is the most diversified one.

TABLE 1 : Cropping Pattern on Case Farms

	FARM1	FARM2	FARM3	FARM4	FARM5	FARM6	FARM7	FARM8	FARM9	FARM10
Holding Size (Ha) Crops (Ha)	1.92	1.92	0.64	1.12	1.34	1.36	1.44	0.^8	1.33	1.20
Local Paddy	0.56	0.48	0.16	0.48-	0.42	0.48	1.12	0.32	0.96	0.88
HYV Paddy	1.24	1.41	0.48	0.64	0.93	0.88	0.32	0.16	0.37	0.32
Sugarcane	0.08	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Oilseeds	0.16	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vegetables	2.30	0.20	0.12	0.30	0.26	0.25	0.27	0.16	0.21	0.68
Gross Cropped Area (CGA)	2.38	2.34	0.76	1.42	1.61	1.61	1.71	0.64	1.54	1.88
% of GCA under Veg	12.75	8.88	15.79	21.30	16.56	15.63	15.88	25.00	13.97	36.17
% of GCA under Cereals	77.18	81.92	84.21	78.65	83.43	84.36	84.11	75.00	86.03	63.83
Cropping Intensity	1.20	1.22	1.19	1.27	1.21	1.18	1.19	1.33	1.66	1.57
No. of Crops Grown:	12.00	10.00	3.00	6.00	10.00	7.00	6.00	5.00	7.00	8.00
Diversification Index	0.33	0.41	0.46	0.33	0.40	0.39	0.47	0.33	0.44	0.31

Area irrigated by source (Table 2) shows that only two case farms (Farms 1 & 2) have access to canal irrigation, ten to tank irrigation and two to shallow tube-wells. The percent of net area irrigated ranges from 15.4 percent (Farm 1) to 71.6 percent (Farm 8). It may be mentioned here that canal irrigation is available only in the *kharif* season and tank irrigation, being dependent on the behaviour of the monsoon, is less reliable as compared to the shallow tube-wells.

Input costs and returns on the case farms are presented in Annexure 1. Costs considered in this study refer only to variable/operational (costs including the imputed cost of inputs supplied by the farm and of the family labour and do not include the rental value of land, interest, depreciation, etc. The gross returns and the net returns for all the crops grown by the case farms are separately presented. Besides, gross and net returns and costs per ha have been computed and shown in the same table. It may be mentioned here that costs and returns per ha have very little significance and usefulness as the average size of a marginal and a small farm in West Bengal is 0.41 ha and 1.49 ha respectively. On the contrary, costs and returns for the actual area under the crops are meaningful. As expected, vegetables in general and brinjal, spongegourd, tomato, cucumber, *parmal* in particular, are highly profitable. However, being induced by higher profitability, extension of area under these crops normally results in glut in the local market due to "over production" and a consequent lower price received by the producers that does not even cover the cost of production. Moreover, cultivation of vegetables, unlike cereals/foodgrains, is labour intensive on the one hand and requires more skilled labour and continuous attention to individual plants at various stages of

growth, on the other. Besides, shortage of working capital, lack of labour in general and skilled labour in particular restrict the area under vegetables on the case farms. It is encouraging to note that the vegetables, almost without exception, use more organic manures than chemical fertilisers as compared to cereals and other crops. Apart from its income enhancing ability, vegetable growing, thus, helps preservation and management of soil fertility, promotes sustainability by protecting soils against degradation through continuous application of higher doses of chemical fertilisers as observed in cereals on the case farms and shown in the same table. It may be mentioned here that costs and returns per ha have very little significance and usefulness as the average size of a marginal and a small farm in West Bengal is 0.41 ha and 1.49 ha respectively. On the contrary, costs and returns for the actual area under the crops are meaningful. As expected, vegetables in general and brinjal, spongegourd, tomato, cucumber, *parmal* in particular, are highly profitable. However, being induced by higher profitability, extension of area under these crops normally results in glut in the local market due to "over production" and a consequent lower price received by the producers that does not even cover the cost of production. Moreover, cultivation of vegetables, unlike cereals/foodgrains, is labour intensive on the one hand and requires more skilled labour and continuous attention to individual plants at various stages of growth, on the other. Besides, shortage of working capital, lack of labour in general and skilled labour in particular restrict the area under vegetables on the case farms. It is encouraging to note that the vegetables, almost without exception, use more organic manures than chemical fertilisers as compared to cereals and other crops. Apart from its income enhancing ability, vegetable growing, thus, helps preservation and management of soil fertility, promotes sustainability by protecting soils against degradation through continuous application of higher doses of chemical fertilisers as observed in cereals on the case farms.

Table 2 :
Area Irrigated by Source (Ha)

Case Farms	Holding Size (Ha)	Canal	Tank	Shallow Tubewell	Total	% of net Area Irrigated
No. 1	1.92	0.04	0.28	0	0.29	15.4
No. 2	1.92	0.8	0.45	0	0.77	40.5
No. 3	0.64	0	0.12	0	0.12	18.7
No. 4	1.12	0	0.33	0	0.33	30.0
No. 5	1.34	0	0.31	0	0.31	23.5
No. 6	1.36	0	0.22	0	0.22	16.1
No. 7	1.44	0	0.31	0	0.31	21.7
No. 8	0.48	0	0.34	0	0.34	71.6
No. 9	1.33	0	0	0.21	0.21	16.2
No. 10	1.20	0	0	0.68	0.68	56.6
No. 11	1.40	0	0.67	0	0.67	48.2
No. 12	0.96	0	0.64	0	0.64	66.6

Vegetable cultivation is eco-friendly in that it generally uses less water than cereals, especially paddy, necessitating withdrawal of less amount of ground water through wells and tube-wells and thus helps in conservation of ground water. It may be noted that widespread cultivation of summer *paddy (boro)* has now resulted in the reduction of water table and consequent non-availability of ground water for irrigation and even for drinking in many areas

in the locality. It has also been observed that two crops of paddy are taken in a year in areas where assured irrigation is available. This is probably because paddy is a traditional crop requiring no intensive management and day to-day care. Further, ease of cultivation, concern for food security, less risk and non-perishability may be responsible for the large scale cultivation of paddy in the study area particularly in the dry season, even at the cost of environmental degradation.

Annual operational costs and returns on the case farms are given in Table 3. These costs and returns are computed for the crops actually grown on the case farms during the agricultural year 1994-95. The net annual returns of the three marginal farms (Farm 3,8 & 12) are Rs. 5,656, 4,088 & 12,341 respectively, while the same for the nine other small farms vary from Rs. 8,470 (Farm 6) to Rs 14,997(Farm 10). The variability of the net farm returns for the actual area under cultivation is more than that of the net returns/ha (given in the parentheses) implying that it is the farm size that governs the level of net farm returns more than anything else. Farm business income for both the actual area under the crops and per ha of the holding size are shown in Table 3. The farm business incomes are computed by adding the imputed cost of family labour to the net farm returns. The net farm returns and for that matter, the farm business incomes of the two marginal farms (Farm 3 & 8) and small farm (Farm no. 6) are far below the poverty line. The farm business income on the other case farms except Farm 2 and Farm 10 are more or less around the poverty line and range from Rs. 10,320 to Rs. 15,359 per annum. Besides these farm incomes, there is hardly any opportunity for off-farm employment and income on the case farms.

Table 3 :
Annual Operational Costs and Returns from Farming

Farms Nos	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Total Operational Expenses	21792	24274	5558	12854	17705	15656	14659	6049	14232	27607	28078	28029
Gross Farm Return	33729	43848	11214	23233	28273	24126	25095	10137	26313	42604	40157	40370
Net Farm Return	11937 (6217)	14574 (7590)	5656 (8837)	10379 (9267)	10568 (7886)	8470 (6228)	10436 (7247)	4088 (8516)	12081 (9083)	14997 (12497)	12079 (8628)	12341 (12855)
Farm Business Income	12107 (6305)	19529 (10171)	7316 (11431)	11379 (10160)	13768 (10274)	10320 (7588)	12376 (8594)	5048 (10516)	14261 (10722)	18357 (15297)	15359 (10970)	14751)15365)

Table 4 gives producer's share in consumer's price. The data reveal that the share of producer in consumer's price is much less in vegetables than in cereals. The share of consumer's price received by the producer is 28 to 30 percent in sweetgourd and 60 to 80 percent in onion. It is important to bear in mind that case farms produce small quantities of the commodities and sell them in the local market. Discussions with the case farmers reveal that increased production, especially of the vegetables, often results in a fall in the prices below the level that cannot cover the cost of production. Perishability of these so-called high-value vegetables, lack of cold storage and other infrastructural facilities and absence of agro-processing industries have all added to the problems of the producers. At the top of all these constraints, public intervention is totally absent in vegetables marketing as in the case of cereals/foodgrains. Vegetables farmers are indeed at the mercy of the traders who employ exploitative tactics to keep the producer's price as low and consumer's price as high as possible.

Table *4 :*
Producer's Share in Consumer's Price

Crops	Price Received By Farmers (Rs.)	Retail Market/ Consumer's Price (Rs.)	Share of Producer In Consumer's Price
Paddy (l)	341.00/qtl	341.00/qtl	100
Paddy (hyv)	336.00/qtl	336.00/qtl	100
Spinach	1.80-2.50/kg	4. 00-5. 00/kg	45-50
Brinjal	2.00-3.35/kg	5. 00-6. 00/kg	40^5
Parmal	2.00-2.50/kg	5. 00*6 .00/kg	40^1
Sesamum	1200.00/qtl	1200.00/qtl	100
Onion	3.00-4.00/kg	5. 00/kg	60-80
Radish	1 .00-1 .50/kg	2.50-3.00/kg	40-50
Cucumber	2.00-2.50/kg	4. 00-5. 00/kg	50
Okra	2.00-2.50/kg	5.00-6.00/kg	40^1
Chilli	6.00-8.00/kg	12.50/kg	50-64
Cabbage	0.80-1. 00/kg	2. 00/kg	40-50
Sweetgourd	0.80-1.00/kg	3. 00/kg	28-33
Tomato	1.80-2.50/kg	5.00-6.00/kg	36-41
Leafy Vegetable	2.00-2.50/kg	3. 00-3 .50/kg	67-71
Arum	1. 50/kg	2.50/kg	60
Potato	1.25-2.40/kg	2.50-3.00/kg	50-80
Sponge Gourd	2.00-2.50/kg	5. 00/kg	40-50
Wheat	4.00/qtl	5.00/qtl	80

The correlation coefficient between the diversification indices of 1 the case farms and net farm returns per ha of holding has been estimated 1 at -0.534 and is significant at 10 percent level of probability. This clearly ! established an inverse relationship between the diversification index and returns per hectare. In other words, it shows that a lower diversification index (i.e., higher level of diversification) is associated with a higher level of income per hectare confirming the notion that diversification is income enhancing.

A prolonged discussion with the case farmers reveals that, apart from constraints on physical and financial resources, the extent of diversification, either in terms of number of crops or combination of enterprises is limited by the inadequacy of management resource. Furthermore, the concept of high-value/value-added enterprises is meaningful if and only if there is a well developed market system with the possibility of public intervention in the sale of the produce. The problem is almost insurmountable when the producer of the high value enterprises produces the commodities in an environment of several market imperfections. He

invariably finds himself in the dock. The Hon'ble Union Minister for Agriculture acknowledges the problem when he is reported to have said " The biggest difficulty we are *facing today* is how to handle this excess production. If farmer produces less, we are hurt. If he produces more, he is hurt because he will not get a good price". He continues " Take for example the tomato crop. Earlier we produced 8 to 10 tonnes an acre. Now, with this hybridisation, yield per acre has gone up to 60 tonnes. If this produce comes into the market there will be glut". Thus the most serious problem for diversification through high value/value added crops and enterprises as a means to enhance income on small farms is the lack of marketing infrastructure and a guaranteed price that would not only be renumerative but would provide further incentive to increased production. In fact, organisational deficiencies, especially in the marketing facilities and a higher share of the producer in the consumer's rupee, is the crux of the problem . The implicit assumption that supply will create its own demand' is not only misleading but can ruin the small and marginal farmers unless there is a strong organisational support or public intervention mechanism for disposal of the produce. In absence of minimum price support as in the case of cereals/foodgrains, high value enterprises may turn into low value ones resulting in the bankruptcy of the small farms. A report published in the Bengali Daily, the AAJKAL *,* on April 25, 1995 clearly brings out the helplessness of the tomato growers in the district of Purulia of West Bengal. These tomato growers, although selected by the District Agricultural Authority with the assurance of marketing through the government marketing organisations, had to sell their produce at a price ranging from Rs. 0.75 to Rs. 0.50 per kg which did not cover even the cost of harvesting of tomatoes. In absence of any other alternatives, the farmers used tomato as raw material for compost and suffered huge financial losses. With this sort of experience the farmers are not expected to commit the same mistake of growing tomato on their land once again and commercial farming will remain a distant dream for them.

The potential demand for high value crops like vegetables, fruits, etc, in the agro-processing industries and the international market mostly remains unrealised. None of the case farms has been found to be aware of the new sources of demand for their product. Organisational deficiencies are once again found to be crucial in involving the farmers, small or big in the process of marketisation.

Even though India is second only to China in the production of vegetable, 30-40 percent of our total vegetable production gets damaged before it reaches the market. A reduction of this damage would increase the income of the vegetable growers and also would reduce the consumer's price even with the existing level of production. The results of the study based on the whole farm analysis of costs and returns point to the conclusion that diversification *per se* is not the panacea for the small and marginal farms. What is needed is cold storage facilities, transportation, grading, quality control and standardization and above all an effective organisation which will be responsible for linking production and marketing thereby ensuring a higher price and income to the vegetable growers, especially the small and the marginal ones, Since high-value agricultural commodities are generally more perishable, implementation of crop insurance programme becomes a necessity for the promotion of the interest of the small and marginal farms. Research not only to enhance productivity but also the quality of these perishable products has to be undertaken, Needless to emphasize that without such facilities and prograrnmes diversification *per se* may not be of much help to lift the small and marginal farms from their "non-viable" existence.

Acknowledgement

The authors thankfully acknowledge the services rendered by Dr. Debasis Sarkar and Shri Dibyendu Mondal of the Agro-Economic Research Centre, Visva Bharati, for collection, of data from the case farms.

Annexure 1 : Input Costs and Returns on Case Farms

Crop Paddy (Local)

Farm	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Items												
Area (Ha)	0.56	0.48	0.16	0.48	0.42	0.48	1.12	0.32	0.9	0.88	1.00	0.56
Human Labour												
Hired	1800	1440	690	1950	900	1800	3750	900	2700	2100	2700	1500
Family	510	720	0	300	900	450	1200	480	1500	1500	1650	900
Bullock	510	450	150	450	390	420	900	300	900	750	960	540
Seed	112	96	32	96	88	100	240	60	200	180	200	120
Fertiliser	392	214	112	336	290	304	710	170	545	605	552	340
Manure	210	13J	60	180	150	150	375	112	338	300	375	225
Pesticides	0	0	0	0	0	0	0	0	0	0	0	0
Irrigation	0	0	0	0	0	0	0	0	0	0	0	0
Yield	1	1	.35	1	0.92	1	2.7	.83	2.33	2	2	1
Gross Return	5600	4*00	1624	5212	4330	5440	11950	392410560		900010850		6260
Total Cost/Ha	6310	6365	6525	6900	6533	6716	6406	6318	6440	6175	6437	6473
Net Return	3696	4884	3625	3958	3875	4616	4263	5343	4559	4051	4413	4705

Note : Cost and returns are in rupees, area in hectare, yields are in quintals/tonnes.

Crop Paddy (HYV) - *Kharif*

Farm No.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Items												
Area (Ha)	1.24	1.41	0.48	0	0.93	0.88	0.32	0.16	0.37	.032	0.4	0.4
Human Labour												
Hired	6720	5750	2250	3000	3900	4200	1800	650	1680	960	1800	1950
Family	0	3000	0	350	1250	1040	450	210	900	360	500	540
Bullock	1380	1320	585	660	990	930	360	150	420	360	450	420
Seed	390	485	150	225	275	260	110	50	125	100	125	125
Fertiliser	542	782	378	553	800	732	297	188	315	315	374	332.5
Manure	497	397	135	217	300	262	105	60	135	105	135	150
Pesticides	351	493	0	150	224	352	160	100	210	195	165	180
Irrigation	0	0	0	0	0	0	0	0	0	0	0	0
Yield (Tonnes)	5	6		2	2	4	3	1	.61	1	2	2
Gross Return	16507	19888	6340	8733	12425	11328	4699	2165	5353	4260	5715	5770
Total Cost	10532	12227	3498	5155	4	7740	3282	1407	3575	2375	3549	3597
Net Return/ha	5975	7661	2842	3578	4685	3551	1417	758	1778	1865	2166	2193
Gross Return/ha	13312	14105	13208	10258	13645	13360	14684	13531	14467	13321	14287	14425
Total Cost/ha	9300	8672	7287	8055	8322	8837	10258	8793	9662	7484	8872	8992
Net Return	4818	5433	5921	5590	5037	4035	4426	4737	4805	5828	5415	5432

Note : Costs and returns are in rupees, area in hectare, yields are in quintals/tonnes as indicated within the parentheses.

Crops	Spinach				Brinjal						Parmal Sesamum	
Farm No.	**5**	**7**	**9**	**10**	**2**	**5**	**6**	**9**	**10**	**12**	**10**	**1**
Items												
Area (Ha)	0.016	0.024	0.04	0.064	0.04	0.048	0.016	0.04	0.024	0.056	0.032	0.08
Human Labour												
Hired	120	270	150	240	800	750	280	680	380	940	810	180
Family	-	-			250	180	20	100	40	200	90	30
Bullock	30	30	60	90	60	270	90	60	30	90	60	60
Seed	30	45	50	80	40	90 '	30	75	60	140	90	120
Fertiliser	23	18	18	32	70	143	58	156	81	220	39	35
Manure	30	60	0	0	0	130	234	80	60	50	144	30
Pesticides	18	10	0	0	45	90	30	10	10	25	135	0
Irrigation	30	30	120	180	420	500	90	135	90	210	180	120
Yield (Qtl.)	2	2	3	4	15	18	5	20	10	20	12	1
Gross Return	390	546	800	900	3000	4000	125	000	2500	6000	3000	720
Total Cost	281	462	397	622	1815	2257	677	1276	741	2958	1548	575
Net Return	109	84	403	278	1185	743	573	3724	1759	3042	1452	145
Yield (Ha)	10	9	8	6	38	38	31	50	42	37	38	1
Gross												
Return/ha	24375 2	,2750	20000	14062	75000	83333	78125	125000	104166	107142	93750	9000
Total cost/ha	17562 1	9250	9935	9718	45375	47021	42312	31900	30875	52821	48375	7187
Net Return/ha	6813	3500	10075	4343	29550	36312	35812	93100	73291	54321	45375	1813

Crops	Onion	Sweet Gourd			Radish		Sugarcane		Mustard		Wheat	
Farm No.	**5**	**6**	**1**	**8**	**4**	**5**	**1**	**2**	**1**	**2**	**1**	**2**
Items												
Area (Ha)	0.01	0.004	0.08	0.064	0.032	0.008	0.04	0.032	0.08	0.16	0.08	0.56
Human Labour												
Hired	120	30	210	150	120	30	15	150	60	90	0	45
Family	0	0	30	30	0	0	90	180	30	90	30	45
Bullock	30	15	0	0	30	15	150	60	90	120	60	45
Seed	40	12	15	10	6	2	200	150	12	40	70	49
Fertiliser	17	4	18	14	7	4	244	144	185	287	25	49
Manure	0	0	0	0	60	30	120	200	22	30	30	15
Pesticides	0	0	0	0	0	0	48	65	45	45	0	0
Irrigation	23	5	60	45	60	15	420	240	38	90	45	60
Yield (Qtl)	1	.27	6	4	3.05	0.8	2.5	2.3	0.6	1.3	2	1
Gross Return	444	108	550	400	458	120	2500	2300	812	1560	540	500
Total Cost	230	65	333	249	284	96	1692	1489	602	1002	440	368
Net Return	218	43	217	151	174	24	808	811	210	558	100	132
Yield (Ha)	7	7	7	6	10	10	6	9	1	1	2	2
Gross Return/ha	28000	27000	68*75	6250	14297	15000	62500	71875	10150	9750	6750	8928
Total cost/ha	14368	16250	4162	3890	8867	11968423000		46531	7525	6262	5500	6571
Net Return/ha	13631	10750	2712	2360	5430	3032	20200	25344	2625	348	1250	2357

Crops	Cucumber					Okra	Green Chilli		Cabbage		Arum	
Farm No.	**3**	**4**	**5**	**6**	**7**	**1**	**1**	**9**	**10**	**11**	**12**	**1**
Items												
Area (Ha)	0.12	0.176	0.012	0.16	0.16	0.008	0.008	0.056	0.04	0.08	0.048	0.024
Human Labour												
Hired	280	700	30	500	550	100	90	390	270	540	330	300
Family	80	200	0	280	200	2	30	90	60	90	90	120
Bullock Labour	60	180	15	180	150	15	30	90	60	120	60	90
Seed	80	75	4	60	60	10	2	240	160	500	200	192
Fertiliser	140	134	6	203	290	43	37	84	55	143	72	50
Manure	100	120	0	200	170	20	20	0	96	0	0	30
Pesticides	51	80	0	0	50	0	50	60	45	56	45	0
Irrigation	225	480	30	540	450	0	0	180	120	240	165	60
Yield (Qtl.)	13	18	1.5	16	20	1.2	1	21	18	30	15	10
Gross Return	3250	4870	300	3520	5000	300	800	2100	2250	3000	1260	1500
Total Cost	1016	2000	85	1963	1919	208	259	1134	866	1689	962	842
Net Return	2234	2870	215	1557	3081	92	541	966	1384	1311	398	658
Yield (I/Ha)	10.8	10.2	12.5	10	12.5	15	38.4	37.5	32.1	37.5	31.2	41.6
Gross Return/Ha	27083	27670	25000	22000	21250	37500	1000000	37500	56250	37500	28333	62500
Total Cost/Ha	8466	11263	70831	222268	11994	26000	32375	20250	21650	21112	20041	35083
Net Return/Ha	18616	16307	17916	9732	19256	11500	67625	17250	34600	16388	8292	27417

Crops	**Sweet Gourd**				**Tomato**						**Leafy Veg.**
Farm No.	**1**	**2**	**6**	**12**	**2**	**5**	**7**	**8**	**9**	**10**	**12**
Items											
Area (Ha)	0.024	0.04	0.032	0.048	0.032	0.016	0.024	0.032	0.04	0.04	0.056
Human Labour											
Hired	100	120	120	180	200	60	100	120	120	120	180
Family	20	30	30	30	40	30	50	60	30	60	30
Bullock Labour	30	30	30	30	60	30	45	60	60	60	90
Seed	5	10	15	20	14	21	28	60	40	56	-
Fertiliser	50	18	14	18	35	37	56	74	14	14	75
Manure	0	30	60	53	110	30	78	90	30	60	60
Pesticides	0	0	0	0	0	13	19	25	0	0	0
Irrigation	60	60	60	75	90	38	60	75	120	105	165
Yield (Qtl)	5	5	5	7	10	4	6	8	3	3	5
Gross Return	500	500	500	700	2000	800	1250	1600	800	750	1080
Total Cost	275	293	324	401	555	252	429	532	434	459	606
Net Return	225	207	176	299	1445	548	821	1068	366	291	474
Yield (T/Ha)	21	13	16	15	31	25	25	25	8	8	8
Gross Return/ha	20833	12500	15625	14583	62500	50000	52083	50000	20000	18750	19285
Total Cost/ha	11458	7325	10125	8354	17343	15750	17875	16625	10850	11475	10821
Net Return/ha	9375	5175	5500	6229	45156	34250	34208	44500	9150	7275	8464

Crops	Potato										
Farm No.	**1**	**2**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Items											
Area (Ha)	0.08	0.064	0.056	0.12	0.04	0.064	0.064	0.04	0.48	0.5	0.48 -!
Human Labour											
Hired	400	540	180	190	90	260	300	150	2500	2480	2200
Family	260	450	30	50	30	130	180	40	980	1040	720
Bullock	180	240	300	660	360	240	240	300	3450	3600	3480
Seed	500	400	575	1375	650	510	480	250	3000	3750	4050
Fertiliser	420	350	260	212	296	177	229	273	3238	3313	3290
Manure	320	90	60	120	60	30	250	60	180	180	210
Pesticies	60	34	0	0	50	0	50	40	575	600	580
Irrigation	360	480	75	150	90	45	120	120	1350	1440	1350
Yield (qtl.)	20	15	12.2	26.4	13.2	11	12.8	10	12	13	12
Gross Return	3400	3500	1960	3960	1980	1650	2048	1700	20094	20592	19200
Total Cost	2500	2584	1480	2757	1626	1392	1849	1233	15273	16403	15880
Net Return	900	916	480	1203	354	258	199	467	4821	4189	3320
Yield (T/ha)	25	23	22	22	333	18	20	25	25	25	25
Gross Return/ha	42500	54687	35000	33000	49500	25781	32000	42500	41862	41184	40000
Total Cost/ha	31250	40375	26428	22975	40650	21750	28890	30825	31818	32806	33083
Net Return/ha	11250	14312	8572	10025	8850	4031	3110	11675	10043	8378	6916

Crops	Sponge Gourd		
Farm No.	**2**	**4**	**5**
Items			
Areas (Ha)	0.032	0.04	0.032
Human Labour			
Hired	300	180	240
Family	150	120	90
Bullock	60	45	30
Seed	32	24	24
Fertiliser	49	11	11
Manure	70	73	69
Pesticides	0	80	50
Irrigation	225	90	75
Yield (qtl)	9	8	6
Gross Return	2200	2200	1500
Total Cost	886	623	589
Net Return	1314	1377	9.11
Yield (T/ha)	34	20	19
Gross Return/ha	68750	50000	46875
Total Cost/ha	27687	15575	18406
Net Return/Ha	14062	34425	28469

CONSTRAINTS IN SMALL FARM DIVERSIFICATION - A STUDY IN KURUKSHETRA DISTRICT OF HARYANA (INDIA)

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Introduction

Farmers in north-western India - Punjab, Haryana and western Uttar Pradesh, have specialized in cultivation of rice and wheat. Assured irrigation, availability of improved technology, and remunerative marketing intervention have contributed to this. While this has transformed the agricultural economy of the region, concerns have been expressed about the continued profitability and sustainability of this system due to plateauing yields, ceilings and its detrimental effect on soil and water resources. Diversification may help.

Concomitantly, concern for small farm viability has also kindled interest in diversification; higher-valued and more labour intensive enterprise mix is suggested as an alternative small farm development paradigm, substituting low valued, highly diversified enterprise pattern characterising subsistence dominated systems.

This study, based on farm level data from Kurukshetra district of Haryana, focuses on potentials and constraints in small farm diversification. Two major constraints - market induced risks in high-value enterprises and limited access to capital, are explicitly evaluated in this regard. The major objectives are : a) to examine the present enterprise mix and returns on farms of different size groups, b) to evaluate risk - return trade-offs on small farms, and c) to assess income and diversification potential in an unconstrained environment.

The district of Kurukshetra was purposively selected for the study. It is one of the leading green revolution districts of India, with almost the entire cultivated area under assured irrigation, and full coverage of rice and wheat area under improved varieties. Data from 100 farmers, of which 50 are small, were obtained from two clusters of randomly selected villages for 1991-92.

Farm level diversification is measured by computing index of maximum proportion (M_d), and Harfindhal index (H_d). The expressions for these indices are under :

Index of maximum proportion (M_d) = Max P_i
Harfindhal index (Hd) = $\sum P_i^2$

Where P_i is the proportion of i th activity in total income . With increase in diversification, maximum proportion held by any activity i.e. Md , decreases. Similarly, sum of squares of all enterprises income proportion(H_d) also decreases.

The possibility of increasing farm return and the effects of risk on it is investigated by different risk efficient farm plans. These plans have been formulated by using deterministic LP and MOT AD programming models. The objective function of MOTAD is defined by dual criteria of parameterization of expected return and minimisation of risk associated with expected return. In the present study the initial level of expected return was fixed at subsistence level for a farm family. The study assumes subsistence return as 10 percent less than the existing farm return for small farms. The maximum return was the potential return on farm obtained through

deterministic linear programming solution, based on existing input-output coefficients. Between these values the return was parameterised in order to have several risk efficient plans. The set of farm plans so obtained depict risk-return trade-offs on small farms. The specification for the same is not provided here (for details, refer Jha 1994a).

Results

Table 1 presents a profile of small, medium and large farms in the sample. It shows that paddy and wheat account for nearly three-fourth of the gross cropped area. Small farms are distinguished in terms of smaller area allocation to cash crops (potato, sugarcane, basmati paddy), pulses and oilseeds, and higher allocation to fodder crops, relative to other farms. Livestock stocking intensity is also higher on small farms. Net return per unit of cultivated area are about 28 percent higher on small farms as compared to large farms. In Table 2, diversification indices are presented.

Table 1:
Enterprise pattern and earnings on sample farms

Particulars		Small Farm (3.8 acres)	Medium Farm (12.3 acres)	Large Farm (28.8 acres)
A	Crop Enterprises (%)			
Paddy		32.0	30.5	31.0
Paddy basmati		6.4	11.5	10.7
Wheat		35.9	34.2	33.1
Pulses		'	2.2	4.3
Oilseeds		5.1	5.5	6.1
Potato		3.8	3.0	3.4
Sugarcane		-	2.1	3.0
Fodder		16.7	10.8	8.3
Cropping intensity		205.3	218.7	216.3
B	Total cattle/acre[1]	0.9	0.5	0.4
Buffalo[1]		0.6	0.3	0.2
C	Net return/acre[2]	3650.0	3839.0	2847.0
Working capital/acre[1]		6224.0	5707.0	5300.0
Gross return/acre[1]		9874.0	9546.0	8147.0

Note : 1 indicates Per acre of cultivated area.
2 indicates (Gross return-working capital) per acre of cultivated area.

Table 2:
Diversification indices on different farms.

Farm Size	Average no. of Enterprises	Index of Max. proportions (M_d)	Harfindhal Index (H_a)
Small (3.8 ac.)	10	0.29[1]	0.18
Medium (12.3 ac.)	13 '	0.25[2]	0.14
Large (28.3 ac.)	13	0.24[2]	0.13

Note: ' 1' indicates maximum proportion for buffalo (dairy enterprise)
'2' indicates maximum proportion for wheat.

These indices, which show consistency amongst themselves, indicate that, contrary to expectations, small farms are less diversified than others. This could be due to relative scarcity of resources on the small farm. Different studies (Gupta, 1995; Walker, 1983) report that diversification is positively related with farm resources. Moreover, in this area risk was found to increase rather than decrease with crop-based diversification (Jha 1995). Since small farmers have higher risk aversion (Jha & Jha 1995) they specialize rather than diversify their farms in order to harvest stable farm returns. A comparison of present study with other farm level studies (Walker et al 1983) reveals that farms in the greenbelt are less diversified than other regions. In fact, paddy and wheat, apart from being remunerative are also more stable crops in the area (Jha 1994). Therefore, with assured irrigation these substitute other field crops, and lead to specialization. Commercialisation of farm economy i.e., non-subsistence nature of crop production, further discourages diversification.

Potential for Diversification:

The following section attempts to assess the potential of different enterprises in diversifying the existing wheat-paddy based small farm. It has been studied by formulating risk efficient plans for a synthetic farm of 3.8 acres. The results for the same is presented in Table 3.

These plans present risk-return combinations in decreasing order i.e., Plan 1 with maximum risk-return pair while Plan 6 with minimum. Optimization of existing resource indicates the possibility of significant changes in enterprise pattern in Plan 1. Although wheat-paddy remain important, their relative share declines. Crops like basmati paddy, potato, sunflower emerge more profitable than existing wheat and paddy crops. However, cultivation of these crops to maximum profitable level is restricted due to resource restrictions and market imperfections prevalent in the area. These are not explicit in the model. For example, in basmati, small number of rice millers influence farm harvest prices of the crop, large price fluctuations occur. Small farmers, having poor retention capacity, suffer the most on this score (Jha 1995). In potato, lack of sufficient storage facilities for target group farmers exposes them to greater price risk. These imperfections result in market induced risk, and have a bearing on farmers' crop acreage decisions. Small farmers with low risk preferences avoid these risky but potentially remunerative crops. Plan 1 indicates that if these market constraints are addressed, a quantum jump (37 percent) is possible on small farms. Even then absolute acreage under paddy and wheat do not decline significantly.

Table 3: Enterprise and Resource utilization pattern under risk for a small farm (3.8 acre) in Kurukshetra district.

S. No	Particulars	Existing Plan	Risk efficient farm plans			Plan UCB*
			Plan1	Plan4	Plan6	
A	Crop Enterprises (Acres)					
Paddy Kharif		2.0	1.3	1.5	1.3	1.3
Paddy Summer		0.5	0.5.	-	-	0.5
Paddy basmati		0.5	1.0	0.8	-	1.0
Toria		0.1	-	-	-	-
Potato		0.3	0.5	0.3	-	0.5
Wheat		2.8	2.6	1.7	1.8	2.6
Sunflower		0.3	0.5	0.5	0.3	0.5
Jowar fodder		0.6	0.8	0.8	0.8	0.8
Berseem fodder		0.7	0.8	0.8	0.8	0.8
Total Cropped Area		7.8	8.0	6.4	5.0	8.0
B	Livestock enterprises (Nos)					
Buffalo		2.2	3.0	3.0	3.0	6.0
Crossbred Cow		0.1	-	-	-	-
Desi Cow		0.5	-	-	-	-
Draught animals		0.7	-	-	-	-
C	Cropping Intensity	205.3	210.5	168.4	131.6	210.5
D	Food Production (Qtl)	114.9	97.3	70.6	70.4	97.3
E	Labour Employment (Mdays)	585.1	590.8	557.0	521.5	694.2
F	Hired Labour (Mdays)	29.5	21.2	6.1	0	30.6
G	Working Capital ('000 Rs.)	23.6	25.5	23.8	22.5	28.8
H	Medium term capital ('000 Rs.)	21.4	21.4	21.4	21.4	39.5
I	Gross Return ('000 Rs.)	37.5	44.5	37.0	32.0	50.7
J	Net Return ('000 Rs.)	13.9	19.0	13.2	9.5	21.8
K	Risk (Rs.)	-	1410.0	930.0	774.0	-

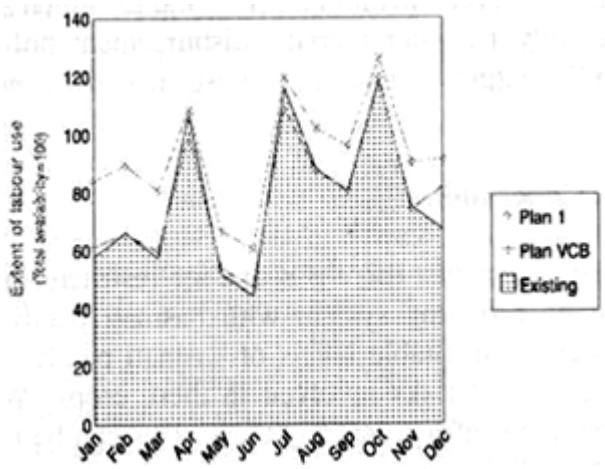
Note : UCB is the plan under unconstrained borrowing, including medium term capital.

Thus the market driven options available to small farmers in the greenbelt do not offer opportunities for soil and water conservation.

An attempt was made to capture the impact of risk on enterprise pattern with six risk efficient plans. The maximum and minimum parameterized returns are Rs. 44000 and Rs. 32000 respectively; six plans were formulated with an interval of Rs. 2500. Only 3 risk return combinations have been presented in Table 3. As concern for risk increases (from Plan 1 through Plan 6), share of kharif paddy increases at the cost of basmati paddy. Similarly, potato involving high return and risk enters in the earlier plans but its area decreases in subsequent plans in order to bring stable farm return. Another notable feature is emergence of fodders as relatively more profitable crops. The area under fodder crops remain constant in successive risk efficient plans, implying increase in its relative share in total cropped area. Fodders involve less risk since these are consumed largely by animals on farm, reducing market induced risk. Again, fodder's demand being price inelastic, decline in yield in a particular year is offset by a simultaneous increase in price (Jha 1994), resulting in lower risk in farm return across years. Amongst different milch animals -buffalo, local and crossbred cows; buffalo is the most profitable. The reason for exclusion of crossbred cow in optimal plan is due to it's poor performance on average farm, lack of proper feeding and management practices by bulk of crossbred cow keepers. Lower prices for crossbred cow milk further reduces it's profitability. Relatively higher market value of crossbred cow also restricts it's entry in suggested plans. Thus, the study reveals that buffalo yield more return per unit of capital investment than crossbred cows in the greenbelt. In different risk efficient plans, number of buffaloes remain constant. Thus predominance of fodder crops and dairy animals in risk efficient plans emphasize the role of vertical integration, dairy with fodders, in providing stable farm return.

Optimization of existing resources in Plan 1, also suggests some significant changes in resource utilization pattern. It is evident that optimization of farm resources results in reduction of hired labour employment (Plan 1). This is brought about largely by reducing the seasonality in labour utilization. Figure 1 shows that peaks in labour employment during the month of April, July and October have been reduced, largely due to smaller area under wheat and paddy. Efficient utilisation of existing resources requires small increase in working capital Plan1). Cropping intensity, as indicator for land utilization also decreases. Similarly, utilization of other complementary resources namely labour and capital also decrease. Table 3 shows that by reallocating the existing farm resources (Plan 1), there is an increase in farm return of around 37 percent. However, as risk considerations are introduced in the model, the return advantage disappears.

Figure 1 : Labour Utilization Pattern on Small Farm of Kurukshetra District.



Potential for diversification with borrowed capital:

The previous section highlights the importance of dairy enterprise in providing stable farm returns. An attempt has been made in this section to assess the potential of further diversifying small farm with dairy enterprises. This was studied by removing constraint on medium term capital borrowing. The results presented in the last column of Table 3, showed that 6 buffaloes were required for most profitable integration of crop and dairy enterprises on a farm of 3.8 acres. It is notable that optimal crop enterprise mix (Plan 1) does not change with the inclusion of 3 more buffaloes in the plan. This indicates supplementary relationship between crop (3.8 acre) and dairy (6 buffaloes) on small farm. The aforesaid enterprise mix results in an increase in income of around 56 percent over existing one. As far as resource utilization pattern is concerned, total labour employment increased by 106 mandays while increase in hired labour over Plan 1 is only 9 mandays. It is brought about largely by proper utilization of family labour (1.8 adult man equivalent per day). This plan requires higher amount (about 22 percent) ! of working capital alongwith term capital. Since dairy provides regular income, farmers will not have to depend on institutional agencies for working capital. However, medium term capital for milch animals can be made available only by liberal credit disbursement policy. A large increase in milk output would also pose it's own market related problems.

Suggestions & Conclusion

The study found that there is scope for restructuring the existing wheat-paddy based cropping system with basmati paddy, potato, and sunflower. However, profitable levels of basmati paddy and potato are restricted due to market risks involved in these crops. With improved marketing and storage infrastructures, these risks can be minimised and full potential of small farms can be exploited.

The study further emphasises that vertical integration of dairy with fodder crops can increase income and employment on a sustained basis. Dairy enterprise is labour intensive and also involves less risk . Again, it's integration with crops provide stable farm return as it is not positively correlated with different crop enterprises. Therefore, provision of liberal credit for further strengthening dairy enterprises may go a long way in enhancing farm return on sustained basis. It is important to note, however, that such changes donot bring about significant changes in area under paddy and wheat and the associated land degradation problem. Solution for these may lie in rational pricing of water, an issue not analysed in this paper.

Acknowledgement

The first author acknowledges the financial assistance provided by the Council of Scientific and Industrial Research (CSIR), New Delhi during the period of this study. The paper draws heavily from the first author's approved Ph.D thesis (Jha 1994 a).

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Annexure 1

The details of the papers which were presented in the Workshop and could not be included in this volume.

S.No	Author/s	Title
1	Ammeta Deshmukhand Anand Karandikar	Feasibility of Strawberry cultivation by small farmers in Western Maharashtra
2	P.M. Sharma and K.A. Varghese	Small farm settings-Challenges and potentials according to agro-climatic regions of Rajasthan
3	Harish Chandra	Role of Animal Husbandry in small farms
4	Prem Singh Dahiya and Ranveer Singh	A study of small farms economy of Himachal Pradesh-Returns, Constraints and Prospects.
5	D.V. Singh	Potential options for upliftment of marginal and small farmers: A case of Himachal Pradesh.
6	I.J. Singh	Prospects of diversification on small farms.
7	I.J. Singh and S.K. Goyal	Analysing India's food security in 21st Century
8	K.D. Sharma A.S. Saini and D.S. Thakur	Income potential on small tirbal farms in Lahul Valley.
9	D. Jha	Problem of small farmers' development Co-operative Farming the way out.
10	Binoy N.Verma R.R. Mishra	Small sector agriculture anc diversification in North Bihar-study of Samstipur District
11	K.R.Chowdry and Ch. Karanasree	Agricultural diversification on small farms of Nizamabad district in An, Pradesh.
12	Md. H. Ali and A. Mukhopadhyay	Cost, Return and Profitability banana and other alternative crop sequences for marginal and small farms in Hooghly district of We, Bengal
13	R.K. Singh and Samar Singh	Diversification of smallholdei agriculture in India-Revisited
14	Sasanka Sekhar Pal & Pijush Mukhopadhyay	Small farms development prospects through vegetable cultivation - A case study in Birbhum, West Bengal
15	Jawahar Thakur and J.N. Choudhary	Assessing farm income through diversifiction : A case study of North Bihar Farm.
16	K.C. Talukdar and S.K. Sarma	Extent of input use and capital requirement for diversification of small farms in central and lower Brahmaputra valley zones of Assam.
17	P.G. Chengappa, S. Bisalaiah and R. Ramanna	Economic viability of land fragments -Need for appropriate legislation

Annexure II

Programme of the National Workshop on Small Farm Diversification: Prospects and Problems - (May 22, 23, 1995), NCAP, New Delhi

	Hrs	Theme/Topic
22.5.95		
Session I	10.00 am-11.30 am	Inaugural Session:
	10.00 am	Welcome Address by Dr. C.C. Maji, Director, NCAP.
	10.10 am	Introduction of the Theme of the workshop by Dr. T. Haque
	10.20 am	Inaugural Address by Dr. R.S. Paroda, Secretary DARE and Director General, ICAR
	11.10 am	Chairperson's remarks by Prof. V.S. Vyas.
	11.20 am	Release of NCAP Publication by Dr. R.S. Paroda
	11.25am	Vote of Thanks by Dr. D. Jha
Tea Break	11.30am	
Session II	12.15pm	Issues Concerning Diversification of Small Holder Agriculture in India Chairperson: Bhanu Pratap Singh Rapportreu : Dr. Ramesh Chand
Lunch Break	13.30 pm	
Session III	14.00 pm	Technological Development and Potentials for Diversification of Small Holder Agriculture. Chairperson : Prof. I.J. Singh Rapporteur : Dr. B.N. Hiremath
Session IV	15.45 pm	Socio-Economic Constraints to Diversification of Indian Agriculture. Chairperson : Prof. Amlan Datta Repporteur : Dr. Mruthyunjaya
23.5.95		
Session V	10.00 am-11.30am	Institutional Requirement for Diversification of Small Holder Agriculture (including Institutional Credit, Marketing, Contract fanning, Agri-business consortium, Delivery of Service etc.) Chairperson : Shri K.B. Saxena Rapporteur : Dr. R.P. Singh
Tea Break	11.30 am	
Session VI	11,45 am-13.45 pm	Areas of Policy Intervention by the Government for Diversification. Chairperson : Prof. G.S. Bhalla Rapporteur : Dr. V.K. Sharma
Lunch Break	13.15 pm	
Session VII	14.00pm-17.00 pm	Conclusion and Recommendations. Chairperson : Shri B. Barua

Annexure III

National Work shop on Small Farm Diversification : Prospects & Problems

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