

Suicide of Farmers in Maharashtra

(Submitted to the Government of Maharashtra)

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Contents

	List of Tables	v
	List of Figures	vi
	List of Boxes	vi
	Acknowledgements	vii
	Acronyms	viii
1	Introduction	1
1.1	Background	1
1.2	Review of Issues	1
1.3	Objectives of the Study	4
1.4	Method of Study	4
1.5	The Three Selected Districts	6
1.6	Organization of the Study	8
2	Agrarian Scenario and Related Issues	9
2.1	Introduction	9
2.2	Gross Value Addition in Agriculture	9
2.3	Agricultural Production	11
2.3.1	Production: Area and Yield Effects, 1990-1 to 2002-3	11
2.3.2	Cropping Pattern Changes, 1990-1 to 2002-3	13
2.3.3	Availability of Water	15
2.3.4	Cotton Scenario in Maharashtra, 2004-5	15
2.4	Cost of Production	17
2.5	Other Issues in Land, Labour and Credit	20
2.5.1	Capital Formation in Agriculture	20
2.5.2	Operational Holdings	21
2.5.3	Ratio of Agricultural Labourers to Cultivators, 2001	21
2.5.4	Credit Scenario in Rural Maharashtra	22
2.6	Focus group Discussions	24
2.7	Public Interventions: The Maharashtra Employment Guarantee Scheme	28
2.8	Conclusions	29
3	Suicide Scenario in Maharashtra	31
3.1	Introduction	31
3.2	Recent Suicide Trends and Patterns in Maharashtra	31
3.2.1	Trends in Suicide Mortality Rates	31
3.2.2	Age-Specific Suicide Mortality Rates	33
3.2.3	Education-wise and Marital Status wise Suicide Mortality Rates	35
3.2.4	Cause wise Distribution of Suicides	36
3.2.5	Distribution of Methods of Committing Suicides	38
3.2.6	Occupation wise Distribution of Suicides	39
3.3	Suicide Mortality Rate for Farmers	40
3.4	Conclusion	43
4	Probing Suicide Deaths: A Micro Analysis	45
4.1	Introduction	45
4.2	Basic Particulars of the Deceased Individual	45

4.3	Land and Caste of Households with a Deceased Farmer	47
4.3.1	Caste of Deceased Farmer	47
4.3.2	Land Owned in Suicide Case Households	47
4.3.3	Incidence of Suicides across Caste and Size-class of Land	48
4.4	Method of Committing Suicide	50
4.5	Identifying Risk Factors	51
4.6	Suicide Cases versus Non-Suicide Controls: Household Features	55
4.6.1	Family Characteristics	55
4.6.2	Ownership of Assets and Access to Basic Amenities	55
4.7	Analyzing Credit Particulars	57
4.8	Agrarian Produce and Changes in Cultivation Practices	61
4.9	A Statistical Exercise	62
4.10	Cost of Cotton Cultivation	66
4.11	Suicide Cases Eligible for Receiving Compensation	68
4.12	Conclusions	70
5	Summary and Policy Suggestions	71
5.1	The Context	71
5.2	Summary Findings	71
5.2.1	The Agrarian Scenario	71
5.2.2	Trends and Patterns of Suicides in Maharashtra	72
5.2.3	Micro Analysis	72
5.3	Policy Suggestions	73
5.3.1	Agricultural Related Strategies	73
5.3.2	Other Suicide Mitigation Strategies	77
5.3.3	On Documentation and Compensation Criteria	79
	References	81
	Annexure (given separately)	

List of Tables

1.1	Socio-Demographic Characteristics of Districts under Study	7
2.1	Crop wise Share of EGVA to Share of Area (TE 2002-3) and Incremental EGVA (TE 2002-3 over TE 1995-6)	10
2.2	Production Growth Rate of Major Crop Groups in the Selected Districts, 1990-1 to 2002-3	12
2.3	Share of Area across Crops in the Selected Districts, TE 1992-3 and TE 2002-3	14
2.4	Rainfall during May-October in the Selected Districts, 2001 to 2004	15
2.5	Share of Cost of Production in Maharashtra, 2001-2	18
2.6	Cost of Production and Minimum Support Prices, (Rs./Qtl.)	19
2.7	Capital Formation and Plan Expenditure in Agriculture	20
2.8	Share in Number and Area Across Size-class of Holdings in the Selected Districts, 1995-6	21
2.9	Ratio of Agricultural Labourers to Cultivators in the Selected Districts, 2001	22
2.10	Rural Credit Scenario, All Scheduled Commercial Banks	23
2.11	Indebtedness of Farmer Households	24
2.12	Issues Raised During Focus Group Discussions	25
2.13	Share of Rural Poor, Rural Population and MEGS Expenditure, 2000-1 to 2003-4	29
3.1	Number of Suicides and Age-Adjusted Suicide Mortality Rates in Maharashtra, 1995-2004	32
3.2	Number of Farmers Suicides and SMR for Farmers by Sex in Maharashtra, 1995-2004	41
3.3	Suicide Mortality Rate for Farmers across Divisions and Selected Districts by Sex in Maharashtra, 2001-4	42
4.1	Basic Particulars of Deceased Persons	46
4.2	Caste of Deceased Farmer	47
4.3	Size-class of Land Owned in Suicide Case Households	48
4.4	Incidence of Suicides across Caste and Size-class of Land	49
4.5	Method of Committing Suicide	50
4.6	Distance from Some Facilities in Kilometres	51
4.7	Risk Factors Identified with Deceased Individual	52
4.8	Social Group, Household Type, Family Size and Members in Occupation: Comparing Suicide (Case) with Non-suicide (Control) Households	55
4.9	Size-class of Land Owned: Comparing Suicide Case and Non-suicide Control Households	56
4.10	Ownership of Assets and Access to Basic Amenities: Comparing Suicide Case and Non-suicide Control Households	56
4.11	Average Outstanding Indebtedness Across Caste	57
4.12	Comparing Case-Control Household by Average Outstanding Debt	58
4.13	Average Outstanding Debt per Transaction across Source	59
4.14	Average Outstanding Loan per Transaction by Source across Purpose/Year of Loan	60
4.15	Produce (Quintals) of Crops Grown and It's Value.	61

4.16	Ratio of Continuity-to-Change in the Last Five Years for Seeds Usage in Cotton, Tur, Jowar and Soyabean Production	62
4.17	Complete Case-Control Comparison	63
4.18	Results (Odds Ratio) of Stepwise Logistic Regression Analysis	64
4.19	Cost of Cotton Cultivation, Four Case Studies	67

List of Figures

1.1	Neurobiological and Socio-economic Risk Factors	4
1.2	Map of Maharashtra showing Selected Districts	5

List of Boxes

2.1	International and Domestic Policies Impact on Cotton Prices in India	16
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Acronyms

BPL	Below Poverty Line
EGVA	Estimated Gross Value Added
FGD	Focus Group Discussion
GDP	Gross Domestic Product
GOM	Government of Maharashtra
GSDP	Gross State Domestic Product
HDI	Human Development Index
HH	Household
IGIDR	Indira Gandhi Institute of Development Research
MCPS	Monopoly Cotton Procurement Scheme
MEGS	Maharashtra Employment Guarantee Scheme
MSCCGMF	Maharashtra State Cooperative Cotton Growers Federation
NGO	Non-Governmental Organization
NSS	National Sample Survey
NWDPRA	National Watershed Development Project for Rainfed Areas
OBC	Other Backward Castes
OC	Other Caste
PHC	Primary Health Centre
RBI	Reserve Bank of India
RIDF	Rural Infrastructure Development Fund
RRB	Regional Rural Bank
SC	Scheduled Caste
SCB	Scheduled Commercial Bank
SHG	Self-help Group
SMR	Suicide Mortality Rate
ST	Scheduled Tribe
TE	Triennium Ending
USA	United States of America
VJNT	Vmyukta Jati and Nomadic Tribe
WHO	World Health Organisation

1 Introduction

1.1 Background

“To be, or not to be:” (Shakespeare, *Hamlet*, 3/1) has been an important question among thinkers.¹ One, however, has to go beyond this philosophical inquiry to understand the risk factors associated with the act of suicide. The risk factors are a combination of two aspects: neurobiological and socio-economic.² In recent years, a larger agrarian crisis, particularly in cotton growing regions of Andhra Pradesh, Karnataka and Maharashtra in India, has precipitated a spate of suicide death among farmers. This is of public policy concern. It is with this concern that the Government of Maharashtra (GOM) assigned the Indira Gandhi Institute of Development Research (IGIDR), Mumbai, to undertake a study on ‘Suicide of Farmers in Maharashtra’. The present study focuses on examining socio-economic aspects that can be identified as important risk factors and in providing some suggestions to the GOM.

1.2 Review of Issues

Farmers’ suicides have been receiving a lot of media attention, more so by the vernacular local dailies, in recent years. There has also been some scholarly attention.³ Over the years, agriculture’s contribution to the gross domestic produce in India has reduced from 56 per cent in 1950-1 to 25 per cent in 2001-2 whereas as per the 2001 census 58 per cent of the total workers are still dependent on agriculture either as cultivators or agricultural labourers. This suggests that rural non-farm employment opportunities are limited. Between 1960-1 and 1995-6, the number of agricultural operational holdings in India increased by 2.36 times

¹ Proponents of ‘to be’ either condemn the act of suicide as a violation of moral law, Immanuel Kant, or invoke a call to vital existence, William James and Albert Camus, whereas proponents of ‘not to be’ defend death through an act of self-harm as an individual right, David Hume, or as the denial of the will to live, Schopenhauer, (Simpson, 2002). This phrase has also been used as the title in at least two books on suicide studies – Dublin and Bunzel (1933) and Rauscher (2000). The two extreme positions denoting life and death can also be represented in a suicide ideation scale from zero to unity, 0-1.

² The specific neurobiological and socio-economic factors are independently insufficient, but in some combination can be considered as non-redundant parts of unnecessary but sufficient causes. In other words, these factors are INUS conditions in a causal sense.

³ Some of the recent studies include Assadi (1998), Bhalla et al (1998), Chowdry et al (undated), Dandekar et al (2005), Deshpande (2002), Government of Andhra Pradesh (2004), Government of Maharashtra (1998), Iyer and Manick (2000), Mohan Rao (2004), Mohanty (2001, 2005), Mohanty and Shroff (2004), Parthasarathy and Shameem (1998), Purendra Prasad (2003), Revati (1998), Shambhu Prasad (1999), Shiva et al (2000), Stone (2002) and Vasavi (1999) among others.

from 48.9 million to 115.6 million, but when one looks at the composition it is only the marginal (0-1 hectares) and small (1-2 hectares) size-class of farmers that increased from 51 per cent to 62 per cent. In absolute numbers, the large size-class (10 hectares & above) started declining since the 1970s and the medium size-class (4-10 hectares) since the 1980s. This suggests that dependence on agriculture is largely among the ranks of marginal and small farmers and agricultural labourers. The small and marginal farmers also bear the brunt of unavailability of water and its associated yield uncertainty. Linking of the national market with international markets has also increased the price uncertainty particularly in crops like cotton. The small and marginal farmer is, however, thinking big and willing to experiment and take risks. However, the farmer is not able to visualise that a bad monsoon leading to crop failure or a glut in the market can put him into a quagmire of indebtedness and crashing of dreams. The farmer cannot get his daughter/sister married, he cannot send his children to college for higher education or he cannot meet health expenses for the family members to mention a few of his responsibilities. This brings about a feeling of dejection and failure among some farmers who in their moments of despair think that life is not worth living any more and they end up committing suicide.

In a recent review of the neurobiological literature, Mann (2002) identifies some important correlates of suicide. Most suicide victims have a diagnosable psychiatric illness/disorder and the most common disorder is mood swings.⁴ From those suffering from psychiatric illness, comparison between suicide attempters and non-attempters points out that the former suffer from a greater degree of depression and hopelessness. There might be some genetic or familial risk factors. For instance, a higher concordance rate of suicide has been observed among monozygotic as compared to dizygotic twins. The specific genetic factors, independent of those identified with psychiatric disorders, is the reduced serotonergic input to the orbital prefrontal cortex, an area of the brain involved in behaviour inhibition. Adverse parenting and physical or sexual abuse are identified as non-genetic familial risk factors. Aggressive-impulsive trait and substance abuse are also identified as risk factors. On medical illness, disorder of the central nervous system, particularly those affecting the pathology of the brain carry a higher relative risk. The neurobiological risk factors are predisposing in nature. They are internal factors that exist with the individual. All those identified with this risk factor do not commit suicide. Presence of additional risk factors that

⁴ Constant exposure to organophosphorous compounds (insecticides/pesticides) can also lead to psychiatric illness/disorder (London et al, 2005).

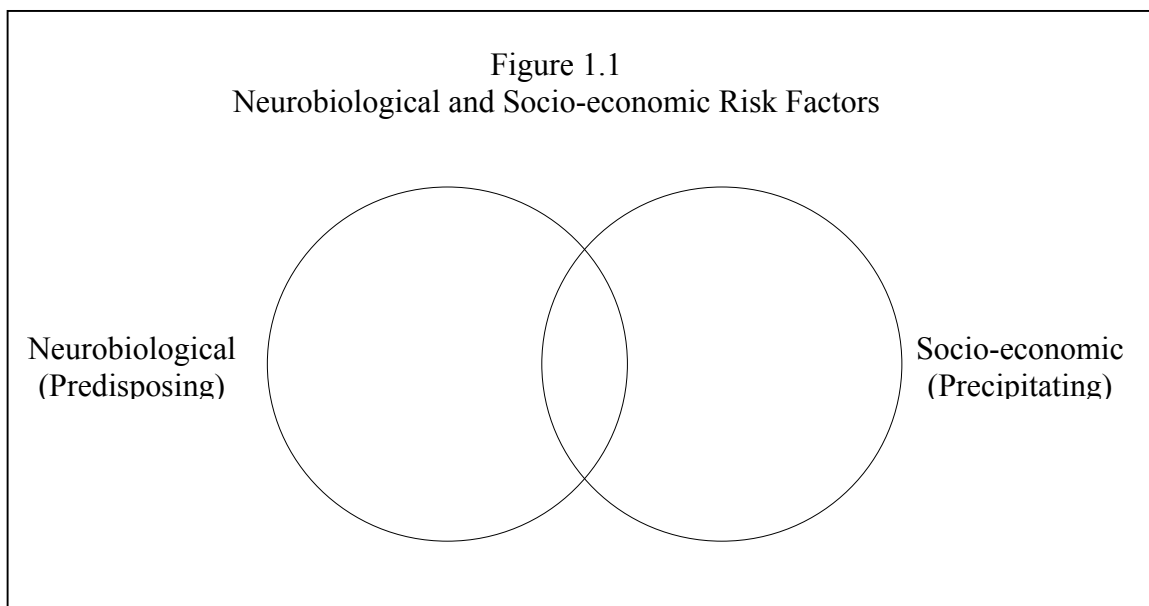
are external to the individual becomes crucial. This takes us to socio-economic risk factors that are precipitating in nature – they can act as a trigger.

Suicides are acts by individuals, but in a social context. As pointed out by Durkheim (2002, first published in French in 1897), suicide could be because of social isolation/individualism (egoistic) or excess of social integration (altruistic), breakdown of social regulation (anomic), or excess of social regulation (fatalistic).⁵ An individual could face a situation where she/he is confronted with a combination of the above possibilities. For instance, changes in policy regime would have an adverse impact on income leading to an economic crisis (anomic), inability to get daughter married in such situation can also be identified with the strict social norms on age and expenditure related with marriage (altruistic and perhaps also fatalistic) and such difficulties can lead an individual to withdraw himself from social activities (egoistic).

The neurobiological and socio-economic dimensions of risk factors are explained in an analytical framework given in Figure 1.1. Each dimension is identified as a set and it is the intersection of the two sets where the relative risk of committing suicide is higher. Relationships between sets of factors within each dimension and for factors between the two dimensions will depend upon the specific case.

For the current study on suicide of farmers, we do not have information on the neurobiological dimension. However, for the specific sub-group of population we can identify some socio-economic risk factors. In particular, we ask the following questions. What is the nature of the current agrarian crisis? Is it largely related with cotton cultivation? Is it also associated with rural credit scenario? Is there a withdrawal of state support from the rural agrarian scenario? Is there a geographical concentration of suicides? Is it of seasonal nature? Is it high among certain social group (age, caste, education and land size owned) that is aggressive in its pursuit of attaining economic well being? Is indebtedness an important risk factor? What are the other socio-economic risk factors?

⁵ Durkheim (2002) had classified fatalistic suicide to ensure symmetry at an analytical level and observed that their actual occurrences are rare or non-existent. A recent paper by Kushner and Sterk (2005) suggests that suicides under excess social integration could also indicate excess social regulation, and hence, fatalistic suicide is not just an analytical category.



1.3 Objectives of the Study

The objectives of the study are as follows:

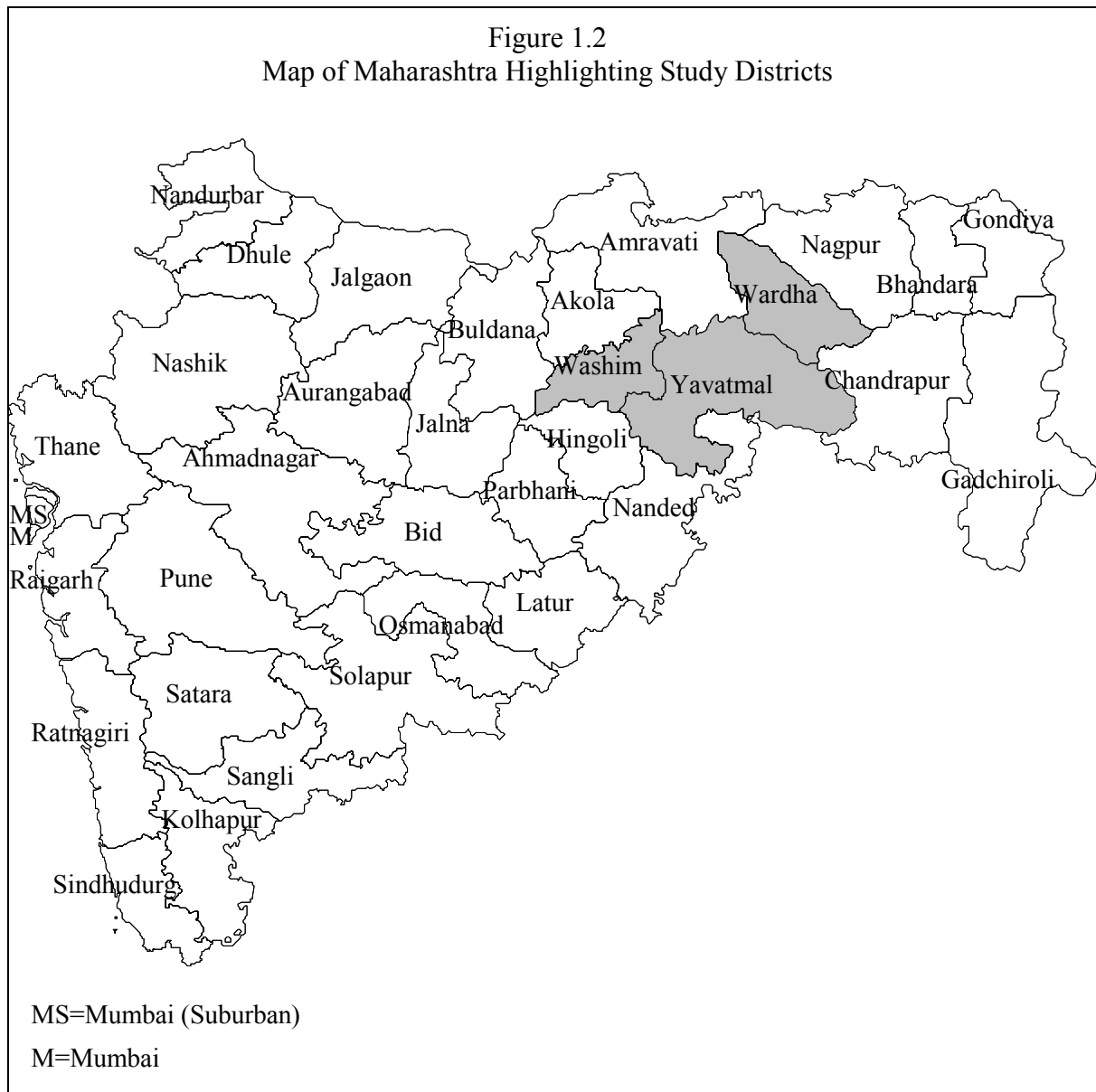
- To analyze the agrarian scenario in Maharashtra with emphasis on the selected districts.
- To look into the trends and patterns of the recent suicide scenario in Maharashtra.
- To study the nature and extent of indebtedness among deceased farmers.
- To identify and examine other socio-economic factors leading to suicidal death by the deceased farmers.
- To compare the suicide (case) with non-suicide (control) households.
- To suggest policy measures.

1.4 Method of Study

To deliberate on the method of study, an inception workshop was held on 11th January 2005. In the workshop, people from the academia (economists and sociologists), bureaucracy, media and a psychiatrist among others participated.⁶ The academicians invited have been involved in some related work in Andhra Pradesh, Karnataka and Maharashtra, the three states where suicide death among farmers has been attracting wide media and policy attention. The bureaucrats present were senior officers from the GOM who have had relevant experience. The current study has largely been based on a primary survey

⁶ List of participants in the workshop is given in Annexure 1.

conducted in the three districts of Washim and Yavatmal from Amravati division and Wardha from Nagpur division (see location of study districts in Figure 1.2).⁷



The survey consisted of three components - household interviews, focus group discussion and village level information.⁸ The villages selected were based on list of reported suicide cases for 2004 and three cases from January 2005 provided by the Government of Maharashtra. The household interview has been conducted in 116 suicide case households spread across 109 villages, but for our analysis we exclude five observations for logistic

⁷ Some basic socio-economic indicators of these three districts are given in the next section.

⁸ Draft schedules (particularly of the household survey) were discussed at the inception workshop and the revised version was sent to a select group of participants for further comments which led to a final version of the schedules that were translated to Marathi (Annexure 2).

reasons: in three cases the death happened following heart attack, in one case our survey was based on information from neighbours and relatives as the other members of the family had moved out from the village, in another case there was partial response when our investigators visited for detailed survey.⁹ Excluding one case in Amravati, all the cases analysed are from Wardha (21), Washim (29) and Yavatmal (60). For our analysis we use data from 111 suicide case households spread across 105 villages. To facilitate comparison, we tried to identify a non-suicide control household that is similar to the suicide household in the village in terms of land ownership and other assets. This was done based on information obtained at the focus group discussion conducted in the village. In this analysis, we also use data for 106 non-suicide control households from 103 villages. In addition to the suicide cases covered through household survey, the study team also visited other suicide households/villages and took down case studies and held focus group discussions, but did not conduct intensive surveys.

In addition to the primary survey some background work on the agrarian scenario and suicide scenario in Maharashtra with emphasis on the selected districts were also taken up at IGIDR. Besides, some background papers were also commissioned to highlight other related aspects.¹⁰ Our initial observations were presented and discussed in the interim workshop held on 18th August 2005. This helped us prepare the interim report that was submitted to the Government of Maharashtra and also circulated for further comments. The revised version was further discussed in the final workshop held on 12th January 2006 to get an independent appraisal from the scientific community.

1.5 The Three Selected districts

In terms of area, Yavatmal with 13.6 thousand square kilometres, that is 4.4 per cent of the states geographical area, is the largest among the three districts (Table 1.1). In 2003-4, per capita net domestic product in the selected districts was lower than that for the state (Rs.29204). Across the three districts, it was the highest in Wardha (Rs.24171) and the lowest in Yavatmal (Rs.19010). A 1997-8 survey suggests that the proportion of rural households below the poverty line is much higher in the selected districts (44 per cent in

⁹ All the 116 households have been mentioned in our case studies (Annexure 3).

¹⁰ The background papers are Bhatkule (2005), Deshpande (2005), Kulkarni and Deshpande (2005), Mishra (2005b), Shah (2006) and Shroff (2005). They add to the robustness of the findings mentioned in this report. Abstracts of the background papers are given in Annexure 4.

Wardha and Yavatmala and 48 per cent in Washim) than the state's average (35 per cent). Human Development Index (HDI) 2000 is much lower in the three districts and among the three it is the highest in Wardha and lowest in Yavatmal. Across 35 districts, the HDI value ranks 15 in Wardha, 31 in Washim and 33 in Yavatmal indicating that two of the three selected districts are among the bottom five HDI districts of Maharashtra.

Socio-Demographic Characteristics	Wardha	Washim	Yavatmal	Maha- rashtra
Area, ('000 sq.km.)	6.31	5.15	13.58	307.58
Population, 2001 ('000)	1236.74	1020.22	2458.27	96878.63
Per Capita Net Domestic Product, 2003-4 ('000 Rs)	24.17	19.37	19.01	29.20
Rural households below poverty line, 1997-98 (%)	44.42	48.35	43.62	34.55
Human Development Index, 2000 (Value)	0.49	0.34	0.21	0.58
Human Development Index, 2000 (Rank)	15	31	33	-
Note: For detailed demographic features on density of population, urbanisation, sex ratio, caste composition and literacy related see Table 1.1a in Annexure 5.				
Source: <i>Census of India 2001, Maharashtra Human Development Report 2000 and Economic Survey of Maharashtra 2004-5.</i>				

According to census 2001, less than 5 per cent of the state's population resided in these three districts. In the three selected districts, compared to the state's average we observe the following. Density of population and proportion of population residing in urban areas is lower (Table 1.1a in Annexure 5). Sex ratio for total as well as for the age group 0-6 years is higher. In the selected districts as well as in the state, sex ratio the age group 0-6 years is lower than that for the total population. This indicates discrimination against girls leading to abortion of the female foetus before birth or greater female infant/child mortality. Proportion of Scheduled Caste (SC) to total population is higher in the three districts whereas proportion of Scheduled Tribe (ST) to total population is higher in Wardha and Yavatmal districts only. In all the three districts, and particularly in Yavatmal and Washim, a significant proportion of the population will be coming under Vmyukta Jati and Nomadic Tribes (VJNT) but this category has not been enumerated separately in census 2001. Literacy rate is lower in the three selected districts, gender literacy gap is higher in Washim and Yavatmal, and urban-rural literacy gap is higher in Yavatmal.

1.6 Organization of the Study

In this interim report, we discuss relevant agrarian and other related issues in chapter 2, the overall suicide scenario in Maharashtra based on some recent data in chapter 3, and results from our primary survey in chapter 4. Suggestions are given in chapter 5.

2 Agrarian Scenario and Related Issues

2.1 Introduction

In Maharashtra, agriculture's contribution to net state domestic product in current prices has reduced from 40 per cent in 1960-1 to 14 per cent in 2002-3 whereas as per the 2001 census 55 per cent of the total workers are either cultivators or agricultural labourers. During 1993-4 to 2003-4, the linear trend growth rate of Maharashtra's Gross State Domestic Product (GSDP) at 4.8 per cent per annum was lower than that of India's Gross Domestic Product (GDP) at 5.8 per cent per annum. During this period, the linear trend growth rate for agriculture & allied activities in Maharashtra was 1.3 per cent per annum whereas at the all India level it was 2.3 per cent per annum.¹¹

In this chapter, we discuss gross value addition and incremental changes in gross value addition in agriculture in section 2.2. Discussions regarding agricultural production, area and yield effects of changing production, changes in cropping pattern and rainfall scenario in recent years are in section 2.3. Cost of cultivation for selected crops in Maharashtra is discussed in section 2.4. Certain aspects related to capital formation in agriculture, operational holdings, proportion of agricultural labourers and farmers' indebtedness are discussed in section 2.5. Observations from our Focus Group Discussions (FGDs) are discussed in section 2.6. Public intervention through social welfare programme of Maharashtra Employment Guarantee Scheme (MEGS) is discussed in section 2.7. The observations are summarized in section 2.8.

2.2 Gross Value Addition in Agriculture

Agriculture's share in Maharashtra's GSDP at 1993-4 prices increased from Rs.21750 crore for the triennium ending (TE) 1995-6 to Rs.24988 crore for TE 2002-3. The eight major crop groups in terms of gross area under cultivation are Cereals with nearly half of it under Jowar, Pulses, Fibres (most of it Cotton), Oilseeds (nearly half of it under Soyabean), Sugarcane, Fruits and Vegetables, Condiments & Spices, and Drugs & Narcotics. The ratio

¹¹ For a recent discussion of Maharashtra's growth and poverty scenario see Mishra and Panda (2005). For a discussion on Maharashtra's agricultural development till early 1990s see Sawant et al (1999). On public intervention backlogs within Maharashtra, a dated but comprehensive analysis is the *Report of the Fact Finding Committee on Regional Imbalance in Maharashtra* (Government of Maharashtra, 1984).

of share of estimated gross value added to share of area in TE 2002-3 and the incremental gross value added in TE 2002-3 over TE 1995-6 are given in Table 2.1 (also see Table 2.1a in Annexure 5).

Table 2.1 Crop wise Share of EGVA to Share of Area (TE 2002-3) and Incremental EGVA (TE 2002-3 over TE 1995-6)				
Crop group	Share of EGVA to share of Area TE 2002-3	Incremental EGVA, TE 2002-3 over TE 1995-6		
		Level (lakh rupees)	Area Effect (%)	Other Effect (%)
Cereals	0.38	-61868.9	-53.0	-47.0
Pulses	0.49	5743.1	98.3	1.7
Fibres	0.61	-8230.5	177.5	-277.5
Oilseeds	0.85	5374.6	-358.5	458.5
Sugarcane	6.05	54313.9	130.5	-30.5
Fruits/Vegetables	7.28	200564.0	205.2	-105.2
Condiments/Spices	1.41	-402.9	-491.0	391.0
Drugs/Narcotics	2.78	-359.7	-82.0	-18.0
Total	1.00	195133.6	-8.8	108.8

Note: TE denotes triennium ending for three year annual average, EGVA denotes estimated gross value added. Crop specific area was estimated from EGVA for crop and EGVA for crop per hectare. If $E=EGVA$, $A=Area$ and $O=Other$ then incremental EGVA comprises of area and other effect, $(E_t - E_{t-k}) = ((A_t - A_{t-k})O_{t-k}) + ((O_t - O_{t-k})A_t)$ where positive/negative sign for shares of area/other indicate the proportion contribution to increase/decrease in the level. Details of some specific crops are given in Table 2.1a in Annexure 5.

Source: *State Income of Maharashtra* (Soft copy), Directorate of Economics and Statistics, Mumbai, 2005.

Share of estimated gross value added is lower compared to the share of area for Cereals (particularly low for Jowar), Pulses (nearly three-tenths under Tur), Fibres (mostly Cotton) and Oilseeds. In TE 2002-3, Cereals and Pulses account for 64 per cent of the gross area under cultivation, but contribute to only 27 of the gross value added in agriculture. Cotton accounts for 15 per cent area, but contributes only 9 per cent of the gross value added in agriculture. Oilseeds account for 12 per cent share of area and 10 per cent of the gross value added but for Soyabean the share of area (5.7 per cent) is slightly lower than its share of gross value added. Sugarcane accounts for less than 3 per cent of the area under cultivation, but 17 per cent of the gross value added. Fruits & Vegetables account for less than 5 per cent of the area under cultivation, but nearly 36 per cent of the gross value added. Among Fruits & Vegetables, Grape, Banana and Tomato have relatively larger share in gross value added.

Between annual average of TE 1995-6 and TE 2002-3, the incremental gross value added from the above eight major crop groups is about Rs.1950 crore. The positive increase is among Pulses, Soyabean, Sugarcane and Fruits & Vegetables; it has declined for Cereals, Cotton, Condiments & Spices, and Drugs & Narcotics. The increase in incremental value for Pulses, Soyabean, Sugarcane, and Fruits & Vegetables is largely explained by an increase in area under cultivation, but for specific crops like Tur, Soyabean, Banana, Grape and Tomato the share of other factors like yield, or advantages in relative prices also contribute.

The decline in incremental value for Cereals is contributed by a decline in area as well as other factors. Condiments/Spices show a decline despite a favourable impact from other factors because such areas might have shifted to more value addition crops under Fruits & Vegetables. The decline of Drugs & Narcotics could be indicative of the legal hassles associated with its cultivation.

In Cotton, incremental value has declined, but there has been an increase in area. With increasing yield (Table 2.2a in Annexure 5), it suggests that the positive effect of an increase in area has largely been offset by unfavourable relative prices. In other words, profitability of Cotton cultivation is declining.

2.3 Agricultural Production

2.3.1 Production: Area and Yield Effects, 1990-1 to 2002-3

We analyse some recent changes in the agrarian scenario in the districts of Wardha, Washim (or undivided Akola) and Yavatmal and the state of Maharashtra. Using three year moving average trends from 1990-1 to 2002-3, we give growth rates of production for selected crops in Table 2.2 (area and yield effects to explain shifts in production from TE 1992-3 to TE 2002-3 has been given in Table 2.2a in Annexure 5)

In the selected districts, the linear trend growth rate for production of Cereals was negative. This is largely explained by a negative area effect mostly for Jowar and Paddy. For these two crops, except for Paddy in Yavatmal, the yield effect has also been negative indicating that the shifts in cropping pattern are likely to be from lands with greater yield. The linear trend growth rate for Wheat was positive and this can be explained by positive area as well as yield effects. An exception is Yavatmal, where yield effect was negative. For

Maharashtra state, the results are somewhat similar – linear trend growth rate for production of Cereals is negative. The share of area/production in the selected districts to total area/production for Cereals (particularly, Jowar and Paddy) in Maharashtra has declined. The share of production, particularly for Jowar, has been higher than the share of area indicating that the yield for Jowar in the study district is higher than the average for the state. Despite this, area has been declining (Table 2.2a in Annexure 5) and its share has come down. This can be explained by the fact that the share of gross value added relative to share of area under cultivation is the lowest for Jowar (Table 2.1a in Annexure 5).

Table 2.2 Production Growth Rate of Major Crop Groups in the Selected Districts, 1990-1 to 2002-3				
Crop groups	Wardha	Akola+Washim	Yavatmal	Maharashtra
Cereals	-6.0	-7.2	-6.3	-1.5
Pulses	3.8	4.1	4.5	2.0
Oilseeds	14.1	18.2	18.5	3.5
Sugarcane	14.5	2.7	1.9	4.6
Cotton	0.4	0.6	1.1	2.8

Note: Linear trend growth rate for production, b in $\ln(P_t)=a+bt+e_t$; where t is time, has been calculated using a three-year moving average series from TE 1992-3 to TE 2002-3. The growth rates are significantly different from zero at 95% confidence interval in all cases except for Cotton in all scenarios. Akola+Washim refers to undivided district of Akola because independent data for the recently created district of Washim are not available for the entire series. Shift in production consists of area and yield effects, $(P_t-P_{t-k})=((A_t-A_{t-k})Y_{t-k})+((Y_t-Y_{t-k})A_t)$, which has been calculated for TE 1992-3 and TE 2002-3 and given in Table 2.2a in Annexure 5. Share of area/production to total area/production in Maharashtra is given in Table 2.2b in Annexure 5.

Source: *Epitome of Agriculture, Year 1999, Part I*, Commissioner Agriculture, Government of Maharashtra, Pune, 2000; *Agricultural Statistical Information, Maharashtra State, Part II*, Commissioner Agriculture, Government of Maharashtra, Pune, 2002; and <http://agri.mah.nic.in> (accessed 4 October 2005).

In the selected districts, the linear trend growth rate of production for Pulses has been positive with both area and yield effect being positive (Table 2.2, also see Table 2.2a in Annexure 5). The share of area under Pulses in the selected districts compared to total area under Pulses in Maharashtra also increased for undivided Akola and Yavatmal (Table 2.2b in Annexure 5). In the selected districts, the share of production is higher than the share of area indicating that yield rates are higher than that of the state's average.

For Oilseeds, the linear trend growth rate of production has also been positive with both area and yield effect being positive (Table 2.2, also see Table 2.2a in Annexure 5). Within Oilseeds, it is Soyabean that has largely replaced other Oilseeds and in the selected districts its share from total area under Oilseeds increased from 23 per cent in TE 1992-3 to 88 per

cent in TE 2002-3. For Maharashtra, Oilseeds production indicates a positive growth due to positive yield effects only. However, for Soyabean, as in the selected districts, both area and yield effects have been positive. In TE 2002-3, Soyabean accounts for 47 per cent of the total area under oilseeds and 55 per cent of the total gross value addition for Oilseeds. Between TE 1992-3 to TE 2002-3, Soyabeab's share in the selected districts to the total for Maharashtra more than doubled with regard to area and more than trebled in terms of production (Table 2.2b in Annexure 5).

Linear trend growth rate for Sugarcane production has been positive and this is largely explained by a positive area effect. In Wardha, there has been a positive yield effect also. In undivided Akola, Yavatmal as well as for Maharashtra the yield effect has been negative. This negative yield effect is stronger than the area effect in Yavatmal and in this district there has been a secular decline in production in the last three years. The increase in area under Sugarcane in the selected districts despite the fact that yield of Sugarcane is lower than the state's average is because of its advantage from gross value addition (Table 2.1). The share of area/production under Sugarcane in the selected districts to the total area under Sugarcane in Maharashtra has increased in Wardha, but not in the other two districts.

In the selected districts, the linear trend growth rate for Cotton has been positive (Table 2.2). This is largely due to yield effect because area has declined in Wardha and undivided Akola. In Yavatmal, the positive area impact comes out because there was an increase in area under Cotton in the mid-nineties (1994-5 to 1996-7), but there after it has declined. In Maharashtra, growth has been greater than the three selected districts and for the state as a whole both area and yield effects are positive. The share of area under Cotton in the selected districts to total area under Cotton in Maharashtra has also declined (Table 2.2b in Annexure 5). This indicates that the increase in area under Cotton is largely outside the selected districts. In fact, it is outside Vidarbha and most of it is in Jalgaon district.

2.3.2 Cropping Pattern Changes, 1990-1 to 2002-3

Changes in share of cropping pattern from TE 1992-3 to TE 2002-3 within the selected districts for selected crops are given in Table 2.3 (also see Table 2.3a in Annexure 5). It shows the following.

In Wardha, total gross area under cultivation under the selected crops increased from 11.94 to 12.88 lakh hectares. The share of area under Cereals (particularly, Jowar), Pulses and Cotton has decreased and that of Oilseeds (mostly Soyabean) and Sugarcane has increased.

In undivided Akola, total gross area under the selected crops increased from 29.51 to 29.62 lakh hectares. The share of areas under Cereals (particularly, Jowar) and Cotton has decreased and that of Pulses, Oilseeds (mostly Soyabean) and Sugarcane has increased. In TE 2002-3 independent data for Washim suggests that the total area under cultivation at 14.01 lakh hectares is a little less than half the total area under cultivation in undivided Akola. Compared to undivided Akola, the share of Cereals and Cotton is lower and that of Pulses, Oilseeds and Sugarcane is higher in Washim.

In Yavatmal, total gross area under cultivation under the selected crops increased from 27.12 to 27.78 lakh hectares. The share of area under Cereals (particularly, Jowar) has decreased and that for the rest – Pulses, Oilseeds (mostly Soyabean), Sugarcane and Cotton – has increased.

Crops	Wardha		Akola+Washim		Washim		Yavatmal		Maharashtra	
	TE 1992-3	TE 2002-3	TE 1992-3	TE 2002-3	TE 1992-3	TE 2002-3	TE 1992-3	TE 2002-3	TE 1992-3	TE 2002-3
Cereals	26.84	13.85	31.66	18.63	NA	18.33	28.78	19.08	54.30	49.86
Pulses	18.89	18.17	26.91	34.32	NA	39.69	20.12	23.94	16.65	18.38
Oilseeds	16.92	34.03	6.44	13.96	NA	20.83	4.51	9.85	13.04	12.97
Sugarcane	0.23	0.82	0.21	0.27	NA	0.45	0.77	0.77	2.23	3.06
Cotton	37.11	33.13	34.79	32.82	NA	20.70	45.81	46.36	13.79	15.73
Total	100.00	100.00	100.00	100.00	NA	100.00	100.00	100.00	100.00	100.00
Total Area (lakh ha)	11.94	12.88	29.51	29.62	NA	14.01	27.12	27.78	584.20	570.90

Note: NA denotes not applicable. For share of area under specific crops like, Jowar, Rice, Wheat, Tur and Soyaben see Table 2.3a in Annexure 5.
Source: As in Table 2.2.

In Maharashtra, as against the observation in the selected districts, the total gross area under cultivation under the selected crops decreased. The direction of change in cropping pattern is similar to that in the selected districts, but the magnitude of change is much lower. This indicates that the shifts, particularly decline in area from Cereals (Jowar) is relatively higher in the selected districts.

Another related point is that the share of area under Cotton in Maharashtra has increased, but it has decreased in the selected districts. The decline is not evident in Yavatmal because it increased in the mid-1990s to a peak in TE 1997-8, but, thereafter, it has been declining.

Between Maharashtra and the selected districts, it can be stated that the selected districts have much higher share of area under Cotton, Pulses (excluding Wardha) and Oilseeds (excluding Yavatmal) and lower share of area under Cereals and Sugarcane.

2.3.3 Availability of Water

It would be interesting to know the production scenario during the year 2004, as it would coincide with our primary survey data discussed subsequently in chapter 4. We do not yet have agriculture production or related data for 2004, but we do have some information on rainfall. In the three selected districts, as in large parts of India, agriculture is monsoon dependent. A positive feature is that the selected districts are by and large rain assured regions.¹² Unfortunately, the monsoon scenario in the selected districts during May-October 2004 was largely deficient (Table 2.4).

		Wardha	Washim	Yavatmal
May- October Rainfall	Normal, in millimetre (mm)	994 (100)	833 (100)	938 (100)
	2001, in mm (% of Normal)	873 (88)	1020 (123)	754 (80)
	2002, in mm (% of Normal)	1065 (107)	1301 (156)	911 (97)
	2003, in mm (% of Normal)	890 (89)	803 (96)	849 (91)
	2004, in mm (% of Normal)	773 (78)	574 (69)	455 (49)

Note: Figures in parentheses indicate rainfall as per cent of normal.
Source: <http://agri.mah.nic.in> (accessed 4 October 2005).

2.3.4 Cotton Scenario in Maharashtra, 2004-5

We have some information on production of Cotton for 2004-5. This, however, is available for India and Maharashtra state at an aggregate level from an alternative source (<http://cicr.nic.in>, accessed 30 July 2005). In 2004-05, despite delay in rain, there has been record production of Cotton. It is estimated at 232 lakh bales for India, an increase of about 70 lakh bales from the previous year. The situation is also good in Maharashtra where it is estimated to be more than 52 lakh bales from 31 lakh bales in the previous year.¹³ This

¹²The drought prone districts in Maharashtra are mostly in Marathwada and Western Maharashtra.

¹³ The estimate of production takes into consideration procurement at various trading centres among other things. It is understood that cotton produced in neighbouring states might have been sold in Maharashtra in

increase in production of Cotton has been worldwide leading to a fall in prices of Cotton (see Box 2.1 on recent international and domestic policies impact on Cotton prices in India).

Box 2.1

International and Domestic Policies Impact on Cotton Prices in India

Excess international supply at a lower price is also because of direct and indirect subsidies leading to dumping by the United States of America (USA). During the period 1998 to 2003 Cotton export prices from USA were lower than their cost of production by more than 50 per cent on average and had reached a maximum of 65 per cent in 2002 (Murphy, Lilliston and Lake, 2005). As against this, domestic policies in India have led to removal of quantitative restrictions and subsequently reduction of import tariff from 35 per cent in 2001-2 to 5 per cent in 2002-3. All these exposed the domestic prices of Cotton to the volatility of international prices. This has been adversely affecting the Cotton farmer. Similarly, excessive Cotton exports leading to an increase in yarn prices can adversely affect the handloom and power loom weavers. Thus, variable import and export tariffs that guard movements in domestic prices against volatility in international prices could be of help to both producers and consumers (Ghosh, 2005).

In Maharashtra, the increase in production is because of two factors. First, there has been an increase in area from 27.7 lakh hectares in 2003-4 to 30.5 lakh hectares in 2004-5, which was propelled by a higher open market price for Cotton in 2003-4. In 2002-3, the private traders were allowed to operate for the first time since the enactment of the Monopoly Cotton Procurement Scheme (MCPS) almost thirty years ago. In 2004-5, the share of area under Cotton in Maharashtra is 34 per cent of the total area under cotton in India (most of it under rain-fed conditions and as of 2000-1 less than 3 per cent of gross area under Cotton cultivation in the state was irrigated). Second, yield in Maharashtra increased by about 52 per cent, from 191 kilograms/hectare in 2003-4 to 290 kilograms/hectare in 2004-5. As a result of this, Maharashtra's share in India's total production of cotton increased from 18.5 per cent in 2003-4 to 22.4 per cent in 2004-5. Despite this, productivity of Cotton in

2004-5 because of the higher price offered under the Monopoly Cotton Procurement Scheme of the state. Even if one concedes that such inflow of Cotton would account for 20 per cent of the estimated produce then also there would be an increase of production in the state by 10 lakh bales.

Maharashtra is the lowest across major states and is about 66 per cent of the national average in 2004-5.¹⁴

One can infer that deficient rain in the selected districts had an adverse impact in some pockets, but overall the weather condition was suitable for the cotton crop ensuring a bumper harvest in the state. Without district-wise data, we would not be able to comment on the scenario in the selected districts, but our observation of shifts in cropping pattern up to TE 2002-3 suggests that much of these gains would have been outside the three selected districts; rather, outside Vidarbha.

2.4 Cost of Production

Between TE 19965-6 and TE 2002-3, the annual average for gross value of inputs used in agriculture in Maharashtra increased by Rs.2063 crore (from Rs.19892 crore to Rs.21956 crore). In TE 2002-3, Jowar, Tur, Soyabean and Cotton account for 88 per cent, 69 per cent, and 84 per cent of the area under major crops in Wardha, Washim and Yavatmal respectively (Table 2.3a in Annexure 5). For these four crops we give item wise share of cost of production in Maharashtra in 2001-2 in Table 2.5 (for values see Table 2.5a in Annexure 5). It shows that operational costs account for nearly 75 per cent of the costs in Jowar, Soyabean and Cotton and about 57 per cent in Tur. A substantial part of operational costs is human and animal labour. For cost attributed to human labour, imputed family labour account for 47 per cent in Jowar, 45 per cent in Tur, 34 per cent in Soyabean, and 37 per cent in Cotton. With regard to animal labour more than 75 per cent of the costs is attributed to owned bullocks – it is as high as 92 per cent for Cotton. Most of the machine labour is hired. The share of costs on account of seeds, fertilizer, manure and insecticides is higher for the cash crops, Cotton and Soyabean, when compared with Jowar and Tur.

What is most striking is the high use of insecticides in Cotton - per hectare usage in Cotton cultivation is nearly 13 times higher than that of Soyabean, 82 times higher than that of Tur, 442 times higher than that of Sugarcane where per hectare insecticide use was Rs.1.4 in

¹⁴ In addition to yield uncertainty and low yield, one of our background papers also points out to cost of Cotton cultivation being much higher than the price received, poor dissemination of scientific farm techniques (farmers do not use certified seeds, seed sowing per unit land is not adhered to, fertilizer usage is not as per recommended dose, insecticide usage is excessive causing damage to crop and ecology), and the farmer being increasingly exposed to price volatility (Shroff, 2005). Another background paper mentions about increasing input prices (Kulkarni and Deshpande, 2005). The farmers receiving unremunerative prices for Cotton has also come up in our FGDs (section 2.6)

2001-2 in Maharashtra, and nearly 2000 times greater than Jowar. Superimposing TE 2002-3 area data from Table 2.3a in Annexure 5 and considering the insecticide usage in Jowar, Tur and Soyabean as proxies for its usage in Cereals, Pulses and Oilseeds one can calculate that from across five crop groups, Cotton accounts for more than 89 per cent of the total expenses for insecticides. This proportion may reduce a little if one includes usage of insecticides in Fruits & Vegetables because insecticide usage for these crops is not likely to be high. This suggests widespread availability of insecticide among farmers growing cotton. Consumption of insecticides is one of the most prevalent methods of committing suicides in the state (Table 3.1h in Annexure 5, 34 per cent of the total male suicides and 30 of the total females suicides, it is much higher in Amravati division and in our three selected districts).

Item	Jowar	Tur	Soyabean	Cotton
Operational Costs	75.7	57.2	73.8	76.8
Human Labour	29.5	27.7	20.3	26.3
Family	14.0	12.5	7.0	9.7
Animal Labour	25.5	18.4	22.0	22.4
Owned	19.8	13.9	18.0	20.5
Machine Labour	4.7	1.5	8.2	3.2
Hired	4.6	1.5	8.2	3.1
Seeds	2.3	3.1	9.9	5.3
Fertilizer	6.5	3.5	9.2	8.2
Manure	1.7	0.3	0.8	3.7
Insecticides	0.0	0.1	0.4	3.6
Irrigation	3.7	1.4	0.9	2.0
Others	1.9	1.4	2.0	2.2
Fixed Costs	24.3	42.8	26.2	23.2
Total Costs	100.0	100.0	100.0	100.0
Note: For value of costs see Table 2.5a in Annexure 5.				
Source: <i>Report of the Commission for Agricultural Costs and Prices</i> , Department of Agriculture and Co-operation, Ministry of Agriculture, Government of India, 2005.				

For Jowar, Tur, Soyabean and Cotton the projected cost of cultivation for Maharashtra and Minimum Support Prices (MSP) for India in 2004-5 is given in Table 2.6 (also see Table 2.6a in Annexure 5). It shows that the MSP for Jowar and Cotton are greater than A2+FL costs (all paid costs including rent for land and imputed family labour) but lower than C2 costs (A2+FL plus interest on value of owned capital assets and rental value of owned land), for Tur and Soyabean it is above C2 costs. This gap between costs and MSP reiterates the relative disadvantages associated with the cultivation of Jowar and Cotton and relative advantages of cultivating Tur and Soyabean. This would hold for Cotton even after taking

into account that Maharashtra State Co-operative Cotton Growers Marketing Federation Limited (MSCCGMF) paid an additional Rs.500/- per quintal over and above the MSP in 2004-5.

Indicators	Jowar	Tur	Soyabean	Cotton
Costs, C2 (Maharashtra)#	629.01	1026.59	885.66	2215.55
MSP (All India)@	515.00	1390.00	1000.00	1960.00

Note: * Rs.=Rupees and Qtl.=Quintal. # C2 costs data for 2004-5 are projections. It includes all actual expenses in cash and kind incurred in production by owner, rent paid for leased in land and imputed value of family labour, interest on value of owned capital assets (excluding land) and rental value of owned land (net of land revenue). @ MSP denotes Minimum Support Prices declared by the Ministry of Agriculture, Government of India. For Soyabean MSP is for yellow variety whereas Cotton MSP is for H-4 (long staple) variety. In Maharashtra, price paid under Monopoly Cotton Procurement Scheme was about Rs 500/- more than the MSP. For data during 2001-2 and information on variable input price index see Table 2.6a in Annexure 5.
Source: As in Table 2.5.

The farmer receives the MSP if the produce is of fair average quality and if it is sold in authorised centres. In practice, farmers sell the produce in the open market where the prevailing price is lower than the MSP. An exception was the Monopoly Cotton Procurement Scheme (MCPS) that has been in operation since 1972-3 in Maharashtra. Under this scheme, cotton procurement was the monopoly of the MSCCGMF and the farmer was not only assured of the MSP, but also received a bonus if MSCCGMF made profit.

Over time, a plethora of problems were identified with the scheme. The bonus was converted to additional advance price that was also guaranteed. The payment of additional price was de-linked from the actual market scenario leading to instances when Cotton was purchased dear and sold at a cheaper rate. This led to a loss that cumulated over time. In addition to this, poor storage facilities led to mixing of different grades of cotton and destruction by fire and rain. Office bearers involved in grading and weighing took to rent-seeking activities. The farmers paid commission to middlemen at the procurement centres. There emerged a class of traders in the guise of farmers. The farmer sold his produce to a trader-farmer at a lower price who in turn sold it to the MSCCGMF. The payment to farmers was delayed and staggered.

To do away with the problems under MCPS, monopoly procurement was relaxed and private traders and textile mills were allowed to buy from the farmers directly in 2002-3. This proved beneficial to the farmers, as the open market prices during this and particularly in the next season was higher than the MSP because of higher international price for cotton.

The doing away with MCPS was very short lived. In 2004-5, there was an increase in cotton production all over the world and open market prices fell much below the MSP and MCPS was back in operation leading to record procurement by MSCCGMF. Under MCPS, price paid per quintal (average fair quality of long staple) was about Rs.2500, but payment was not immediate. Many farmers sold their produce in the open market at Rs.1900 or even lower. It is by and large the trader-farmers or farmers who do not want ready cash who sold to the MSCCGMF.

2.5 Other Issues in Land, Labour and Credit

2.5.1 Capital Formation in Agriculture

We do not have independent estimates on capital formation in agriculture for Maharashtra. A perusal of the all India situation suggests that gross fixed capital formation in agriculture as a proportion of gross domestic product (GDP) declined from 3.1 per cent in the early eighties (1980-5, which also coincides with the sixth plan) to 1.6 per cent in recent times (1997-2002, which also coincides with the ninth plan), see Table 2.7. During the same period, gross fixed capital formation in agriculture as a proportion of total gross fixed capital formation declined from 13.1 per cent to 7.4 per cent. Proportion of plan expenditure towards agriculture & allied activities also declined in India as well as in Maharashtra.

Year	GFCF in Agr as % of GDP, India	GFCF in Agr as % of total GFCF, India	Exp on Agr & Allied as % of total Plan Exp, India	Exp on Agr & Allied as % of total Plan Exp, Maharashtra
1980-85, Sixth Plan (Actuals)	3.1	13.1	6.1	6.0
1985-92, Seventh Plan (Actuals)	2.3	9.6	5.9	5.6
1992-97, Eighth Plan (Actuals)	1.9	7.4	5.1	5.7
1997-2002, Ninth Plan (Actuals)	1.6	7.4	4.5	3.3

Note: GFCF indicates Gross Fixed Capital Formation, GDP indicates Gross Domestic Product at Factor Cost, Exp indicates expenditure, Agr indicates Agriculture.
 Source: *Report of the Committee on Capital Formation in Agriculture*, Ministry of Agriculture, Government of India, <http://agricoop.nic.in/Capital%20Formation/annexes.xls> (accessed 18 January 2006), *Economic Survey of India*, Various Years and *Economic Survey of Maharashtra*, Various Years.

2.5.2 Operational Holding

In 1995-6, the share of marginal, small and other size class of operational holdings in the selected districts and also in Maharashtra are given in Table 2.8. From the total operational holdings 40 per cent were marginal and nearly 30 per cent were small farmers in Maharashtra state. These proportions are lower in the selected districts indicating that the shares are higher for 'other' size-class of holdings (2+ hectares). The inequality in land distribution is also lower in the selected districts. Across the three districts, inequality is the lowest in Yavatmal). The average land sizes are much higher in the selected districts, but these being largely unirrigated the gross value addition from a unit land size will be lower than that in Konkan or Western Maharashtra. It may be mentioned that in Maharashtra, as also in India, the size of operational holdings has been declining (Table 2.8a in Annexure 5). It follows that the proportions of marginal and small size-class of holdings would be much higher in recent years than that in 1995-6.

Size-class of Land Holding	Wardha		Akola+Washim		Yavatmal		Maharashtra	
	Number (%)	Area (%)	Number (%)	Area (%)	Number (%)	Area (%)	Number (%)	Area (%)
Marginal	16.29	4.55	23.09	6.58	5.18	1.22	40.05	10.53
Small	36.68	20.16	36.78	22.08	40.48	20.28	29.82	23.25
Others	47.03	75.30	40.13	71.34	54.34	78.50	30.13	66.21
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Total (No/Area, lakh)	1.43	3.77	3.08	7.47	2.74	8.00	106.38	197.88
Gini coefficient	0.30		0.34		0.25		0.42	

Note: No is number of lakh holdings and area is lakh hectares. For trends in size-class distribution of holdings in Maharashtra and India see Table 2.8a in Annexure 5.
Source: *Agricultural Census 1995-6*, Commissioner Agriculture, Government of Maharashtra, Pune.

2.5.3 Ratio of Agricultural Labourers to Cultivators, 2001

An intriguing aspect of the selected districts is that these are also the ones with large proportion of agricultural labourers. In fact, data from census 2001 given in Table 2.9 suggests that the ratio of agricultural labourers to cultivators is greater than 1.6. In other words, between agricultural labourers and cultivators the proportion of the former is greater than 62 per cent and the latter less than 38 per cent. This means that in the selected districts the proportion of landless agricultural labourers is relatively higher. It also means a relatively greater socio-economic position of those whose primary work is cultivation. It follows that a decline in the economic position of the cultivators would be socially perhaps

more humiliating in these districts than where the divide between agricultural labourers and cultivators is not as striking.

Indicators	Wardha	Washim	Yavatmal	Maharashtra
Total Workers as % of population	44.5	44.6	45.5	42.5
Agricultural Labourers as % of Total Workers	43.4	52.4	49.7	26.3
Cultivators as % of Total Workers	25.2	31.4	27.6	28.7
Ratio of Agricultural Labourers to Cultivators	1.7	1.7	1.8	0.9

Source: *Census of India 2001*.

2.5.4 Credit Scenario in Rural Maharashtra

From 1995 to 2004, rural branches of all scheduled commercial banks declined from 2320 to 2241. In the study districts the absolute number of branches remained more or less the same (44 in Wardha, 87 in undivided Akola, and decreased from 70 to 66 in Yavatmal), but as proportion of total branches in the districts it showed a decline. Between triennium ending (TE) 1996-7 and TE 2003-4, rural deposits as a proportion of total deposits in the district decreased by 1 percentage point (from 26.4 per cent to 25.3 per cent) in Wardha, increased by 3.4 percentage point (from 17.3 per cent to 20.7 per cent) in undivided Akola and remained around 22 per cent in Yavatmal (Table 2.10). Agricultural credit as per cent of total credit disbursed as per utilization has been declining from TE 1996-7 to TE 2003-4. An exception is Wardha where it first increased in TE 2000-1 and then decreased. The latter decrease could be because of an increase in credit to industry during TE 2003-4. This increase in credit to industry also explains the large increase in credit-deposit ratio during TE 2003-4 in Wardha. The credit deposit ratio for all scheduled commercial banks in the three study districts seems to have first decreased and then increased. The increase in recent years has been due to an increase in credit towards personal loans.

One of the major sources of credit from formal institutions for agricultural purposes is through primary agricultural credit societies. It has even been observed in one of our background papers that per hectare loan given through primary agricultural credit societies during TE 2002-3 is among the lowest in Vidarbha region and the value for all the three study districts (Rs.665 for Wardha, Rs.326 for undivided Akola and Rs.232 for Yavatmal) is much lower than the state average of Rs.1120 (Shah, 2006).

Indicators	Year	Wardha	Akola+ Washim	Yavatmal	Maha- rashtra*
Rural Branches as per cent of Total Branches	TE 1996-7	61.1	55.4	58.6	49.3
	TE 2003-4	59.5	54.6	57.2	45.7
Rural Deposits as per cent of Total Deposits	TE 1996-7	26.4	17.3	21.9	15.2
	TE 2003-4	25.3	20.7	22.1	13.5
Agricultural Credit as per cent of Total Credit	TE 1996-7	14.9	28.7	42.1	16.0
	TE 2003-4	9.7	26.4	32.4	10.7
Credit-Deposit Ratio	TE 1996-7	122.4	69.3	53.3	60.5
	TE 2003-4	148.5	66.6	52.7	69.6

Note: Credit is as per utilization, TE indicates triennium ending. * Maharashtra excludes Greater Mumbai.
Source: Calculations based on data obtained through communication from EPWRF, Mumbai

We also have information on farmers' indebtedness across states from the National Sample Survey Organisation (59th round) survey of January-December 2003, the results of which were released in May 2005. It shows that more than half of the rural households in Maharashtra are farmers and more than half of the farmer households are indebted (Table 2.11). In Maharashtra, compared to the all India average, the proportion of farmers is less but that of indebted farmers is more. Within Maharashtra as well as in the all India scenario, a relatively greater proportion of the other backward caste and the other caste farmer households seem to have loans. Nearly three-fifths of the farmer households in Maharashtra depend on cultivation as their source of income and this proportion is slightly more among the indebted farmers. There are about three features separating out Maharashtra from the all India average and the three states of Andhra Pradesh, Kerala and Punjab.

First, it has one of the lowest proportions of indebted farmer households with less than 1 hectare of land. It is a little more than one-third compared to the all India average of three-fifths.

Second, nearly three-fourths of the outstanding loan is for farm business (capital and current expenditure). This is almost 15 percentage points greater than all India average and that of Andhra Pradesh and Punjab and 45 percentage points greater than Kerala.

Third, nearly, half of the loans are from cooperative societies compared to about one-fifth for the all India average. Further, the loan from professional moneylenders is about 7 per cent of the outstanding loan compared to more than half in the case of Andhra Pradesh. This has to be interpreted with caution because the outstanding loans are not current loans. A

recent study on Yavatmal suggests that the greater outstanding loan from cooperative societies is largely because more than half the members are defaulters with their credit lines choked from one to many years (Sarangi, 2004). In fact, for current loans the farmers falls back on the informal sector like moneylenders (see relevant discussion in chapter 4). Some of the modus operandi of moneylenders in the selected districts is discussed in the next section.

Indicators	Maha-rashtra	Andhra Pradesh	Kerala	Punjab	All India
Per cent of farmer HHs among rural HHs	55.7	42.3	43.9	61.8	60.4
Per cent of farmer HHs indebted	54.8	82.0	64.4	65.4	48.6
Per cent of farmer HHs with cultivation as main income	57.9	53.7	16.8	45.6	57.2
Per cent of indebted farmer HHs with cultivation as main income	62.6	54.4	14.4	52.7	56.9
Per cent of indebted farmer HHs, land <1 hectare	36.0	55.7	87.7	53.3	61.0
Per cent of indebted farmer HHs, land 1-2 hectares	26.2	21.8	9.1	15.8	18.9
Per cent of indebted farmer HHs, land >2 hectares	37.9	22.4	3.2	31.0	20.1
Per cent of farmer HHs taken loan for farming activities	75.4	61.5	21.4	62.4	58.4
Per cent of farmer HHs taken loan from Government	1.2	1.0	4.9	1.9	2.5
Per cent of farmer HHs taken loan from Cooperative societies	48.5	10.4	28.3	17.6	19.6
Per cent of farmer HHs taken loan from Banks	34.1	20	49.1	28.4	35.6
Per cent of farmer HHs taken loan from Moneylenders	6.8	53.4	7.4	36.3	25.7
Per cent of farmer HHs taken loan from Other sources	9.4	15.1	10.2	15.8	16.7

Note: HHs indicats Households
 Source: *Situation Assessment Survey of Farmers: Indebtedness of Farmer Household: NSS 59th round (January-December 2003)*, National Sample Survey Organisation, Report No. 498 (59/33/1), May 2005.

2.6 Focus Group Discussions

From the 109 villages where we visited a deceased household we have analysed information from focus group discussion (FGD) conducted in 99 villages. During FGDs, the participant strength was fluid as some left in between and others came and joined in between. There were others who just come to see what is going on and end up being onlookers. We have taken note of those who by and large contributed to the discussions. On average, we had 6-7 participants in an FGD with the minimum number of participants being 2 and the maximum number of participants being 9 (Table 2.12).

Some of the important issues raised in the focus group discussions are as follows. Almost all the persons have some outstanding loans taken either from formal or informal sources. Current operational loans are likely to be from moneylenders. There are a number of them operating from district headquarters, taluka headquarters and smaller ones operating at the

village level. The village moneylender in turn could have taken loans from larger moneylenders or input dealers operating at the taluka/district level. The ones operating at the village level are either economically or politically or socially dominant. This made it difficult to obtain specific details about the informal moneylender in a village. One participant's remark during an FGD that "Gentleman, you will go away after this discussion. It is we who have to stay in the village. Please do not probe further into the details. Further revelation by us will make our stay in the village difficult." In 70 per cent of the FGDs, the availability of the informal loans in the village was mentioned and in 29 per cent of the FGDs the difficulty in getting a formal loan was also mentioned.

Issues	Total (N=98)	% of Total
Informal Loans Available within the Village	69	70.4
Middlemen at Government Cotton Procurement Centre	62	63.3
Difficulty in Seeking Health Care	54	55.1
Water Scarcity	49	50.0
Dowry	46	46.9
Inappropriate Prices for Cotton	44	44.9
Delayed Payments at the Government Procurement Centre	43	43.9
Difficulty in Getting Loans from Formal Sources	28	28.6
Political Apathy/Division	25	25.5
Land Seized/Mortgaged	17	17.3
No Transport Facilities	17	17.3
Difficulty in Getting Employment/Low Wages	14	14.3
No School after Primary Level	13	13.3
Average number of Issues Discussed in FGDs	4.9	
Average number of Participants in FGDs	6.6	
Note: N indicates number of FGDs. FGD indicates focus group discussion. Field survey was conducted in 109 villages, but after cleaning FGD data from 98 villages have been analysed. An issue not being raised in an FGD does not mean that it is not relevant in that village. District wise details of FGDs are given in Table 2.12a in Annexure 5. Source: Field Survey.		

Informal loan transactions could be in *dedhi*. The debtor has to return the loan around harvest (within four to six months) and pay Rs.150 for loan of Rs.100. Similarly, there is *sawai* (payment of Rs.125 for loan of Rs.100).

Another popular form of loans for agricultural and social purposes is at an interest rate of Rs.10/Rs.5 per month. In this case the interest is calculated after the principal is returned. For a loan that is repaid in 4-6 months, Rs.10 interest is similar to *dedhi* whereas Rs.5

interest is similar to *sawai*. The difference crops in if for some unforeseen reasons like crop failure the loan is not repaid. Non-payment virtually leads to rewriting of a fresh loan with some additional credit being given during the start of the next agricultural season. The cumulative interest paid will be lower under *dedhi/sawai* than under an interest rate of Rs.10/Rs.5 per month.

The rewriting of old loans as fresh loans makes the debtor feel that the old loan is written off and he is being given a new loan. During this rewriting of loan the debtor is also given some additional credit. Thus, the debtor is made to understand that on the loan he is taking he pays an interest of *dedhi*, *sawai*, or Rs.10/Rs.5 per month. As against this, loans from formal sector cumulate over time and the absolute difference between amount taken and amount repaid can become higher than *dedhi/sawai*. For instance, at 14 per cent compound interest per annum, non-payment of loan for a little more than 3 years (say, 38 months) will be higher than *dedhi* and non-payment for 2 years will be higher than *sawai*.

A conventional form of giving loan is through mortgaging of land. Creditors now consider it risky because fatality like suicides can lead to cancellation of such contracts. They have come up with a new design. They insist on sale of land with a verbal (not legal) promise that it will be sold back to the debtor after the loan is repaid. If required, legal registration expenses on both counts are borne by the debtor. Land seizure/mortgage was mentioned in 17 per cent of FGDs.

Some of the moneylenders would also be traders. Loan taken could be for purchase of an input and repayment through sale of produce. Interlocking of credit, input and output markets are not necessarily enforced by the trader-moneylender, but operating with a single trader-moneylender, would save transaction costs to the farmer.

The discussions revealed difficulty in selling their produce at the Government procurement centres. In 63 per cent of FGDs the participants mentioned about the presence of middlemen who take 1.5-3.0 per cent as commission. Besides, 44 per cent of FGDs indicated the delayed payments for produce sold at Government procurement centres. The participants also feel that the price they receive for their produce is inappropriate. This was indicated in 45 per cent of the FGDs.

One of the common problems mentioned by participants during our FGDs is the paucity of water (nearly 50 per cent of FGDs). This was acute during early part of 2005 because of deficient rainfall in 2004. This was also observed in some urban centres. Some villages near Yavatmal pointed out the existence of a dam/storage tank very near to their village, but the water was meant for Yavatmal town. In some places, availability of drinking water was a serious problem. It is this greater reliance on monsoon that restricts the cultivation to fewer crops. Many villagers echoed the need for water harvesting or irrigation schemes.

Despite delay and deficient rain, there were instances of people (whole villages) opting for a second or third sowing. With seed replacement being almost complete, it contributed to additional expenses for seed. There is also the question of spurious quality of seeds. We came across farmers stating that there were instances when the plant grew and so necessary expenses were also incurred for fertilizers and pesticides, but these plants did not flower.

In the last 5-10 years there has been an increase in the number of spraying for insecticides/pesticides. This also has added to the cost. One reason for an increase in the number of spraying is also spurious quality of these. There is no mechanism to check or regulate the quality of these. A poor quality of pesticide would also mean that the insects/pest become resistant and their new mutations would subsequently require higher doses of insecticides/pesticides.

Over the years there has been an increase in the need and cost for fertilizers. Here also, as in the case of seeds and pesticides, farmers could end up buying spurious quality.

This brings forth some important points. First, the absence of an extension service which could have advised the farmers against late sowing or improper use of other inputs. Second, it is the private traders selling farm inputs who provide extension service. This leads to supplier-induced demand. This needs to be regulated. There is also a need to certify the quality of the inputs sold.

Difficulty in seeking health care was mentioned in 55 per cent of FGDs. In about 30 villages there was neither any public nor any private caregivers. With difficulty in transport facilities (17 per cent of FGDs) this means that the time lag in taking a suicide victim who has consumed poison can prove fatal.

The social problem of dowry came out in 47 per cent of FGDs. This can add to the indebtedness burden. In about 13 per cent of villages there were no schools after primary level and many others not beyond middle school level. Security concerns prevent parents from sending adolescent girls to a nearby school for continuing their studies. Once this stops the parents start thinking about their daughters marriage. There are instances when daughters are married before they attain the age of 18 years.

In 24 instances the participants in FGDs thought that their political representatives had little or no understanding of their problems. In another village, political conflict between two groups was cited as a major reason for not leading to any solution for their problem.¹⁵

We also came across villages from where many people have migrated out in search of jobs. These included people those who have land and also those who are landless. Some of the migrants and their family members said that work is not available near the villages, and hence, they had to go to far off places. Many from their villages have gone to Andhra Pradesh in search of work. Besides, in 14 per cent of the FGDs difficulty in getting employment or availability of work in low wages were mentioned. These not only indicate the unavailability of non-farm jobs in the study regions, but also indicate poor public interventions.

2.7 Public Interventions: The Maharashtra Employment Guarantee Scheme

One of the important social welfare measures in the state is the Maharashtra Employment Guarantee Scheme (MEGS), which has been in operation since 1970s. We would like to see the interventions in our selected districts in recent years. All our selected districts are from National Sample Survey (NSS) Inland Eastern region.¹⁶ In this region, the proportion of poor in total rural population was 32 per cent in 1999-2000. This constitutes about 23 per cent of the state's rural poor whereas this region's share of state's rural population is 17 per cent. The region's share of expenditure under MEGS is, however, lower than even their share of rural population and it has been declining (Table 2.13, also see Table 2.13a in

¹⁵ Lack of strong voice among politicians of the region has also been mentioned in the background on media perspective (Deshpande, 2005). This also came up in our discussion with officials and peasant activists from the region.

¹⁶ The National Sample Survey (NSS) Inland Eastern region of Maharashtra consists of all the districts of Amravati division and the districts of Wardha and Nagpur in Nagpur division.

Annexure 5).¹⁷ Expenditure under MEGS during 2000-1 to 2003-4 also indicates that the share for the region is lower for each and every item. In particular, it reflects poor intervention in works associated with developing agriculture either directly or indirectly through interventions in irrigation and horticulture.

	Inland Eastern Region*	Maharashtra	(MEGS expdn, Rs Crore)#
Proportion of Poor, Rural, 1999-2000	31.7	23.7	
Share of Poor, Rural, 1999-2000	23.2	100.0	
Share of Population, Rural, 2001	17.3	100.0	
<i>MEGS Expenditure</i>			
Agriculture, 2000-1 to 2003-4	4.2	100.0	(929.9)
Irrigation, 2000-1 to 2003-4	6.5	100.0	(528.6)
Horticulture, 2000-1 to 2003-4	13.0	100.0	(211.9)
Total, 2000-1 to 2003-4	10.4	100.0	(3338.0)
Note: * Inland Eastern Region, according to National Sample Survey, comprises of all the districts of Amravati division and the districts of Wardha and Nagpur of Nagpur division. # Figures in parentheses indicate total expenditure under MEGS and it excludes certain miscellaneous expenditure at the aggregate level for the state. Selected district wise and year wise shares of expenditure under MEGS are given in Table 2.13a in Annexure 5. Source: Calculation based on data obtained through communication from Mantralaya, Mumbai, facilitated by Secretary, Relief & Rehabilitation.			

What is intriguing is that in Yavatmal the expenditure on establishment as a share of total expenditure in the state is greater than the share of rural population. In fact, in Wardha the total expenditure under MEGS in 2003-4 was either on establishment or on miscellaneous accounts only. This is also the scenario in Wardha in 2004-5, a year with deficient monsoon (Table 2.5).¹⁸ These observations are in line with the findings mentioned in a recent study that MEGS has been successful as a relief measure largely concentrated in drought prone areas of Marathwada and Western Maharashtra divisions of the state and has had a limited success as a poverty eradication measure (Vatsa, 2005).

2.8 Conclusions

In recent years, Maharashtra's gross value addition from agriculture is relatively more from Fruits & Vegetables and Sugarcane – together these two Vegetables account for less than 8 per cent of the area under cultivation, but nearly 53 per cent of the gross value added in agriculture. These crops are largely not grown in the selected districts of Wardha, Washim

¹⁷ This point has been discussed in Mishra and Panda (2005).

¹⁸ Interview with District Magistrate, Wardha, on 28 March 2005.

and Yavatmal. The cash crops in the selected districts are Cotton and more recently Soyabean. Over the years, profitability from Cotton has declined. Some of the reasons are as follows: high subsidies by the USA leading to distortions in the international prices, low import tariff by India, failure of the MCPS in Maharashtra. At the same time, the state has been withdrawing, as is evident from, declining public investment in agriculture, poor agricultural extension, diminishing role of formal sources of credit and relatively lower public intervention programmes under MEGS in the selected districts. The farmer, now, depends on the input supplier for advice leading to supplier-induced demand and on informal sources for credit with higher interest rate thereby increasing his repayment burden. To add to these, 2004 happened to be a rain deficient year in the selected districts, but this year was one when the macro supply scenario of Cotton was good. The farmers from our selected districts were exposed to both yield as well as price shocks. To sum up, there seems to be a larger socio-economic and agrarian crisis. In the next chapter, we discuss the suicide scenario in Maharashtra.

3 Suicide Scenario in Maharashtra

3.1 Introduction

Suicide data in Maharashtra, as also in India, is compiled through police records.¹⁹ In 2001, Maharashtra constituted about 9.4 per cent of the all India population but accounted for 13.5 per cent of the total suicide deaths in the country. Suicides accounted for 2 per cent of the total deaths in the state whereas at the all India level suicides accounted for 1.3 per cent of the total deaths.²⁰ What is the reason for the relatively higher suicide deaths in Maharashtra? In this chapter we analyse some recent trends and patterns in attempting to answer this question.

In section 3.2 we discuss the recent trends and patterns in Suicides in Maharashtra. In particular, we discuss about trends in Suicide Mortality Rates (SMRs, suicide deaths per 100000 population), age-specific, education wise and marital status wise SMRs, and distribution of cause, method and occupation of suicide victims. Trends in farmers SMR rate is discussed in section 3.3. This chapter is summarized in section 3.4

3.2 Recent Suicide Trends and Patterns in Maharashtra

3.2.1 *Trends in Suicide Mortality Rate*

The trends in age-adjusted SMRs in Maharashtra from 1995 to 2004 are given in Table 3.1 (for trends in age undadjusted SMR see Table 3.1a in Annexure 5).²¹ Further, suicide is a social phenomenon that differs across gender groups and it is appropriate to discuss about patterns in males and females separately. Age adjusted SMR for males increased from 17.4 in 1995 to 20.3 in 2004 and that for females decreased from 13.6 in 1995 to 10.8 in 2004. Absolute numbers of male suicides decreased in 1996, but thereafter it has been increasing for the whole period. For females, absolute number of suicides decreased in 1996 and then increased in the next two years, but has been declining since 1999. Age-adjusted SMR for males has not always been increasing indicating that the increase in number of suicides has

¹⁹ There is likely to be underreporting of suicide deaths to police because of legal hassles and shame identified with the act. A recent verbal autopsy study in some villages of Southern India has indicated a much higher suicide mortality rate (Aaron et al, 2004; also see Joseph et al, 2003).

²⁰ For a recent discussion of suicides in India see Mishra (2005a).

²¹ Medically, suicide is not defined for age group 0-4 years. Thus, it is technically appropriate to give age-adjusted SMR by taking into consideration 5+ population. In our exercise, this increased the level but did not alter the trend or pattern.

not been commensurate with the increase in population. In fact, between 2001 and 2004 age-adjusted SMR for males has been in the range of 20-21. Decline in absolute female suicides when population has been increasing explains the declining age-adjusted SMR for females.

Year	Number of Suicides		Age Adjusted (5+) Suicide Mortality Rate		(Male/ female) SMR Ratio
	Males	Females	Males	Females	
1995	6882	4984	17.4	13.6	1.28
1996	6489	4727	16.1	12.6	1.27
1997	7333	5303	17.7	13.8	1.28
1998	8014	5644	18.9	14.4	1.31
1999	8021	5573	18.5	13.9	1.33
2000	8706	5299	19.6	12.9	1.52
2001	9338	5280	20.6	12.6	1.63
2002	9447	5082	20.3	11.9	1.71
2003	9810	4950	20.6	11.3	1.83
2004	9903	4826	20.3	10.8	1.89

Note: Suicide Mortality Rate indicated suicide deaths per 100000 population. Year wise population for each sub-group was interpolated/extrapolated and adjusted to give estimates that are sub group consistent. Age-adjusted Suicide Mortality Rate excludes age group of 0-4 years, as suicide is not defined for this population. For age unadjusted SMR see Table 3.1a in Annexure 5. For district/division wise trends, age-specific, education wise, marital status wise, cause wise, method wise and profession wise data see Tables 3.1b-3.1i in Annexure 5.

Source: *Census of India, 1991 and 2001; Accidental Deaths and Suicides in India, 1995, 1996, 1997, 1998 and 1999*, National Crime Records Bureau, Ministry of Home Affairs, Government of India, Various Years; Communication from Additional Director General of Police, Crime Investigation Department, Maharashtra State, Pune, through their letter number CID/STATS/Suicides/4377/2005 dated 12 July 2005; and www.indiastat.com (accessed 5 October 2005).

The male/female SMR ratio in Maharashtra has decreased from 1.28 in 1995 to 1.27 in 1996 but thereafter it has been increasing and the ratio was 1.89 in 2004. At the all India level it has decreased from 1.32 in 1995 to 1.29 in 1996 but thereafter it has increased and the ratio was 1.47 in 2001. The all India male/female SMR ratio was higher than that for Maharashtra till 1999, but thereafter in 2000 and 2001 the ratio has been higher in Maharashtra. This trend might have continued, but as we have all India suicide data by sex only till 2001 we do not want to speculate on the possibilities. However, the male/female SMR ratio in Maharashtra as well as that of India is much lower than the global scenario of 3.3 in 1998 (male SMR of 26.9 and female SMR of 8.2).

Trends of age-adjusted SMR by sex across districts/divisions from 1998 to 2004 are given in Table 3.1b in Annexure 5).²² Amravati division has the highest suicide mortality rate for both males and females for all the years. Besides, SMRs for Nagpur division are also higher than the average for the state for both males and females for all the years. In the other divisions, SMRs are higher than the state average in Aurangabad for both males and females in 1999 and for females in 2000, 2002 and 2004 and in Pune for males in 2000 and from 2002 to 2004.

The trends over the years show that male SMR seems to have increased with jumps: by 7.8 points in Amravati division in 2001, by 5.6 points in 2000 in Nagpur division, and by 2.7 points in Pune division in 2000. Trends in female SMR seem to be declining in all the divisions. Male-female SMR ratio has been increasing in all the years (exceptions are Konkan in 1999 and 2002, Nagpur in 2003, Nashik in 2004 and Pune in 1999) and in 2004 male SMR is more than double that of female SMR in Amravati, Nagpur and Pune divisions.

For the three selected districts, SMRs in Yavatmal seems to be greater and Washim lower than that for Amravati division and Wardha is higher than that for Nagpur division. SMRs in Wardha are closer and for some years higher than that in Yavatmal. The trends, as in the case for their respective divisions, show that there is a jump to higher age-adjusted male SMR in Wardha in 2000 and in Washim and Yavatmal in 2001. Between 2001 and 2004, age-adjusted male SMR was the highest in 2002 and age-adjusted female SMR in 2001 in all the three districts. Male SMR is double that of female SMR in Wardha and Yavatmal districts in 2004.

3.2.2 Age-specific Suicide Mortality Rates

For ease of analysis, we divide the data into two periods 1998-2000 and 2001-2004. As indicated earlier, the latter period is identified with higher male SMR in some regions. Table 3.1c and 3.1d in Annexure 5 give age-specific SMRs across districts/divisions by sex for the above-mentioned two periods.

Between 1998-2000 and 2001-2004 age adjusted SMR for males increased in Amravati division by 8.1 points (from 32.5 to 40.6), in Aurangabad division by 0.5 points (from 18.6

²² This and other information on suicides across all districts of Maharashtra have been given in Annexure 5.

to 19.1), in Nagpur division by 2.5 points (from 25.0 to 27.5), in Nashik division by 0.9 points (from 15.9 to 16.8), in Pune division by 2.5 points (from 18.6 to 21.1) and in Maharashtra state by 1.4 points (from 19.0 to 20.4) whereas female age-adjusted SMRs declined in all the divisions leading to a decline in Maharashtra by 2.1 points (from 13.7 to 11.6).

In 2001-4, Maharashtra's age-specific SMRs are as follows. For males it is 0.9 for 5-14 years, 19.9 for 15-29 years, 34.4 for 30-44 years, 35.0 for 45-59 years and 20.5 for 60+ years whereas for females it is 1.0 for 5-14 years, 20.2 for 15-29 years, 15.1 for 30-44 years, 10.8 for 45-59 years and 5.8 for 60+ years. Across divisions, Amravati and Nagpur seem to have relatively higher SMRs and also the ones where the absolute increase in male SMRs was relatively higher. In these two divisions, excluding age group of 5-14 years, male SMRs increased in all other age groups and the increases are particularly notable in Amravati division.

In the three selected districts, age adjusted SMR increased in Wardha by 9.5 points (from 38.1 to 47.6), in Washim by 6.7 points (from 26.5 to 33.2) and in Yavatmal by 8.3 points (from 38.3 to 46.0). Notable increase in age-specific male SMRs are in the age groups of 15-29 years (by 25.3 points, from 29.9 to 55.3) and 30-44 years (by 11.1 points, from 65.0 to 76.1) in Wardha, in the age groups 45-59 years (by 30.4 points, from 36.6 to 67.0) and 60+ years (by 29.8 points, from 7.7 to 37.5) in Washim and in the age groups of 15-29 years (by 10.3 points, from 40.9 to 51.2), 30-44 years (by 13.9 points, from 62.8 to 76.7) and 45-59 years (by 13.0 points, from 67.1 to 80.1) in Yavatmal.

Across age groups, SMR for males in Maharashtra was the maximum in the early middle age group of 30-44 years in 1998-2000 and shifted to the late middle age group of 45-59 years in 2001-4. This pattern seems to have been the case in the divisions of Amravati, Aurangabad, Konkan and Nagpur and also in the selected districts of Washim and Yavatmal whereas in Wardha district the shift was reversed with maximum male SMRs for 45-59 years in 1998-2000 and 30-44 years in 2001-4.

The former pattern (shift in maximum SMR from early middle age to late middle age) explains that people those who are now entering into a stage of getting their children married and are in the process of training them the tricks of the trade. This group is an

intermediary stage prior to retirement from active participation. If he is a cultivator then he will have relatively greater experience (20+ years) in farming, which in a conventional setting would be very useful knowledge. Relatively greater SMRs among them would mean that they are not able to fulfil certain social obligations like getting children married/educated and that their experience in farming is not being of much help.

The latter pattern (shift in maximum SMR from early middle age to late middle age) would indicate greater years of life lost. If he is a cultivator then his is likely to be one with less years of experience in farming. He may be willing to take greater risks expecting higher returns, but a failure can be catastrophic.

In both the time periods, SMR for females, as is the case at the all India level, is the maximum in the youth age group of 15-29 years. An exception to this is in our study district Wardha where maximum female SMR is in 30-44 years. An important feature of age-specific SMR is that among children (5-14 years) and youth (15-29 years) female SMR is greater than male SMR. This along with the fact that SMR for females is the maximum among youth (15-29 years) indicates that years of life lost among females will be proportionately more than their proportion of total suicide deaths. It is said that higher SMR for females in this age group could be an outcome of domestic conflict such as dowry harassment.²³ Or, they could be because of other forms of female victimization such as suspected illicit relationship, not having children, cancellation/non-settlement of marriage, physical abuse, illegitimate pregnancy and divorce. Some of the reported female suicides could even be homicides in the guise of suicide or accident.

3.2.3 Education-wise and Marital Status wise Suicide Mortality Rates

Education wise and marital status wise average SMRs per annum across districts/divisions by sex in Maharashtra for the period 2001-4 are given in Table 3.1e and 3.1f in Annexure 5. Education wise SMRs in Maharashtra are as follows. For males it is 8.4 for 'no education', 28.9 for primary education completed, 42.7 for middle school completed, 31.5 for matriculates and 11.1 for higher secondary and above whereas for females it is 4.7 for 'no education', 17.6 for primary education completed, 31.9 for middle school completed, 23.7 for matriculates and 8.2 for higher secondary and above.

²³ On victimization of women leading to dowry deaths see Natarajan (1995)

The patterns are similar in the divisions indicating that the peak SMR is among the middle school education category. The exception is maximum SMR for matriculates among education group in Amravati division for both males and females. In the selected districts, including Washim and Yavatmal from Amravati division, the pattern is similar to that for Maharashtra. This is so because in Akola, Amravati and Buldhana districts SMR is the highest for matriculates across education groups. In all the districts of Amravati division middle school and matriculates either have the maximum or the second highest SMR across education groups. This means that those with 7-10 years of schooling have relatively greater risk.

As in age-specific subgroups, education wise subgroups in Amravati and Nagpur divisions as well as in the three selected districts have by and large greater SMRs than the subgroup average for Maharashtra state. The exceptions are 'no education' male and female SMRs and 'middle school' female SMR in Nagpur division, and 'no education' male SMR in Wardha districts.

Marital status wise SMRs in Maharashtra are – not married: 8.7 males, 6.8 females; married: 30.6 males, 15.4 females; widowed: 38.7 males, 7.0 females; and divorced/separated: 135.9 males, 30.3 females. Across marital status category, SMR is the maximum for divorced/separated for both male's and females. This pattern holds across all divisions with the exception being for females in Aurangabad and Pune divisions where the maximum SMR across marital status categories is among married.

The marital status subgroups in Amravati and Nagpur divisions and the selected districts also have SMRs higher than that for the subgroup average for Maharashtra state. The exceptions are 'divorced/separated' male SMR in Amravati division, male and female SMRs in Washim and Yavatmal districts and 'widowed' male SMR in Wardha district. This means that, compared to the state average for that subgroup, never married and married males in Amravati division have a greater disadvantage.

3.2.4 Cause wise Distribution of Suicides

Suicides could be because of a number of factors/stressor that need not be mutually exclusive – they can co-exist and be interrelated. Nevertheless, police records provide some data on causes that are mutually exclusive. The distribution of this by sex across broad

category of causes for districts/divisions of Maharashtra is given in Table 3.1g in Annexure 5. The distribution of causes of suicides in Maharashtra suggests that for males 31 per cent is due to family problems, 8 per cent is due to insanity, 24 per cent is due to other illness, 11 per cent is due to economic reasons, 1 per cent is due to love affairs, 2 per cent is due to female victimization and the remaining 23 per cent is due to other reasons. For females, 41 per cent is due to family problems, 8 per cent is due to insanity, 20 per cent is due to other illness, 3 per cent is due to economic reasons, 2 per cent is due to love affairs, 12 per cent is due to female victimization and the remaining 12 per cent is due to other reasons.

In Amravati division, other illness is the reason where proportions are higher than the state average by 5 percentage points for males and nearly 8 percentage points for females. In the three selected districts, causes with higher proportions than the state average are notable for other illness by 21 percentage points among males and 22 percentage points among females in Wardha district and by 13 percentage points among males and by 17 percentage points among females in Yavatmal district and for family problems by 10 percentage points among males and for female victimization by 19 percentage points among females in Washim district.

Having pointed out these, it needs to be reiterated that suicide is multifaceted and understanding it is a complex endeavour.²⁴ More over, various causes can co-exist and be interrelated. For instance, illness gets aggravated due to poor economic condition because it makes care seeking difficult. Similarly, ill health can lead to a loan to meet medical expenses and also reduce the ability to work aggravating the economic condition. Both economic problems and ill health can lead to conflict within the family. It is for this that one should be cautious while interpreting the mutually exclusive cause data available from police records. In our micro level study, we could identify on an average 4.8 risk factors for the 111 cases analysed (Table 4.7). This point has also been mentioned in our background paper based on content analysis of news reports on farmers' suicides (Mishra, 2005b).

²⁴ The complexity can be elucidated through an example given in Leenaars (1995, p.363). "A 16-year-old was found dead in a car, having died of carbon monoxide poisoning. People were perplexed: "Why did this young person from an upper-middle-class family kill himself?" The parents found out that his girlfriend had rejected him the day of his suicide. That was the reason: ... A few friends and his teachers knew that he had been having problems in school. That was the reason. A few others knew that his father was an alcoholic and abusive. That was the reason. His physician knew that he had been adopted and had been recently upset about that. She knew the real reason. And others knew..."

3.2.5 Distribution of Methods of Committing Suicides

Distribution of methods of committing suicide by sex across districts/divisions of Maharashtra for 2001-4 is given in Table 3.1h in Annexure 5. The distribution for Maharashtra is as follows. For male suicide deaths: 34 per cent were by consuming insecticides, 8 per cent were by consuming other poison, 10 per cent were by drowning, 7 per cent were by self-immolation and the remaining 8 per cent were by other methods. For female suicide deaths, 30 per cent were by consuming insecticides, 8 per cent were by consuming other poison, 18 per cent were by hanging, 15 per cent were by drowning, 26 per cent were by self-immolation and the remaining 3 per cent were by other methods. This shows that across gender there are some differences.

The maximum proportion of suicide deaths are by insecticide consumption for both males and females. The second most common method was hanging by males whereas it was self-immolation by females. In fact, hanging by males has the maximum proportion in the divisions of Konkan and Pune and self-immolation by females has the maximum proportion in the divisions of Konkan, Nagpur and Pune. Across division, the proportion of suicide deaths by drowning is relatively much higher in Nagpur for both males and females. The involvement of females in household work brings them in close proximity to fire in the kitchen and the well for fetching water. Spur of the moment decisions might lead them to using these methods. Suicide death through burns and to some extent drowning could conceal homicide, which mostly arises out of domestic violence (see Kumar, 2003). Some of these are dowry deaths.²⁵

In the selected districts of Washim and Yavatmal the proportion committing suicide by consuming insecticide is much higher than the state average: 59 per cent for males and 51 per cent for females in Washim and 76 per cent for males and 68 per cent for females in Yavatmal. In Wardha, the proportion committing suicide by consuming other poison (22 per cent for males and 23 per cent for females) is much higher than the state average and together with consumption of insecticide it accounts for 61 per cent of male and 53 per cent of female suicides.

²⁵ In 2002 and 2003, 4725 female suicide deaths in India were associated with dowry disputes and 609 of these were in Maharashtra (Rajya Sabha Starred Question No 326 dated 17 August 2005, www.indiastat.com, accessed 11 November 2005).

Insecticide/pesticide is most commonly available in farming households (particularly, those cultivating Cotton). Thus, suicide deaths by consumption of insecticides would largely be individuals in these households. Spur of the moment decision will lead to use of this fatal method because of its easy availability. We have mentioned earlier that cotton cultivation uses nearly 90 per cent of the total pesticides used across five major crops in Maharashtra (section 2.4). Restrictions on its easy availability can help reduce incidences of suicide with such a fatal method. In this regard, important policy lessons can be taken from Sri Lanka's experience (see references in Gunnell and Eddleston, 2003).²⁶

3.2.6 Occupation wise Distribution of Suicides

Distribution of occupation of suicide victims aggregated for 2001-4 across districts/divisions of Maharashtra is given in Table 3.1i in Annexure 5. For males, 35 per cent are self employed in agriculture, 8 per cent are self employed in other activities, 17 per cent are in service, 10 per cent are unemployed, 5 per cent are students and the remaining 25 per cent are in other occupations. For females, 69 per cent are housewives, 10 per cent are self employed in agriculture, 1 per cent is self employed in other activities, 4 per cent are in service, 2 per cent are unemployed, 8 per cent are students and the remaining 8 per cent are in other occupations.

Across divisions, one observes that the maximum proportion for different occupations is as follows: self-employed in agriculture: 52 per cent for males in Aurangabad and 21 per cent for females in Nagpur, self-employed in other activities: 14 per cent for males in Nagpur and 3 per cent for female in Konkan, service: 34 per cent for males and 8 per cent for females in Konkan, unemployed: 20 per cent for males and 4 per cent for females in Konkan; students: 7 per cent for males and 11 per cent for females in Nagpur, and other occupation: 35 per cent for males in Amravati and 12 per cent for females in Nashik and Amravati.

In the selected districts, the proportion for those self-employed in agriculture is lower than that for the state as a whole and also from their respective division (except for females in Wardha). In Wardha 20 per cent of the male suicide victims were self-employed in other

²⁶ On easy availability of firearms leading to greater suicides among farmers in UK, USA and how restrictions on its availability led to reduction of incidences of suicide through this fatal method see Hawton et al (1998) and Miller and Hemenway (1999). For a recent discussion on suicide prevention strategies in developing countries see Vijayakumar et al (2004).

activities. The proportion of males in 'other' occupations is higher than that for the state in all the three districts: Wardha (36 per cent), Washim (73 per cent) and Yavatmal (42 per cent). This is partly explained by the fact that a larger proportion of total workers in these regions are agricultural labourers (Table 2.9). For females, the proportions being housewives at 73 per cent in Wardha and 82 per cent in Washim whereas the proportion in 'other' occupation at 9 per cent in Washim and 17 per cent in Yavatmal are higher than the respective proportions for the state. In the absence of population data across the above population categories the suicide incidences cannot be normalized and one cannot infer much from the proportions. However, to enable some comparison with regard to farmers we make use of the population of cultivators from census and superimpose this on suicides by those self-employed in agriculture to arrive at SMR for farmers.

3.3 Suicide Mortality Rate for Farmers

Trends in farmers' suicides and SMR for farmers by sex for Maharashtra from 1995 to 2004 are given in Table 3.2. The total number of farmer suicides increased from 1083 in 1995 to 4147 in 2004. The increase was largely because of 288 per cent increase in male farmer suicides from 978 to 3799. During this period, male farmer suicides as a proportion of total male suicides in Maharashtra increased from 14 per cent to 38 per cent. SMR for male farmers more than trebled from 17 in 1995 to 53 in 2004, but for females the trend fluctuated to reach a peak of 12 in 2001 but thereafter it has been declining. Age-adjusted SMR for males increased from 17 in 1995 to about 21 in 2001 and has remained at that level for the remaining three years whereas age-adjusted SMR for females reached a peak of 14 in 1998, but thereafter it has been declining (Table 3.1).

The ratio of male-to-female SMR for farmers decreased from 7.2 in 1995 to 2.9 in 1996 but thereafter it has been increasing to reach 8.3 in 2004. In 1995 the ratio was higher because of low SMR for female farmers whereas its increase after 1996 is because of the increase in SMR for male farmers. From 1995 to 2004, the overall age-adjusted SMR increased by only 0.6 points (from 1.3 to 1.9). During the same period, ratio of farmers to age-adjusted SMR increased from 1.0 to 2.6 for males and from 0.2 to 0.6 for females. The SMR for farmers became higher than that of the age-adjusted population from 1996. In particular, the trends show that suicide among male farmers has been increasing over the years and this subgroup of population is becoming more and more susceptible than the overall population. This has not been the case for female farmers, but this has to be interpreted with caution

because female suicide victims from farming households (or whose husband or son is considered as self-employed in agriculture) would have their occupation indicated as housewives as per police records and also perhaps in the census. In fact, in Washim district, occupation of female suicide victims are indicated either as housewives or students or service or 'other' occupation – none are indicated under self-employed in agriculture or self-employed in other activities or as unemployed (Table 3.1g in Annexure 5).

Year	Number of Farmer Suicides		SMR for Farmers		Ratio of (Male/Female) SMR		Ratio of SMR for Farmers to Age-adjusted SMR	
	Males	Females	Males	Females	Farmers	Age-adjusted	Males	Females
1995	978	105	16.7	2.3	7.19	1.28	0.96	0.17
1996	1570	411	26.2	8.9	2.95	1.27	1.63	0.71
1997	1600	317	26.1	6.7	3.89	1.28	1.47	0.49
1998	1938	471	31.0	9.8	3.17	1.31	1.64	0.68
1999	2050	373	32.0	7.6	4.23	1.33	1.73	0.55
2000	2492	530	38.1	10.5	3.61	1.52	1.94	0.82
2001	2945	591	44.1	11.5	3.83	1.63	2.14	0.91
2002	3155	540	46.2	10.3	4.49	1.71	2.27	0.87
2003	3381	455	48.5	8.5	5.70	1.83	2.35	0.75
2004	3799	348	53.3	6.4	8.37	1.89	2.62	0.59

Note: For population interpolation/extrapolation see note in Table 3.1. SMR for farmers is calculated by making use of 'cultivators' population from 2001 census. It is assumed that cultivators as a proportion of age adjusted population is the same for all the years as it is in 2001 census.
Source: As in Table 3.1.

SMR for Farmers across divisions and selected districts of Maharashtra for 2001-4 is given in Table 3.3 (trends from 2001 to 2004 for all districts/division of Maharashtra by sex are given in Tables 3.3a and 3.3b in Annexure 5). As in age-specific, education wise and marital status sub-groups, farmers SMR was higher than that for the state average in Amravati and Nagpur divisions and Amravati division has the highest SMRs in all the years for both males and females. Across divisions, there are some differences in the trend. SMR for male farmers have by and large increased, but there were decreases in Amravati, Konkan and Pune in 2002, and Aurangabad and Pune in 2003 whereas SMR for female farmers have been largely declining.

In the selected districts, SMR for farmers among males was lower than the state average in Washim for all the four years and for Wardha in 2001.²⁷ In Wardha, farmers SMR increased by 90 points (from 8.6 in 2001 to 98.3 in 2002) in one year. In all the three districts, SMR decreased in 2003, but increased again in 2004. In fact, for the four years under analysis, 2004 has the highest SMR for male farmers in all the divisions and in the three selected districts of Wardha, Washim and Yavatmal.

Divisions/ Districts	SMR for Farmers		Ratio of SMR for Farmers to SMR for Age-adjusted Population	
	Males	Females	Males	Females
Amravati Division	115.6	24.3	2.8	1.1
Aurangabad Division	47.6	9.2	2.5	0.8
Konkan Division	25.1	7.7	2.0	0.8
Nagpur Division	55.5	8.5	2.0	0.6
Nashik Division	36.6	12.0	2.2	1.4
Pune Division	34.7	3.6	1.6	0.4
Wardha District	75.7	31.9	1.6	1.1
Washim District	14.6	0.0	0.4	0.0
Yavatmal District	90.9	13.4	2.0	0.6
Maharashtra State	48.1	9.1	2.4	0.8

Note: For population interpolation/extrapolation see relevant notes in Table 3.1 and Table 3.2. Trends from 2001 to 2004 for all districts/divisions of Maharashtra are given in Tables 3.3a and 3.3b in Annexure 5. Age wise distribution of farmers' suicides for 2001-4 by sex is given in Table 3.3c in Annexure 5.
Source: As in Table 3.1.

Across division, the ratio of farmers-to-age-adjusted SMR is the maximum in Amravati among males and in Nashik among females. Nagpur has a higher SMR for farmers, which is lower only to Amravati, but the ratio of farmers to age-adjusted SMR is much lower. This indicates that in a relative sense the SMR in Nagpur is also high across other sub-groups of population whose occupation is not self-employed in farming.

Age-wise distribution of suicide victims self-employed in agriculture by sex across districts/divisions of Maharashtra is given in Table 3.3c in Annexure 5. For males, 26 per cent were youth, 40 per cent in the early middle age group, 23 per cent in the late middle

²⁷ In Washim, the proportion of suicide victim whose occupation is 'Other' during 2001-4 is very high: 73 per cent of males (state average is 25 per cent) and 17 per cent of females (state average is 8 per cent). With 90 per cent of the workforce of the district being dependent on agriculture as per 2001 census, this suggests that suicide incidences are likely to be higher among agricultural labourers or there is underreporting of farmers suicides.

age group, and 11 per cent were in the old age group. For females, 47 per cent were youth, 31 per cent were in the early middle age group, 15 per cent were in the late middle age group, and 7 per cent in the old age group.

Across divisions, notable differences from the state average is that for youth with relatively higher proportions in Aurangabad for both males and females and in Nashik for males alone, and relatively lower proportions in Konkan and Pune for males and in Nagpur for females. Compared to the state average, the distribution is more skewed towards the higher ages for males in Washim and for females in Wardha and Yavatmal. In the absence of age-specific data for cultivators it cannot be normalized and it would be difficult to infer much from this distribution. Nevertheless, if the proportions are relatively higher among younger age groups then it indicates greater years of life lost, and hence, a matter of grave concern.

3.4 Conclusions

From 1995 to 2004, suicide deaths in Maharashtra increased from 11866 to 14729. This increase is largely among males, but after normalizing for population the age-adjusted SMR for males has remained in the range of 20-21 from 2001. Total suicide deaths as well as SMR for females have been declining after 1999. Across divisions, Amravati and Nagpur are the ones with greater SMR than the state average. Further, male SMRs have jumped to a higher level around 2000 or 2001 in Amravati, Nagpur and Pune divisions and also in the three selected districts of Wardha, Washim and Yavatmal whereas female SMRs have been declining in all the divisions.

Distribution by method of committing suicide indicates the higher usage of pesticides (34 per cent males and 30 per cent females). This is higher in Amravati and Aurangabad divisions and also in our selected districts.

One shocking revelation of our analysis is that SMR for male farmers has trebled from 17 in 1995 to 53 in 2004. Division wise trends from 2001 to 2004 indicate that SMR for farmers in Amravati, Aurangabad and Nagpur divisions is higher than that for the state. It is the highest in Amravati division where SMR for male farmers is 116 during 2001-4 and reached as high as 140 in 2004. In the three selected districts, SMR for farmers is higher than the state average in Wardha and Yavatmal, but not in Washim.

SMR for male farmers has been increasing in recent years and is very high in certain regions when the SMR for the overall population has stabilized. Thus, an important explanation for relatively higher suicide deaths in Maharashtra is farmer suicide deaths. In the next chapter, we probe further into farmer suicide deaths by analysing field survey based data from 111 suicide (case) and 106 non-suicide (control) households.

4 Probing Suicide Deaths: A Micro Analysis

4.1 Introduction

To delve into the possible socio-economic risk factors that can be identified with farmers' suicides we conducted a field survey in the districts of Wardha, Washim and Yavatmal.²⁸ Identification of suicide case households was possible because of lists provided by Mantralaya, Mumbai, and the relevant district administration that gave the names of farmers, addresses and their date of death. We collated these and for the three selected districts arrived at a list of 390 farmer suicide deaths from 2001 to 2004.²⁹ To reduce recall error, our survey was confined to the suicide death of farmers that occurred in 2004 and a few cases of 2005 that were brought to our notice.

In section 4.2 we provide some basic particulars of the deceased individual. Land and caste scenario of suicide (case) households is discussed in section 4.3. Method of committing suicide is discussed in section 4.4. Some socio-economic stressors or risk factors of suicides are given in section 4.5. Comparison of the suicide (case) with non-suicide (control) households has been done with regard to household characteristics and asset structure (section 4.6), credit particulars (section 4.7) and agricultural practice (section 4.8). A logistic regression identifies the important variables separating the suicide case with the non-suicide control households (section 4.9). Four case studies on cost of cotton cultivation explaining vulnerability of farmers to price and yield shocks are discussed in section 4.10. We discuss the eligibility criteria of receiving compensation among suicide households in section 4.11. Concluding remarks are in section 4.12.

4.2 Basic Particulars of the Deceased Individual

As mentioned earlier, the analysis will be using information from 111 suicide (case) and 106 non-suicide (control) households. However, before comparing we will analyse some

²⁸ The purpose of this exercise is to understand certain processes leading to socio-economic risk factors and the interrelationships between them to help us in identifying important risk factors and in formulating appropriate policy guidelines.

²⁹ There is a mismatch between the data obtained from Mantralaya and that from the district administration. We understand that the list is being constantly updated. Nevertheless, we feel that there is scope to improve the documentation of such a list. We elaborate on some of the reasons in Annexure 6. The taluka wise and season wise distribution of the list of 390 farmers' suicides in the three selected districts are given in Annexure 7.

information regarding the deceased individual and the circumstances leading to his/her suicide from information collected from the suicide case households only.

Some basic particulars of deceased members are given in Table 4.1 (for district wise distribution see Table 4.1a in Annexure 5). From the 111 suicide cases under analysis, 91 per cent are males, 71 per cent are below 50 years of age and 80 per cent were currently married.

Characteristic		N	%
Gender	Male	101	91.0
	Female	10	9.0
Age	<20	1	0.9
	21-30	16	14.4
	31-40	30	27.0
	41-50	32	28.8
	51-60	21	18.9
	60+	10	9.0
	Not available	1	0.9
Marital Status	Never Married	16	14.4
	Currently Married	89	80.2
	Widow(er)	4	3.6
	Not available	2	1.8
Educational Status	Illiterate	23	20.7
	Lit(bel.Pri.)	15	13.5
	Primary	29	26.1
	Matriculate	25	22.5
	HSC	15	13.5
	Technical	2	1.8
	Grad.(and Above)	2	1.8
Experience in Farming	0-5	27	24.3
	6-10	20	18.0
	11-20	21	18.9
	21-40	29	26.1
	41-60	6	5.4
	60+	1	0.9
	Not available	7	6.3
Total	100.0	111	100.0
Note: N indicates number of households, HSC=Higher Secondary Certificate, Grad+ indicates Graduate and above. District wise distribution are given in Table 4.1a in Annexure 5. Source: All the tables in this chapter are based on information obtained from field survey unless otherwise mentioned.			

On educational status, 21 per cent (mostly in Yavatmal) are illiterate, 14 per cent are literate below primary level and 26 per cent completed primary education but below matriculation. There were instances of people having completed higher secondary, other technical education or graduation. On experience in farming, it can be said that 24 per cent had less

than five years of experience, 18 per cent of deceased had about six to ten years of experience and the rest 58 per cent had more than 10 years of experience in farming.

4.3 Land and Caste of Households with a Deceased Farmer

4.3.1 *Caste of Deceased Farmer*

The caste of the deceased farmer is given in Table 4.2 (for district wise distribution see Table 4.2a in Annexure 5). The three castes with most number of cases are Kunbi's (31 per cent, spread across the three districts), Banjara's (16 per cent, mostly in Yavatmal) and Baudh (9 per cent, mostly in Washim). Kunbi's are the predominant peasant community in the selected districts and Banjara's have a substantial presence in Yavatmal and Karanja sub-division of Washim.

Caste	N	%
Baudh (Scheduled Caste, SC)	10	9.0
Other SCs	5	4.5
Gond (Scheduled Tribe, ST)	5	4.5
Other STs	9	8.1
Kunbi (Other Backward Caste, OBC)	34	30.6
Mali (OBC)	6	5.4
Other OBCs	9	8.1
Banjara (Vmyukta Jati and Nomadic Tribes, VJNT)	18	16.2
Others VJNTs	5	4.5
Other Castes	7	6.3
Not Available	3	2.7
Total	111	100.0

Note: N indicates number of households. Other SCs include three Bhoysis, one Mahar and one without caste specified. Other STs include one Agrahari, three Andhs, one Govari, one Kolam, and three Pradhans, Other OBCs include one Mahadev Koli, one Maheshwari, one Perki, one Phulmari, four Telis, and one without caste specified. Other VJNTs includes one Dhangar, one Hatkar, one Pardeshi and two Vadars. Other Castes include six Marathas and one Rajput.

4.3.2 *Land Owned in Suicide Case Households*

The size-class of land owned in suicide case households is given in Table 4.3. It shows that 14 per cent are marginal, 39 per cent are small farmers, 21 per cent semi-medium, 15 per cent medium, 4 per cent are large and 7 per cent have not given information on their land ownership. After excluding the missing information category, the gini coefficients from among the suicide case households surveyed indicate that across the three districts inequality is the highest in Yavatmal (0.38) and the lowest in Washim (0.27). This is so because Yavatmal is the only district from where we got large farmers among suicide case

households in our survey. Washim, in addition to not having any large farmers, also has the least proportion of medium farmers.

Size-class of Land	%	Average Land
Marginal (0-2.5 acres)	14.4	2.1
Small (2.5-5 acres)	38.7	3.9
Semi-medium (5-10 acres)	20.7	7.4
Medium (10-20 acres)	15.3	13.1
Large (20+ acres)	3.6	30.0
Not available	7.2	-
Total	100.0	6.9
Gini		0.380
Note: % is from number of households, N=111. District wise distribution is given in 4.3a in Annexure 5.		

4.3.3 Incidence of Suicides across Caste and Size-class of Land

It would be interesting to superimpose the sample proportions of our survey on population proportions. We have attempted that by using agricultural census for 1995-96, but before that we state the limitations of such an exercise. First, between our survey and the agricultural census there is almost 10 years gap as a result of which the latter proportions for lower size-class would be underestimates and upper size-class would be overestimates. Second, during these 10 years Washim has been formed from the undivided Akola district, and hence, proportions for Akola are used as a proxy for Washim. Third, the data obtained by us from agricultural census are only for marginal (0-1 hectares), small (1-2 hectares), and others (>2 hectares). Fourth, our survey data has collected land ownership and this is not the same as size-class of operational holding available in agricultural census. Fifth, our survey has obtained land ownership from 103 households only and the numbers would be very less in sub-groups once we classify the proportions according to size-class of land owned and caste across the three districts. Sixth, agricultural census does not have data for Kunbi's and Banjara's the two castes with a larger number of reported suicide deaths. Seventh, suicide event, being a rare one a single incident can markedly affect the proportions. Despite these limitations, we attempt at some comparisons.

In Table 4.4 we give the ratio of proportions from our survey to proportions in agricultural census for various sub-groups of caste by controlling for size-class of land and also for various size-class of land by controlling for caste (district wise estimates are given in Table

4.4a in Annexure 5). The differences did not turn out to be statistically significant. Nevertheless, we elucidate the following patterns.

	Compare across caste for given size-class of land				Compare across size-class of land for given caste			
	Marginal	Small	Other Size-Class	All Size-Class	Marginal	Small	Other Size-Class	All Size-Class
Scheduled Castes	1.88	1.05	0.74	1.15	1.70	1.01	0.59	1.00
Scheduled Tribes	1.03	0.76	2.03	1.36	0.79	0.62	1.37	1.00
Other Castes	0.81	1.02	0.83	0.90	0.93	1.23	0.84	1.00
All Castes	1.00	1.00	1.00	1.00	1.04	1.09	0.91	1.00

Note: Incidences are ratios calculated using our sample proportion of suicide case households with population proportion of Agricultural Census 1995-6. The zeros in the above cells indicate that there were no entries from the suicide case households surveyed. Total includes one case from Amravati district in the Other Size-class in Other Caste. The differences in the incidences are not statistically significant at 95 per cent confidence interval, $e^{\pm 1.96((1/a)+(1/b))}$, where a and b indicate the absolute number of sample and population respectively. District wise estimates are given in Table 4.4a in Annexure 5

For all size-class of land the ratios indicate relatively higher suicides among SCs and STs and lower among 'other' castes. This is also the scenario in all the three districts except for STs in Washim where our survey has no case for this caste group.

For marginal size-class of land, relatively higher suicides are among SCs and STs in the total sample and Wardha, SCs in Washim and Yavatmal. For small size-class of land, relatively higher suicides are among SCs and 'other' castes in total sample and Yavatmal, SCs and STs in Wardha and SCs in Washim. For 'other' size-class, relatively higher suicides are among STs in the total sample and Yavatmal, other castes in Wardha and SCs in Washim.

For all castes, the ratio of sample to population proportion indicates relatively higher suicides among marginal size-class and small size-class of farmers and lower suicides among 'other' size-class of farmers. This is also the scenario in Yavatmal district. The relative proportions are higher for marginal size-class of land only in Wardha and for 'other' size class of land only in Washim.

For SCs, the pattern is similar to that for the all castes. For STs, relatively higher suicides are among 'other' size-class category in the total sample and Yavatmal, small size-class and

marginal size-class of land categories in Wardha. For ‘other’ castes, relative higher suicide deaths are among small size-class land category in the total sample, ‘other’ size-class land category in Wardha, marginal size-class and small size-class land categories in Washim and Yavatmal.

4.4 Method of Committing Suicide

In 79 per cent of the cases, suicide was committed by consuming insecticide/pesticide (Table 4.5). These proportions are much higher than that indicated for the overall population in the selected districts (Table 3.1h in Annexure 5). This suggests that consumption of insecticides to commit suicide is higher among farmers. It is said that Cotton cultivation in about 8 million hectares occupies 5 per cent of total arable land in India, but uses 54 per cent of pesticides (Rajendran et al, undated).

Method	Total	
	N	%
Insecticide Consumption	88	79.3
Hanging	14	12.6
Immolation	5	4.5
Drowning	4	3.6
Total	111	100.0

Note: N=number of cases. For district wise distribution see Table 4.5a in Annexure 5.

Our analysis for Maharashtra indicated that across five major crop groups grown, nearly 90 per cent of pesticide usage is in Cotton (section 2.4). This indicates the ready availability of insecticides among Cotton farmers. Batra (2003), Batra et al (2003), Bhatkule et al (2003) and Chavan et al (1999) have discussed from a medical perspective the problem of suicides through insecticide consumption in Maharashtra.³⁰ It is a continuing tragedy in developing countries (Gunnell and Eddleston, 2003).³¹

³⁰ Batra et al, 2003 point out that during 1998 to 2001 poisoning is the third leading cause of admissions and with maximum number of deaths in Yavatmal medical college. After normalising for 100000 population, death from poisoning increased from 15.4 in 1998 to 27.8 in 2001. Within poisoning, organophosphorous insecticides lead in terms of admissions (23 per cent) as well as fatalities (43 per cent). Bhatkule et al (2003) point out that in Yavatmal medical college during January 2001 to July 2003, 33 per cent of total poisoning admissions are due to organophosphorous insecticides and another 13 per cent from other insecticides. Both the studies, as also Batra (2003) and the background paper prepared by Bhatkule (2005), indicate that poisoning cases are relatively more during July-September. Our analysis based on the list of farmers’ suicide provided by the GOM also indicates this to be the case in 2004 (Annexure 7).

³¹ A recent study suggests that pesticides are not only agents for suicide, but are also part of the causal pathway (London et al, 2005). In other words, constant exposure to organophosphorous pesticides can lead to

The average distance from the nearest facilities shows that the concerned block/taluka headquarter, market yard or monopoly cotton procurement centre and hospital are in the range of 10-15 kilometres (Table 4.6). However, a hospital that can treat emergencies like poisoning is on an average more than 20 kilometres away (particularly, in Washim and Yavatmal). This means that the time taken to reach a treatment centre in these hilly regions can easily be more than an hour. This delay can prove fatal. This should be considered while discussing issues on access to treatment for patients with insecticides poisoning.

Distance From	Total (N=106)	
	Average	Maximum
Block/Taluka	16	45
Market Yard	12	48
MCPC	11	35
Hospital	10	65
Poison Treatment	20	100

Note: N indicates the number of villages. MCPC denotes monopoly cotton procurement centre. District wise details are given in Table 4.6a in Annexure 5.

4.5 Identifying Risk Factors

Suicide is the complex interplay of multiple factors. As mentioned earlier, we try to identify certain socio-economic risk factors and do not delve into the neurobiological aspects. The latter are predisposing factors operating at an individual level and the former are precipitating factors and they are external to the individual (Vijayakumar et al, 2004). A psychiatric disorder would be identified with most suicide victims, but it is the presence of additional risk factors that lead an individual to commit suicide (Mann, 2002). In Table 4.7, we identify some risk factors associated with the individual who committed suicide.³² A number of risk factors can co-exist and one particular individual can come across all or none of the risk factors identified by us. In our sample, the minimum number of risk factors is one and the maximum is nine. They have been presented in a descending order based on the

affective disorder. It affects the central nervous system in such a way that it can lead to depression and subsequently suicide. A recent case-control study conducted across six states of India also suggests arrested development of mental and motor abilities among children exposed to pesticides when compared with children not exposed (Kuruganthi and Shalini, Undated). These important findings point out the relevance of corporate responsibility, that is, on those who produce and sell pesticides.

³² Identifying socio-economic risk factor was a difficult task because it led to discussions about a deceased individual – a painful exercise for the respondent as also for the interviewer. It is possible that our investigation did not get all possible risk factors. This, however, does not in any way reduce the relevance of the factors identified by us. More over, as mentioned earlier, the purpose of this exercise is to help us understand certain processes and identify important risk factors so as to help us in devising policy guidelines.

frequency of their occurrence in our sample of 111. The most common thing was indebtedness (96 cases, 86 per cent). From all those indebted, 44 per cent were harassed for repayment of loan and in 33 per cent of cases the creditor insisted on immediate repayment.³³

Risk factors	N=111	%
Was the deceased indebted?	96	86.5
Did his economic status deteriorate before the incident?	82	73.9
Did the deceased not share problems with other family members?	61	55.0
Was there a crop failure?	45	40.5
Was there a change in his social position before the incident?	40	36.0
Did the deceased have a daughter/sister of marriageable age?	38	34.2
Was there any suicide occurrence in the nearby villages recently?	36	32.4
Did the deceased have any addictions?	31	27.9
Was there a change in the deceased's behaviour before the incident?	29	26.1
Did the deceased have disputes with neighbours or others?	26	23.4
Did the deceased have some health problem?	23	20.7
Did any death occur in the family recently before the incident?	11	9.9
Has there been any suicide previously in the family?	7	6.3
Are some other family members chronically ill/handicapped?	4	3.6
Average number of risk factors	4.8	
Minimum number of risk factors	2	
Maximum number of risk factors	9	
Note: N indicates number of households. The risk factors are not mutually exclusive, and hence, will not add up to 100 per cent. District wise details of risk factors are given in Table 4.7a in Annexure 5.		

Next in importance is fall in economic position (74 per cent). Taking loans can be associated with indebtedness. Loans per se will not lead to a fall in economic position, but if it reaches a stage that will lead to sale of assets then it can be associated with a fall in economic position. Similarly, a fall in economic position can also lead greater reliance on credit, increasing the debt burden.

In 55 per cent of cases, we identified that the deceased did not discuss his/her problem with other family members. This means that the individual was not sharing the difficulties with others. An avenue for letting out ones pent up feelings and frustration was closed.

Crop failure is mentioned in 40 per cent of the cases and most of these also mentioned about loss in second or third sowing due to delay in rainfall. There were a few cases which

³³ Indebtedness has been identified as one of the important risk factors in recent studies on farmers' suicides in Maharashtra (Dandekar et al, 2005; Mohanty, 2001 and 2005; Mohanty and Shroff, 2004). This has also been identified in studies done in other parts of India.

mention fire or theft. Crop loss can also happen due to excessive untimely rain, say, during the time of harvest. Crop failure can lead to economic downfall and make it difficult to repay existing loans. This will also increase the need for additional credit. Crop failure leading to fall in economic position is quite straight forward, but the causal links can also be the other way round. A house that had some fall in economic position or was heavily indebted could not take additional loans for investing in agriculture (say, during a pest attack) and this can lead to a reduction in yield or total crop failure.

Change in social status was identified in 36 per cent of the cases. This can be associated with a fall in economic position. Harassment by creditors or their agents due to non-payment of loans can also lead to a loss of face in the community. Crop failure due to unsuccessful experimentation by a farmer who was recognised as successful entrepreneur may find a change in his social status – people who earlier came for advice are now providing solace.

A socially important role of a brother/father is to get one's sister/daughter married. Communities have norms in terms of age and expenditure.³⁴ A farmer is largely dependent on a good return from his produce to fulfil this obligation. Thus, crop failure, greater credit burden or a fall in his economic position can come in his way of fulfilling this obligation. Inability to conduct sister's/daughter's marriage can be socially humiliating. It can also increase intra-household conflicts. To complete this social obligation a farmer may also take loans thinking that he can repay the amount after the harvest. Recent marriage of a sister/daughter or inability to get one's sister/daughter married has been identified as a risk factor in 34 per cent of the cases.

We have also taken note of recent suicides in a nearby village and identified them as an additional risk factor in 32 per cent of the case. This was done because an individual who is facing some similar socio-economic problem can relate to the earlier incident and contemplate suicide. There could be an imitation effect.³⁵

³⁴ In our study areas as also in rural Maharashtra a substantial proportion of females get married before 18 years of age, the legal age limit. The expenditure would depend on the economic position of the household and FGDs indicate that it would be in the order of Rs.20000-Rs40000 for marginal/small farmers.

³⁵ In other words, suicide contagion is real. This is also true of the way suicide is popularly reported in media. It is in this context that the guidelines by the World Health Organization on suicide reportage would be of help. This has been elaborated in one of the background papers (Mishra, 2005b).

Addiction (particularly, alcohol) was identified in 28 per cent of the cases. It is said that under intoxication an individual may indulge in an act of self-harm without being aware of the consequences. Alternatively, getting intoxicated could itself be a reaction to get out of depression that can be associated with some socio-economic problem.

Change in the individual's behaviour was identified in 26 per cent of the cases. These are symptoms and indicate that the individual needs some psychosocial help.

Dispute with neighbours/others in the villages was identified in 24 per cent of the cases. This could be related with property disputes or an altercation leading to a social humiliation. Or, it could be a part of his changed behaviour indicating that he needs some help.

Personal health problem of the deceased was identified in 21 per cent of the cases. From these, 26 per cent (6 cases) were those with some mental health problem. Illness gets aggravated due to poor economic condition because it makes care seeking difficult. Similarly, ill health can lead to a loan to meet medical expenses and also reduce the ability to work aggravating the economic condition. If the sick person is some other member (3 per cent of the cases) then the breadwinner has the added frustration and helplessness in not being able to provide appropriate care for an ailing parent/spouse/child.

Death of another member in the family before the incident was identified in 10 per cent of the cases. The near ones death could have been because of not receiving appropriate health care. Inability to provide care is largely because of the poor economic condition rooted in the larger agrarian crisis.

Suicide history in the family could be identified in 6 per cent of the cases. This could be indicative of a genetic factor. However, as mentioned earlier such individual factors are predisposing in nature and they can be intensified with some additional risk factors.

Our discussions indicate that the risk factors can co-exist and they can be interrelated and that they feed into each other and aggravate each other. They are not mutually exclusive, and hence, will be more than 100 per cent. In fact, given that the average number of risk factor is 4.8, the proportions add up to 480 per cent.

4.6 Suicide Cases versus Non-suicide Controls: Household Features

4.6.1 Family Characteristics

Having discussed some aspects of the deceased households, we take up an analysis of comparing 111 suicide case with 106 non-suicide control households. Some household characteristics are given in Table 4.8. It shows that nearly half of the survey households are from other backward castes (OBCs), mostly Kunbi, the predominant cultivating caste. The second group is vmyukta jati and nomadic tribes (VJNT) mostly banjaras, a predominant community in Yavatmal and Karanja sub-division of Washim.

Household Characteristics		Total	
		Case	Control
Social Group#	SC	15	17
	ST	14	10
	OBC	48	50
	VJNT	23	22
	Others	8	5
	Not available	3	2
Household Type	Nuclear	80	63
	Joint	30	37
	Not available	1	6
Average Male Children		1.35	1.46
Average Female Children		1.64	1.29
Average Children		2.15	1.98
Average Family Size\$		5.53	5.08
Average Members in Occupation		1.97	1.87
Note: # SC, ST, OBC and VJNT denote Scheduled Caste, Scheduled Tribe, Other Backward Caste and Vmyukta Jati and Nomadic Tribes respectively. \$ Average Family Size for suicide case households includes the deceased member also.			

Most of the households are nuclear, but the proportion of joint families is slightly higher in the non-suicide control group. Despite a slightly higher proportion of nuclear families, it is intriguing that the average family size, after including the deceased individual, is higher among suicide case households. This is largely due to a relatively greater size in average number of females. The average number of members in occupation is higher among the suicide households, but this being the situation when the survey was conducted it could indicate coping strategy after the death of the main breadwinner.

4.6.2 Ownership of Assets and Access to Basic Amenities

Ownership of land is given in Table 4.9. It shows that average land owned is slightly higher for the suicide case households. This is true for small, marginal and large size class of

farmers. Inequality in land ownership is also slightly higher among suicide case households when compared with non-suicide control households.

Size-class of Land	Case (N=103)		Control (N=97)	
	Per cent Households	Avg Land (Acres)	Per cent Households	Avg Land (Acres)
Marginal (0-2.5 acres)	15.5	2.1	17.5	1.9
Small (2.5-5 acres)	41.7	3.9	44.3	4.0
Semi-medium (5-10 acres)	22.3	7.4	22.7	7.8
Medium (10-20 acres)	16.5	13.1	11.3	13.4
Large (20+ acres)	3.9	30.0	4.1	23.0
Total	100.0	6.9	100.0	6.4
Gini	0.380		0.363	

Note: Households for whom land-size is not available (includes landless) are not included for calculating proportion. This also explains the difference between this and Table 4.3.

Assets/Basic Amenities		Total		
		Cases	Controls	
Livestock	Bullocks	46	66	*
	Cow	30	46	
	Sheep/Goat	16	25	
	Buffalo	6	15	
	Poultry/Birds	5	15	
Agricultural Implements	Plough	51	59	
	Bullock Cart	35	46	
	Tractor	1	5	
Consumer Durables	Electric Fan	59	62	
	Television	38	38	
	Bicycle	34	46	
	Radio	24	29	
	Smokless Chullah	20	22	
	Gas	19	21	
	Two Wheeler	7	12	
	Car	2	2	
Access to Basic Amenities	Electricity	61	68	
	Drainage/Sewage	17	20	
	Toilet Facility	16	23	

Note: * denotes that the difference between suicide cases and non-suicide control households is statistically significant at 95% CI.

The non-suicide households are slightly better in terms of ownership of livestock, agricultural implements, consumer durables and access to some basic amenities (Table 4.10). However, the difference in ownership between the suicide case and non-suicide control households was statistically significant at 95 per cent confidence interval for

ownership of bullocks only. In an agrarian economy like India, bullocks are important productive assets.³⁶

4.7 Analyzing Credit Particulars

Outstanding debt is on average Rs.38444/- (Table 4.11, for outstanding debt across various sub-groups by gender, age, marital status, education and experience in farming see Table 4.11a in Annexure 5).³⁷ Across various sub-groups, outstanding debt is higher than the overall average for males among gender, for 21-30 years, 41-50 and 51-60 years among age groups, for currently married among marital status, for HSC and technical/graduate and above among educational categories, for groups with farming experience of more than ten years (in fact, average indebtedness seems to be increasing with years of farming experience) and for OBC and 'other' among caste groups.

Castes	Formal Sources		Informal Sources		All Sources	
	Mean	N	Mean	N	Mean	N
Scheduled Caste	6067	6	13164	11	13938	13
Scheduled Tribe	24571	7	13400	5	21727	11
Other Backward Caste	49693	29	35033	30	54176	46
Vmyukta Jati and Nomadic Tribes	10875	8	29917	18	27196	23
Other Castes	81500	2	21333	3	45400	5
Not Available	19333	3	60000	1	39333	3
Total	35591	55	28313	68	38444	101

Note: N=number of households. Formal sources of indebtedness are Cooperative Societies, Rural Banks and Scheduled Commercial Banks whereas informal sources of indebtedness are Landlord/Employer, Moneylenders, Relatives/Friends, Self Help Groups and Traders among others. Total for all sources includes eight cases where outstanding debt is zero. If N for a sub-group is lower than that in Tables 4.2 it indicates that information on outstanding debt is not available for some households. For sub-group wise outstanding indebtedness by gender, age, marital status, education and experience in farming of deceased see Table 4.11a in Annexure 5.

At the aggregate level, average outstanding debt from formal sector is higher than that from the informal sector. This is not true for some sub-groups: females among gender, all the age groups below 41 years, widow(er) among marital status, illiterates, those having completed primary schooling and matriculates among educational categories, and those with 6-10 or 41-60 years of experience in farming.

³⁶ The relevance of bullocks in agricultural households has been discussed in Jodha (1978), Rosenzweig and Wolpin (1993) and Vaidyanthan (1988) among others. For the socio-economic relevance of cattle in the Indian context see Harris (1992, first published 1966) and the interesting debate that followed in the *Current Anthropology*.

³⁷ Outstanding debt obtained, as per information given by the respondents, is the principal amount or the outstanding amount remaining after the last repayment.

Comparing suicide case with non-suicide control households, average outstanding debt is higher in the former by 3.5 times and after normalizing for family size or land size it is higher by three times (Table 4.12, for comparison across districts, size-class of land, ownership of bullocks and number of loans taken see Table 4.12a in Annexure 5).

District/Size-class of Land/Owns Bullocks/ No of Loans	Suicide Case						Non-suicide Control					
	Formal	N	Infor-mal	N	Total	N	Formal	N	Infor-mal	N	Total	N
All *#	35591	55	28313	68	38444	101	17745	30	16261	31	10910	95
Per Person*#	6266	55	5662	68	7224	101	3872	30	3624	31	2405	95
Per Acre*#\$	4499	55	6634	63	7079	94	3640	29	3698	29	2365	90

Note: N indicates number of households. Formal and informal sources are as in Table 4.11. * denotes that for total outstanding debt the difference between suicide cases and non-suicide control households is statistically significant at 95% CI. # Total includes eight instances in suicide case and 40 instances in non-suicide control households where outstanding debt amount is zero, but excludes those households whose outstanding loan status/amount was not available. \$ Excludes households whose land ownership status was not available. For comparison of outstanding debt across districts, size-class of land, ownership of bullocks and number of loans taken see Table 4.12a in Annexure 5.

This greater debt burden for suicide case households is true for all the three districts, for all size-class of land, whether they own or do not own bullocks and also after controlling for the number of loans that the household has taken - the only exception is households having taken three loans each. This is so because in one of the three instances the outstanding debt is Rs.160200/-.

At the aggregate level, the difference in average outstanding debt between suicide case and non-suicide control households is statistically significant (in this as well as subsequent comparisons we are referring to 95 per cent confidence interval). This is true even after normalizing for family size and land size. For other sub-groups the difference is statistically significant for small size-class of land holding, whether they own or do not own bullocks and for those having taken a single loan only.

Across the three study districts, average outstanding debt is the highest in Wardha and the least in Washim. Average outstanding debt from informal sector is higher than the formal sector for suicide case households in Wardha and Yavatmal districts (Table 4.12a in Annexure 5).

The number of loans indicates that 95 suicide case households have outstanding debt from 163 loan transactions and 55 non-suicide control households have outstanding debt from 71 loan transactions. Thus, the average number of loans with outstanding debt is higher in suicide cases (1.8) when compared with non-suicide controls (1.3). Analysis of source of loan indicates a greater reliance on Cooperatives in the formal sector and Moneylenders in the informal sector (Table 4.13).

Source	Suicide Case		Non-suicide Control	
	Amount	N	Amount	N
Cooperative Bank	30466	50	13756	26
Rural Bank	11314	7	40800	4
Commercial Bank	95000	4	11500	1
Moneylender	22080	60	11973	26
Relatives/Friends	16268	28	2000	2
Self Help Group	4500	2	14000	1
Trader	5000	2	20000	1
Land Lord/Employer	4000	2	10000	1
Others	12571	7	16089	9
Not Available	5000	1	-	-
Total	23821	163	14598	71

Note: N indicates the number of transactions with outstanding debt. The transactions are from 93 suicide cases and 55 non-suicide controls.

The reliance on Moneylender's and Friends/Relatives is higher for suicide cases (54 per cent of 163 transactions) than non-suicide controls (39 per cent of 71 transactions). A very high amount is indicated for suicide case households under commercial bank because a large farmer (owning 28 acres) having an outstanding loan of Rs.2.5 lakh which was incurred for marriage in the family (in fact, the individual had taken a loan of Rs.5 lakh and had already returned Rs.2.5 lakh). After excluding this extreme case, the distribution of total outstanding debt indicates that 42 per cent is from cooperative banks, 36 per cent is from moneylenders and 13 per cent is from relatives/friends. In non-suicide control households, after excluding a loan transaction with outstanding debt of Rs.98200 from a rural bank, the distribution of total outstanding debt indicates that 38 per cent is from cooperative bank, 33 per cent is from moneylenders and 15 per cent is from other unspecified informal sources.

The purpose of loan is given in Table 4.14. After excluding the transactions where purpose is not available, 67 per cent in the suicide cases and 89 per cent in the non-suicide controls

are for agricultural purposes only. This proportion further increases if we take into consideration transactions from formal sources only.

Purpose/Year		Suicide Case						Non-suicide Control					
		Formal	N	Infor- mal	N	Total	N	Formal	N	Infor- mal	N	Total	N
Purpose	Agriculture	28861	49	20660	53	24600	102	18475	26	11353	30	14660	56
	Marriage	250000	1	27324	17	39694	18	-	-	25000	4	25000	4
	Others	45326	4	13192	25	17624	29	6000	2	21000	5	16714	7
	Not available	17833	6	5125	8	10571	14	13333	3	11700	5	12313	8
Year	2005	-	-	7760	5	7760	5	-	-	50000	1	50000	1
	2004	18427	15	16273	44	16821	59	17562	13	9629	14	13448	27
	2003	29333	18	15722	27	21167	45	10080	7	14955	11	13059	18
	2002	18810	11	22588	17	21104	28	17083	6	9614	7	13062	13
	2001	38560	5	21000	4	30756	9	22500	2	15000	5	17143	7
	2000 & earlier	64050	8	200000	1	79156	9	28667	3	-	-	28667	3
	Not Available	78667	3	16600	5	39875	8	-	-	6250	2	6250	2
	Total	32542	60	18741	103	23821	163	17173	31	12603	40	14598	71

Note: N indicates the number of transactions with outstanding debt. Others under purpose include consumption, education, health, house, livestock, nonfarm, and also dual-purpose loans including any of these with agriculture and one for agriculture and marriage. The outstanding debt for loans incurred in 2005 is before the onset of the agricultural season as the survey was conducted in late March/early April of 2005. The transactions are from 93 suicide cases and 55 non-suicide controls. In suicide case households, under agriculture there are two instances where loans were specifically for digging borewell – in one case outstanding amount is Rs.11000/- from a formal source (cooperative bank) and in another case the outstanding amount is Rs.25000/- from an informal source (friend/relative). For details of purpose see Table 4.14a in Annexure 5.

Next to agriculture is marriage, which is mostly from informal sources. For each specific purpose the number of transactions with outstanding debt and the average outstanding debt per transaction is higher among suicide case households when compared with non-suicide control households. The average amount of outstanding debt per transaction for agricultural purposes is greater than Rs.10000/-. For marriage, after excluding an extreme observation with outstanding debt of Rs.250000/- from a commercial bank by a suicide case household, the gap is Rs.2324/- only. There is an instance in suicide case households where loan for health expenditure was to the tune of Rs.1.5 lakh. From total outstanding debt (including those where purpose is not available), agriculture being the sole purpose accounts for 65 per cent of the outstanding debt in suicide case households and 79 per cent in non-suicide control households. Marriage being the sole purpose accounts for 18 per cent of the total outstanding debt of suicide case households (reduces to 13 per cent if we exclude the extreme case of Rs.2.5 lakh outstanding debt from a commercial bank) whereas it is 10 per cent of the total outstanding debt of non-suicide control households.

The total outstanding debt from suicide cases is 3.7 times more than the total outstanding debt from non-suicide controls. Compared to non-suicide controls, the suicide cases have a greater proportion of outstanding debt that are more than one year old (74 per cent and 65 per cent respectively) and for 2004, the most recent year, a greater proportion of outstanding debt is from informal sources (72 per cent for suicide cases and 38 per cent for non-suicide controls). Year wise distribution of transaction in 2005 covers outstanding debts at the time of survey (March/April 2005), before start of agricultural season.

4.8 Agrarian Produce and Changes in Cultivation Practices

Comparing cropping pattern between suicide case and non-suicide control households would be interesting, but our limitation is that there were logistic problems in obtaining information on area under different crops. However, we have information on total land and total produce for each crop grown. We multiply the total produce with the Minimum Support Price (MSP) for 2004-5 for Kharif crops declared by the Government of India to obtain the total value of produce. On average, total land is higher in the suicide case households whereas total value of produce as well as average value of produce per household and average value of produce per acre is lower (Table 4.15). In the absence of land under each crop, it will be difficult to compare yield between the two groups.

Source	Case N=93	Control N=90
Total land (acres)	632.0	573.0
Cotton (quintals)	658.0	849.0
Soyabean (quintals)	339.0	303.5
Tur (quintals)	253.0	292.0
Jowar (quintals)	240.0	259.5
Wheat (quintals)	23.0	11.0
Moong (quintals)	1.0	1.0
Udid (quintals)	10.0	3.5
Total Produce (Rs lakh)	21.3	37.2
Produce Per N (Rs 000)	22.9	41.4
Produce Per acre (Rs 000)	3.4	6.5

Note: N refers to all those households who have given information on produce for crops grown. The Minimum Support Price (MSP) for 2004-5 Kharif used to arrive at the value of produce is as follows: Cotton-Rs.1960/-, Soyabean-Rs.1000/-, Tur-Rs.1390/-, Jowar-Rs.515/-, Wheat-Rs.630/-, Moong and Udid-Rs.1410/-.

We also compare whether there has been any change in the variety of seed usage in the last five years across four major crops (Table 4.6). It shows that for the four crops (Cotton, Tur, Jowar and Soyabean) change in usage of seed is greater in suicide case households when

compared with non-suicide control households. Continuity in usage of seed is less than 50 per cent in Cotton for both suicide case and non-suicide control households and in Jowar for suicide case households. This could be reflective of new varieties of cottonseeds, Bt (*Bacillus thuringiensis*) and non-Bt, being available in the market.³⁸ Usage of Bt varieties without appropriate extension service and technical know-how can be detrimental.³⁹

Crops	Cases	Controls
Cotton	0.62 (73)	0.85 (74)
Tur	1.04 (55)	1.31 (60)
Jowar	0.61 (45)	1.06 (33)
Soyabean	3.00 (20)	4.33 (16)

Note: Ratio equal to, greater than or less than unity indicates observations indicating continuing is equal to, greater than or less than observations indicating change in the usage of the input.

4.9 A Statistical Exercise

We consider the households suicide status as a binary dependent variable, Y , where suicide case household ($=1$) and non-suicide control household ($=0$). To identify relative risk factors, we compare these two types of households by taking the independent variables of outstanding debt in rupees (X_1), a yes/no binary variable on ownership of bullocks (X_2), family size (X_3), value of produce in rupees (X_4), outstanding debt per acre of land owned in rupees (X_5), value of produce per acre of land owned in rupees (X_6). These variables have been chosen based on our field experience and initial data analysis. A complete case control for these six independent variables is available for 68 pairs of observations of suicide case and non-suicide control from the same villages.⁴⁰ Table 4.17 reiterates our general observations for these 68 pairs, that is, suicide case households have on average a higher outstanding debt, a fewer proportion that own bullocks, a higher family size (particularly, female members) and a lower value of produce. The difference is statistically significant (95 per cent confidence interval) for both debt related variables.

³⁸ A three-year assessment study of Bt Cotton in Andhra Pradesh led to the finding that gross returns from Mech-12, Mech-162, and Mech-184 varieties of Bt were lower than non-Bt varieties (Qayum and Sakkhari, 2005). This led to Genetic Engineering Approval Committee rejecting approval of these three varieties in Andhra Pradesh for 2005, but it is surprising that the same varieties have been approved for cultivation in Maharashtra and the rest of the country.

³⁹ Stone (2002) has pointed out how cultivation with new Bt varieties can lead to deskilling because his past knowledge of cotton cultivation becomes redundant. Foster and Rosenzweig (1995) have pointed out how shifting to high yielding varieties led to poor returns for farmers with poor technical know-how.

⁴⁰ This is less than 212 ($=106 \times 2$) because all households do not have information on all variables used in this statistical exercise.

Variables	Cases	Controls	
Outstanding Debt (Rs)	36583.90	9933.24	*
Own Bullocks (Yes/No)	0.46	0.65	
Family Size	5.66	5.15	
Value Produce (Rs)	23285.45	26522.74	
Outstanding Debt per Acre (Rs)	6814.11	1980.73	*
Value per Acre (Rs)	4022.18	4926.75	
Note: N=68 pairs of suicide cases and non-suicide controls. * The differences are statistically significant at 95% CI.			

Using the above-mentioned six variables, we estimate step-wise logistic regression

$$\ln[p/(1-p)] = \alpha + \beta_i X_i + u; i=1, \dots, 6.$$

where \ln is natural logarithm, p is probability of obtaining a suicide case household, $\ln[p/(1-p)]$ is the log odds ratio of a suicide case household, α is a coefficient on the constant term, β_i 's are the coefficients of the six independent variables, X_i 's, and u is error term.

The results were estimated using STATA. The step-wise logistic regression method uses the chi-square differences to determine automatically which variable to add or drop.⁴¹ While discussing results, instead of coefficients, we give odds ratio, e^{β_i} . We do so because the interpretation of odds ratio is more intuitive. It would mean that for a unit increase in the independent variable there would be a corresponding change in the odds ratio (probability of suicide household/probability of a non-suicide household).⁴² Further, one can also calculate the probability from the odds ratio.

The results of the step-wise logistic regressions estimated for complete case-control analysis under different restrictions are given in Table 4.18. First, the results are estimated for all complete case-control analysis of 136 observations from 68 villages. This gives outstanding debt and absence of bullocks as statistically significant variables that differentiate suicide case from non-suicide control households.⁴³ It suggests that if outstanding debt increases by

⁴¹ In our restriction a variable is added if it increases chi-square significance by 0.05 and it is dropped if it increases chi-square significance by 0.1.

⁴² Before estimating, we need to point out that the non-suicide control household chosen by us in each village was restricted to similar land size and some visual similarity in the condition to that of the suicide case household of the village. The non-suicide control household is not meant to be a representative one for the whole village.

⁴³ Indebtedness burden in suicide case households being higher than the non-suicide control households have been pointed out by other studies (Deshpande, 2002; Mohanty 2005). The relevance of bullocks to agrarian

Rs.1000 then the odds that the household is one with a suicide victim increases by 6 per cent and if the household owns bullocks then the odds that it is a household with a suicide victim decreases by 65 per cent.⁴⁴

	Complete Case- Control Analysis	Similar Land Size	Same Caste	Similar Land Size and Same Caste	Wardha	Washim	Yavatmal
N	136	110	70	56	24	32	80
Debt	1.000061 (.0000138) [0.000]				1.000237 (.0000974) [0.015]	1.00009 (.0000383) [0.019]	1.000055 (.0000176) [0.002]
Own Bullocks	.3462934 (.1403603) [0.009]		.2092665 (.1139936) [0.004]	.2156863 (.1258042) [0.009]			.3084751 (.1685215) [0.031]
Debt per Acre		1.000325 (.0000776) [0.000]					
Family Size			1.352608 (.2021914) [0.043]			2.124579 (.8003213) [0.045]	
Value Produce					.9997406 (.0001221) [0.034]		
Value Per Acre							.9997575 (.0001234) [0.049]
Log Likelihood	-74.6497	-61.682649	-42.619212	-35.079024	-5.4993989	-16.388205	-42.176024
LR Chi2	39.24	29.13	11.80	7.47	22.27	11.59	26.55
Prob >Chi2	0.0000	0.0000	0.0027	0.0063	0.0000	0.0031	0.0000
PseudoR2	0.2081	0.1910	0.1216	0.093	0.6694	0.2612	0.2394

Note: Logistic regression is $\ln(p/(1-p))=a+b_iX_i+u$. The overall odds ratio $(p/(1-p))=e^{(a+b_iX_i+u)}$. For each coefficient associated with a variable, odds ratio is e^{b_i} . Thus, if b_i is positive then odds ratio >1 , whereas if b_i is negative then $0 < \text{odds ratio} < 1$. Round brackets give standard error, square brackets give prob $> |z|$. The variables are indicated in the order in which they were selected in the step-wise logistic regression.

Second, we estimate the results by controlling for land size owned (the land size of non-suicide control household not differing from the suicide case household by more than 25 per cent). The estimation for 55 pairs of observations shows that only outstanding debt per acre of land is a statistically significant variable that differentiate suicide case from non-suicide control households. It indicates that if outstanding debt per acre of land owned increased by

economy as a productive asset in Indian agriculture is also well known (Jodha, 1978; Rosenzweig and Wolpin, 1993; Vaidyanthan, 1988). Absence of bullocks may actually be reflection of hardship that the household has been facing. In fact, in Maharashtra the reliance on owned bullocks for animal labour is as high as 92 per cent for Cotton cultivation (Table 2.6). In other words, absence of bullocks would increase expenditure on hired animal labour and thereby increasing the operational costs to be paid as wages for those households who do not own bullocks.

⁴⁴ Odds ratio ranges from zero to infinity, and hence, the per cent increase and decrease are not commensurate. For instance, 6 per cent increase in odds ratio means that probability of the occurrence of the event increases from 0.5 to 0.500015 whereas 65 per cent decrease in odds ratio means that probability of the occurrence of the event decreases from 0.5 to 0.25722.

Rs.1000 then the odds that the household is one with a suicide victim increases by 33 per cent.

Third, we control for caste and estimate for 35 pairs of observations. Here, ownership of bullocks and family size are statistically significant variables that differentiate suicide case from non-suicide control households. It suggests that if the household owns bullocks then the odds that it is a household with a suicide victim decreases by 79 per cent and if the family size increases by one member then the odds that the household is one with a suicide victim increases by 35 per cent.

Fourth, we control for both land size and caste and estimate for 28 pairs of observations. Under this restriction, ownership of bullocks is a statistically significant variable. The result indicates that if the household owns bullocks then the odds that it is a household with a suicide victim decreases by 78 per cent.

We also estimate the results for the three districts separately. In Wardha, there were only 12 pairs of observations and estimation was possible only after reducing the number of variables – we excluded outstanding debt per acre and value of produce per acre. Thus, there were four independent variables to begin with. From these, outstanding debt and value of produce turned out to be statistically significant variables that differentiate suicide case from non-suicide control households. The result indicates that if outstanding debt increases by Rs.1000 then the odds that the household is one with a suicide victim increases by 24 per cent and if value of produce increases by Rs.1000 then the odds that it is a household with a suicide victim decreases by 26 per cent.

In Washim, estimation is for 16 pairs of observations where outstanding debt and family size turn out to be statistically significant variables in explaining the difference between suicide case and non-suicide control households. It suggests that if outstanding debt increases by Rs.1000 then the odds that the household is one with a suicide victim increases by 9 per cent and if family size increases by one member then the odds that the household is one with a suicide victim increases by 216 per cent.

In Yavatmal, estimation is for 40 pairs of observation. Three independent variables – outstanding debt, ownership of bullocks and value of produce per acre – are statistically

significant in explaining the difference between suicide case and non-suicide control households. The results indicate the following. If outstanding debt increases by Rs.1000 then the odds that the household is one with a suicide victim increases by 6 per cent, if the household owns bullocks then the odds that it is a household with a suicide victim decreases by 69 per cent and if value of produce per acre increases by Rs.1000 then the odds that it is a household with a suicide victim decreases by 24 per cent.

The above results reiterate our earlier observations that indebtedness and absence of bullocks are important factor in explaining differences between suicide case and non-suicide control households. However, under different scenarios (controlling for land-size, caste or districts) other factors like family size, value of produce, outstanding debt per acre or value of produce per acre are also relevant.

4.10 Cost of Cotton Cultivation

During our field visits we collected information on some paid out costs of cotton cultivation under different conditions. Four such cases are given in Table 4.19. Case 1 is an owner cultivator who had to go for a second sowing due to delay in rain. This village is in Yavatmal taluka. This has led to an increase in seed expenses, but the expenses incurred in the second instance was reduced by half by going in for a different variety and using some left over seeds.⁴⁵ The total expenditure on seed was Rs.7500/-. After including expenditure on fertilizer, pesticides and labour his total costs are Rs.17500. He got a produce of 15 quintals, which he sold to the Maharashtra State Cooperative Cotton Growers Marketing Federation (MSCCGMF). He has received Rs.1500 per quintal and was expecting another Rs.500 per quintal. After receiving this balance amount his net income will be Rs.12500. For a family size of five, this income will be Rs.2500/- per person per annum. Assuming some further produce from the remaining land, the scenario presented in Case 1 depicts that a semi-medium size class of farmer household facing a yield shock would fall below the poverty line.⁴⁶

⁴⁵ It is generally the case that in an acre of land one packet of seeds (910 grams) that costs around Rs.450/- to Rs.500/- for non-Bt varieties and Rs.1600/- for legal Bt varieties would suffice. However, due to a guaranteed germination rate of 65 per cent only, farmers end up sowing two instead of one seed and thereby increasing the seed requirement. Under assured water, such practices might reduce.

⁴⁶ Updating the Planning Commission poverty line for rural Maharashtra to 2004 one gets an income of Rs.4037/- per person per annum (that is, Rs.336.45 per capita per month).

Case 2 is a tenant farmer from the same village as that of case 1. He had leased in 6 acres of land by paying Rs.10000. To optimise his income from this he wanted to cultivate everything under Cotton. He was also faced with the delay in rain and had to go in for a second sowing. Compared to case 1, he used less fertilizer, no pesticides and did cultivation by using family labour. His paid costs were largely on credit. Without taking into account the interest paid, his total expenses were Rs.22000. He got a produce of 12 quintals. As he is not a legal owner of land he cannot sell his produce at MSCCGMF. He sold all his produce to a private trader for Rs.20000. Even without taking into account interest on credit and imputed wages for family labour his net income turns out to be negative.

Indicators	Case 1	Case 2	Case 3	Case 4
Total Land (Acres)	8	6	3	15
Area under Cotton (Acres)	5	6	3	3
Rent (Rupees)		10000		
Seed (Rupees)	7500	9000	4000	1800
Fertilizer (Rupees)	5000	3000	3000	2400
Pesticide (Rupees)	3000		600	3000
Labour (Rupees)	2000		1000	15000
Total (Rupees)	17500	22000	8600	22200
Produce (Quintal)	15	12	1	17
Price received (Rupees)	22500	20000	1550	27750
Yet to receive (Rupees)	7500			5000
Net Income (Rupees)	12500	-2000	-7050	32550
Hypothetical Net Income (Rupees)#	27000	23400	12200	

Note: * Case 1 is owner cultivation under second sowing in a village in Yavatmal taluka. Case 2 is tenant cultivation under second sowing in the same village as that of Case 1. Case 3 is owner cultivation under third sowing in a village in Pusad taluka of Yavatmal district. Case 4 is owner cultivation under first sowing in a village in Nagpur district. All the above four cases are from villages where there was a farmer suicide in 2004 but these villages were not covered in the intensive survey. # This is a hypothetical situation under the assumption that seed expenses would be as under a single sowing and with per acre expenses similar to that for Case 4, there is no alteration in other expenses, produce per acre is 4 quintals (70 per cent of that in Case 4), and price they receive for selling the produce remains the same.

Case 3 is an owner with 3 acres of land in Pusad taluka of Yavatmal district. Rainfall played truant and he had to go for a third sowing. He invested heavily on fertilizer and pesticides to get a higher yield, but to no avail. He just got 1 quintal of produce, which he sold to a private trader for Rs.1550. The farmer's expenses on fertilizer and pesticides could not be recovered from the produce. This is a clear case of wrong advice provided by input sellers to go in for a third sowing. Even if he had got 3 quintals of produce he would not have been able to recover the costs incurred after the third sowing. In fact, he is not the lone farmer in

the village to have gone in for a third sowing, there were many others like him. This also explains the break down of extension service and absence of an effective regulation to control input traders.

Case 4 is a medium farmer with 15 acres of land from a village in Nagpur district. He produces a number of crops and also follows the practice of crop rotation. His main income is about Rs.50000 from 100 sweet lime trees planted in 2 acres of land. He also has access to assured water through a personal bore well. In cotton cultivation, his usage of pesticide was the maximum among the four cases being discussed. His major expenses in Cotton cultivation were on account of labour, as he did not use family labour at all. Among the four cases discussed, his yield is the maximum. Despite his relatively comfortable status, he did not sell all his produce to the MSCCGMF. Immediate credit requirement made him sell 7 quintals to a private trader for Rs.1250 per quintal. He has plans of planting another 100 sweet lime trees and experimenting with Bt Cotton in the coming season.

Let us discuss a hypothetical situation for Case1, Case 2 and Case 3. The hypothetical situation assumes that if the availability of water was assured then these farmers would have gone in for a single sowing and that the expenses on seeds per acre would be similar to that given in Case 4. We further assume that all other expenses remain the same, the farmers get a produce of 4 quintals per acre (this is 70 per cent of the yield attained in Case 4), and for the additional produce they receive the maximum price that they have received for their actual produce. This hypothetical situation more than doubles the income for Case 1, makes it positive for Case 2 and Case 3. This can take households of Case 1 and Case 2 to above the poverty line. Now, let us further state that the price fluctuation gets reduced such that the Case 3 farmer gets an additional Rs.500/- per quintal. This along with the production mentioned in the hypothetical situation a family with five members can fall a little short of the poverty line. With some additional income this family is also likely to go above the poverty line. These scenarios explain the vulnerability of the farmers to yield-related and price-related shocks.⁴⁷

4.11 Suicide Cases Eligible for Receiving Compensation

As mentioned earlier, all farmers who committed suicides are not investigated for compensation. In 2004, police records indicated that there were 4147 suicides of those

⁴⁷ For a recent discussion of risk and risk management in Indian agriculture see Ramaswami et al (2004).

whose profession is self-employed in agriculture. All these are not investigated for consideration of compensation.⁴⁸ The number investigated in 2004 is in the range of 500-600 in 2004. For the three selected districts of Wardha, Washim and Yavatmal, as per our information the cases investigated are 218 in 2004 (Annexure 7). Further, all suicide cases investigated do not receive compensation. From the 111 cases analysed by us (110 from the three selected districts and one from Amravati), 24 have received some help from the government and from these only 21 have been considered eligible to receive compensation (includes one case in Amravati district).⁴⁹ The surviving members of a deceased individual's family are considered for receiving compensation of Rs.1 lakh if the following three conditions are satisfied:

- The deceased was a farmer and its proof lies in ownership of land,
- The deceased was indebted when the incident took place
- Indebtedness was the cause of suicide

Let us elaborate on the above-mentioned three criteria. On land ownership, there are differences in *de facto* and *de jure* ownership of land. Land is not in the deceased individual's name; it is in his/her father or spouse's name. Two individuals from the same family have separated and cultivate independently, but legally the lands are still under a single ownership. The legal landowner may not be residing in the village and might have rented the land out to tenants for cultivation. On indebtedness, one observed that almost all those interviewed had some or the other loans. It is easy to investigate and verify institutional loans, but not so when the amount is from informal sources like a moneylender or a trader-cum-moneylender. More so, after the demise of the debtor when the interest rates and collection practices by the creditor are likely to come under scrutiny. There can be practical difficulties in identifying cause based on circumstantial evidence because the

⁴⁸ Those investigated are largely a subset of those indicated as self-employed in agriculture as per police records, but it is possible that a small proportion might have been indicated differently such as student or housewife or have not been reported to the police. In other words, those investigated for consideration will be a different set, much smaller in size, but with a large proportion intersecting with those indicated in the police records as self-employed in agriculture.

⁴⁹ We attempted some analysis to compare between eligible and ineligible suicide case households, but did not get any results indicating that the differences are statistically significant. Our survey does point to some subjectivity in considering certain cases as eligible. In our survey we came across two cases where the families were related to leaders of some political parties (ex Ministers of Maharashtra) and one case where the deceased was himself contemplating to contest for the local body elections. The purpose of our mentioning these is not to contest their inclusion in the list, but rather to indicate the subjectivity involved. In fact, a more serious error, as discussed subsequently, is the exclusion of genuine cases. Our survey observations and the official investigation for consideration of compensation for the 116 households where we conducted intensive survey are given in Annexure 3.

deceased is no longer among us. Given this limitation, any investigation that forms the basis for compensation will have to sort out two possible errors. First, it should not exclude genuine cases from being given compensation. Second, it should not include those that do not deserve to receive compensation. Any compensation criteria or investigation should keep in mind that both errors should be minimised, but exclusion error should be considered as more serious.

4.12 Conclusions

From the 111 suicide cases under analysis, basic particulars of the deceased indicate that 91 per cent were males, 71 per cent were below 50 years of age, 80 per cent were currently married, 39 per cent completed their matriculation or higher education, 58 per cent had more than 10 years of experience in farming, and in 79 per cent of the cases the method of committing suicide was by consumption of insecticide/pesticide. The difference in incidence of suicides across caste groups and size-class of land is not statistically significant. The interrelated and co-existing socio-economic stressors identified in order of frequency are indebtedness (87 per cent), deterioration of economic status (74 per cent), conflict with other members in the family (55 per cent), crop failure (41 per cent), decline in social position (36 per cent), burden of daughter's/sister's marriage (34 per cent), suicide in a nearby village (32 per cent), addictions (28 per cent), change in behaviour (26 per cent), dispute with neighbours/others (23 per cent), health problem (21 per cent), a recent death in the family (10 per cent), history of suicide in family (6 per cent), other family members being ill (3 per cent). Comparing suicide case and non-suicide control households, one observes that the former have slightly higher proportion of nucleus families, have a higher average family size (particularly, greater number of females), ownership of assets and access to basic amenities is lower, and more importantly the average amount of loan is much higher and the average value of produce is lower. A statistical exercise reiterates our observation that indebtedness and absence of bullock (a productive as well as a liquid asset) are significant risk factor. Under other restrictive conditions, higher family size and lower value of produce also turn out to be significant risk factors. Analysis of cost of cotton cultivation in four case studies brought out the vulnerability of the farmers to yield related and price related shocks. Comparing suicide case households considered eligible for receiving compensation and those not eligible for receiving compensation and examining the compensation criteria we understand that there is scope for subjective interpretation. Based on our observations in chapters 2-4 we give some suggestions in the next chapter.

5 Summary and Policy Suggestions

5.1 The Context

In recent years, a larger agrarian crisis, particularly in cotton growing regions of Andhra Pradesh, Karnataka and Maharashtra in India, has precipitated a spate of suicide death among farmers. This is of public policy concern. It is with this concern that the current exercise on Maharashtra looked into various socio-economic aspects to understand processes and identify risk factors that would be of help in formulating policy suggestions.

The broad objectives of the current exercise are:

- To analyze the agrarian scenario in the selected districts of Wardha, Washim and Yavatmal.
- To look into the trends and patterns of the recent suicide scenario in Maharashtra.
- To study the nature and extent of indebtedness among deceased farmers.
- To identify and examine other socio-economic factors leading to suicidal death by the deceased farmers.
- To compare the suicide (case) with non-suicide (control) households.
- To suggest policy measures.

5.2 Summary Findings

5.2.1 The Agrarian Scenario

In Maharashtra, gross value addition is relatively higher for Fruits & Vegetables and Sugarcane, but these crops are not grown in the selected districts. Traditionally, Cotton has been the cash crop for farmers of the districts. Over the years, profitability from Cotton has declined. Some of the reasons are: high subsidies by the USA leading to price distortions, low import tariffs in India, and failure of the MCPS in Maharashtra. Withdrawal of the state is evident from declining public investment in agriculture, poor government agricultural extension service, diminishing role of formal institutions in rural financial market among others. The farmer now depends on the input dealer for advice leading to supplier-induced demand and on informal sources of credit with greater interest burden. To add to this, 2004 was a rain deficient year that affected yield in at least some pockets of the selected districts,

but overall macro supply scenario being good market prices were low. In short, there seems to be a larger socio-economic and agrarian crisis.

5.2.2 Trends and Patterns of Suicides in Maharashtra

From 1995 to 2004, suicide deaths in Maharashtra increased from 11866 to 14729. This increase is largely among males, but after normalizing for population the age-adjusted suicide mortality rate (SMR, suicide death per 100000 population) for males has remained in the range of 20-21 from 2001. Total suicide deaths as well as age-adjusted SMR for females have been declining after 1999. Across divisions, age-adjusted male SMRs have jumped to a higher level around 2000 or 2001 in Amravati, Nagpur and Pune divisions and also in the three selected districts of Wardha, Washim and Yavatmal whereas age-adjusted female SMRs have been declining in all the divisions.

One of the most revealing aspects of our analysis is that SMR for male farmers has trebled from 17 in 1995 to 53 in 2004. Division wise trends from 2001 to 2004 indicate that SMR for farmers is higher in Amravati, Aurangabad and Nagpur divisions than that for the state. It is the highest in Amravati division where SMR for male farmers is 116 during 2001-4 and was as high as 140 in 2004. In the three selected districts, SMR for farmers is higher than the state average in Wardha and Yavatmal, but not in Washim. Easy availability of highly toxic insecticides/pesticides with the farmers has also proved fatal.

SMR for male farmers has been increasing in recent years and is very high in certain regions of the state when the SMR for the overall population has stabilized. Thus, an important explanation for relatively higher suicide deaths in Maharashtra is farmer suicide deaths.

5.2.3 Micro Analysis

In this exercise based on our field survey, we analysed data from 111 suicide cases and 106 non-suicide control households spread across 105 villages. Difference in incidence of suicides across caste and size-class of land are not statistically significant. Nevertheless, we may mention that incidences are slightly higher for SCs and STs across caste groups and for marginal and small farmers across size-class of land.

The interrelated and co-existing socio-economic stressors identified in order of frequency are indebtedness, deterioration of economic status, conflict with other members in the family, crop failure, decline in social position, burden of daughter's/sister's marriage, suicide in a nearby village, addictions, change in behaviour of deceased, dispute with neighbours/others, health problem, a recent death in the family, history of suicide in family, other family members being ill. Comparing suicide case and non-suicide control households, one observes that the former have slightly higher proportion of nucleus families, have a higher average family size (particularly, greater number of females), ownership of assets and access to basic amenities is lower, and more importantly the average amount of outstanding debt is much higher and the average value of produce is lower.

A statistical exercise comparing suicide case with non-suicide control reiterates our observation that indebtedness and absence of bullock (a productive asset) are significant risk factor. Under other restrictive conditions (like controlling for land-size, caste or district), higher family size and lower value of produce also turn out to be significant risk factors. Analysis of cost of cotton cultivation in four case studies brought out the vulnerability of the farmers to yield related and price related shocks. Comparing suicide case households considered eligible for receiving compensation and those not eligible for receiving compensation and examining the compensation criteria we understand that there is scope for subjective interpretation.

5.3 Policy Suggestions

5.3.1 Agriculture related strategies

Policy interventions should not be restricted to suicide households. A deeper agrarian crisis can be averted by policy interventions beneficial in overall terms. It will also help reduce suicides.

- **Revitalize rural financial market:** The credit market needs immediate attention; the formal credit structure should be revitalized.
- **Vaidyanathan committee report:** One could benefit from the recent recommendations of the “Task Force on Revival of Cooperative Credit Institutions,” which suggests to make the cooperative credit societies accountable, to reduce the number of intermediary societies in the three-tire structure, to reduce interest rates charged to the farmer, to

reduce intervention by the state government, and to bring them under Reserve Bank of India (RBI) regulation.

- **Vyas committee report:** Another recent report is on “Flow of Credit to Agriculture and Related Activities from the Banking System.” It suggests a two-stage reorganization of Regional Rural Banks (RRBs) to consolidate their functioning. This will help them scale up their operations, utilize manpower optimally, have greater autonomy and infuse professionalism while retaining their rural focus.
- **Working Capital:** This can be for consumption purposes also. It can be operationalized through Kissan Credit Cards.
- **Investment Capital:** Care should be taken not to divert loans given for this purpose. There should be strict supervision by formal institutions to prevent such possibilities. Otherwise, repayment will become difficult.
- **Credit Cap:** Our observations on cost of Cotton cultivation in a hectare of land is approximately in the range of 15000-Rs.20000. Credit available for agricultural purposes from formal sources for a hectare of land is much lower than this. There is a need to revise this credit cap to around Rs.25000 or more.
- **Information bureau:** There is a demand for credit, but the supply side of rural financial market is not responding due to some constraints. Enabling the formation of an information bureau will help formal institutions to judge credit worthiness of an individual. When moneylenders operate in a village, they take the help of a prominent person of the village to gather information on credit worthiness of an individual and at times also use their influence to recover loans. In return, they pay him a commission.
- **Micro credit:** Formal institutions have by now started entering into rural credit market through SHGs and other micro credit enterprises. They should be encouraged to intervene and have a greater presence among farmers.
- **Regulate private moneylenders:** The Non Governmental Organizations (NGOs) are already involved in facilitating self-help groups (SHGs). The NGOs and local SHGs should be encouraged to act as pressure groups to regulate private moneylenders.
- **Insurance schemes:** The farmer’s problem is rooted in his exposure to risk – yield as well as price shocks. Insurance schemes may be devised to mitigate these. This can be done in three possible ways. *Credit insurance* can look into the credit default. A fund with contribution from the creditor, the debtor and the Government may be created for this. Appropriate mechanisms to look into its modus operandi should be devised. *Crop insurance* will be linked with yield risk. Implementation of this should be village and if

possible plot of land specific. Theft of crop and loss due to fire or other calamities should be taken into consideration while administering this. The earlier mentioned information bureau could also help in this endeavour. *Income insurance* will address the poor returns, particularly for marginal and small farmers and also tenants. The poor returns could be because of poor prices, low yields or high transaction costs arising out of low quantity of produce.

- **Risk mitigation fund:** A risk mitigation fund can be generated to finance the three different insurance schemes – crop, credit and income – or any other appropriate risk mitigation scheme. This fund will have contribution from the Government and can also be drawn from the Rural Infrastructure Development Fund (RIDF).
- **Water management:** In the selected districts where agriculture is largely rainfall dependent, strategies to increase irrigation potential (particularly, through watershed development), should be devised so as to provide scope to increase value addition. The Maharashtra Employment Guarantee Scheme (MEGS), the National Watershed Development Project for Rainfed Areas (NWDPA) and the RIDF can be used for this. Expedite the completion of already initiated irrigation projects. For completed projects take measures that ensures utilization is up to potential, and there is better utilization of water through drip/sprinkler.
- **Land management:** Excessive use of fertilizer and pesticides and mono-cropping can affect the fertility of land. Appropriate land management techniques should be devised. This should complement the efforts in improving water management. The MEGS and RIDF can be used for this.
- **Diversification of cropping pattern:** The important cash crops of this region are Cotton and Soyabean. To reduce the vulnerability, the farmer should have more options and be able to go beyond these crops. Policies that can make diversification of cropping pattern feasible should be put into place. Inter cropping, fitting two crops, crop rotation and horticulture should be encouraged. Better water and land management will also help in attaining this objective.
- **Revive agricultural extension:** In cotton, there is the emergence of new varieties of seeds that makes conventional methods of cultivation redundant. The experience gained over the years is of no use. There is deskilling. The farmer has to upgrade his technical know-how. He should also be abreast with the latest developments in water and land management. An appropriate mechanism to revive agricultural extension is urgently required. Local NGOs can also be involved in facilitating agricultural extension.

- **Input quality:** Inputs in the form of seeds, pesticides and fertilisers sold to farmers could be of spurious quality. There is no regulatory mechanism. We came across situations where farmers were advised by traders to go in for a third sowing – a case of supplier-induced-demand. The private traders should be regulated. Local non-governmental organizations (NGOs) can be involved in regulating the private trader.
- **Encourage organic farming:** It will be beneficial on two counts - to reduce costs associated with pesticides and fertilizers and reduce the availability of pesticides for committing suicide. We have also observed its successful practice in two cases during our survey. Replication of such experiments should be encouraged. For instance, shifting from inorganic to organic farming will give low returns in the initial two to three years. This acts as a deterrent for marginal and small farmers. Compensating them during initial years would help. This can be done through MEGS. It would be similar to payment of wages to the landowner under horticulture scheme of MEGS. The help provided should also be in terms of technical know-how (agricultural extension), certification & quality control and marketing. The Vidarbha Organic Farmers Association and other similar organization may be involved in this endeavour.
- **Integrated pest management:** Another alternative is to encourage a judicious mix of organic and inorganic farming. This will also require help in terms of agricultural extension, quality control and marketing.
- **Increase import tariff:** The farmer is exposed to price fluctuations, particularly in cotton, because of global price movements. In the current scenario low domestic price is largely due to huge subsidy by the United States of America (USA), a major exporter, and low import tariff in India. The Government of India may be requested (1) to raise the issue of high subsidies in the USA at appropriate forums and (2) to increase the import tariff in Cotton to 30-35 per cent from the current 5 per cent.
- **Price stabilization:** The Monopoly Cotton Procurement Scheme of Maharashtra has failed in mitigating price fluctuations. Some of the reasons are because of inappropriate functioning of the scheme like payment of additional advance price without looking into market conditions, rent-seeking by office bearers during grading/weighing, involvement of middlemen who take a commission from farmers, delay and staggered nature of payment to farmers and the payment to farmers being linked with loan repayment among others. These failures should be looked into and an appropriate mechanism to control price fluctuation may be considered. It will also help in risk mitigation.

- **Marketing of produce:** Good marketing network can reduce transaction costs. It will also provide non-farm employment opportunities with agricultural linkages.
- **Non-farm employment:** A large proportion of rural population being dependent on agriculture (cultivators and agricultural labourers) indicates that there are not many avenues of diversifying sources of income. Agro-based industries and other non-farm opportunities should be increased. With the current cropping pattern, the agro-based industries can be cotton or oilseeds based. It can be related to organic farming like manufacture of composts, bio-fertilizers and bio-pesticides among others.

5.3.2 Other Suicide Mitigation Strategies

- **Reduce access to pesticides:** Reduce the easy access and availability of insecticides/pesticides. From those available, toxicity should be reduced to non-lethal levels. The containers of these toxic chemicals should have prominent warning signs as also instructions for proper handling, storage and usage in Marathi. Wherever possible add emetics or stenching agents to make insecticide/pesticide repulsive while consuming. Consider providing formulations that cannot be readily absorbed in human body. The providers/suppliers of insecticides/pesticides should be part of this exercise and held accountable for their lapses. As mentioned earlier, encourage other forms of pest control. Encourage bio-pesticides and phase out chemical pesticides within a time frame. Some of the above-mentioned practices have helped reduce organophosphorous poisoning deaths in Sri Lanka.
- **Public Health:** The average distance to reach a health facility which can handle poisoning cases is more than 20 kilometres in Washim and Yavatmal and there are instances where this is about 100 kilometres away. The primary health centres (PHCs) should have trained staff and be equipped with necessary material to handle cases of poisoning. This will reduce travel time and save more lives. The personnel at the primary health centres should also be trained to identify, intervene (improve their listening skills) and refer patients with suicidal tendency for personalized care. Educate the community to identify depression and alcoholism and initiate treatment. The native healers, practitioners of alternative medicine and faith healers can also be trained to identify such cases and refer them for more specialized care.
- **Volunteer crisis centres:** Organizations operating in urban areas like *The Samaritans* may be encouraged and provided with support to open their centres in these regions. The volunteers working in these centres should be adequately trained to identify

psychological illness and be allowed to refer cases for more personalized care. There should be a process of certification and regulation of these centres to ensure quality and adequacy of care provided by them. Networks of various crisis centres should be encouraged so that they can learn and support each other's work.

- **Helplines:** Introduce helplines and disseminate the numbers in the villages so that individuals in distress can turn to someone. To begin with, the helplines of organisations operating in urban areas like Nagpur and Mumbai can be disseminated.
- **Community groups:** Develop a protocol for starting survivor support groups. Form community/farmer groups in rural areas. These groups can discuss farm related and other socio-economic problems.
- **Socio-religious activities:** The help of socio-religious organization like *The Art of Living* or *Vipassana* may be sought to mitigate the general state of despair among people.
- **Responsible reporting:** Guidelines by the World Health Organisation (WHO) on suicide reporting should be disseminated among the media fraternity to promote responsible reporting of suicides. Government-Media-Academia can come together to improvise on the guidelines to suit to the local condition. Enable the media personnel to form a regulatory and self-monitoring system. Sensationalizing, graphical depiction, providing too many personal details and depicting the act to be a method of resolving personal crisis should be avoided.
- **Administration-media coordination:** Reporters usually get their information from government officials. The latter too have an important role in shaping the report that media presents to the public. Officials should refrain from a 'no comment' response; should avoid dictating how the suicide should be reported and help by giving accurate and responsible responses to the reporters' queries. There is a case for coordination between the administration and the media.
- **Reduce social expenditure:** One of the reasons for indebtedness is expenses associated with marriages in the family. A related risk factor observed is the difficulty in conducting daughter's/sister's marriage when faced with an economic crisis like crop loss. Initiate involvement of civil society to discuss and bring about changes in the society by curtailing huge expenses on marriages and other social functions.
- **Social sector needs:** Healthcare needs and higher educational requirements also lead to credit requirement and indebtedness. Poor infrastructure also adds to transaction costs in terms of storage and marketing. Poor transportation can also lead to delay in seeking

healthcare during times of emergency (including the consumption of pesticides/poison). Appropriate interventions may be designed.

- **Research:** More multi disciplinary research should be encouraged.

5.3.3 On Documentation and Compensation Criteria

- **Decriminalize attempted suicide:** A person attempting suicide is not a criminal. She/he needs psychosocial help. Decriminalizing attempted suicide and widely disseminating that will help reduce the shame and stigma attached to the act. This will change the society and the caregivers approach to them. This will also improve reporting and documentation of suicides.
- **Clear guidelines:** In India, all suicides are supposed to be reported to the police. The police should have clear guidelines to identify farmers' suicide cases and inform the civic administration so as to facilitate scrutiny for compensation. The civic administration should also report to the police if any suicide case is reported to it directly.
- **Streamline collection and maintenance of data:** A common electronic format should be used to collect and maintain data on farmers' suicides. The entry in this format should be done at the source (preferably Talukas and if not possible Districts). From Talukas it should be sent to the concerned District headquarter, Divisional headquarter and Mantralaya electronically at the same time. This electronically entered coded unit level data without revealing basic identification of the deceased should be made available on the Internet to help research and public discourse.
- **Criteria for compensation:** The criteria for compensation should be clear, unambiguous and minimise scope for subjective interpretation. As mentioned earlier, there was not much difference between suicide case households considered eligible and those considered not eligible in terms of land ownership or indebtedness. The scope for subjective interpretation while scrutinising should be minimized.
 - Definition of farmer/cultivator should be broad. Legal ownership of land should not be the only criteria for considering an individual to be a farmer. It should include individuals who cultivate land without having the legal ownership (spouse, children, other family members and also tenants). Information on farmers should be maintained at the village level and updated regularly.

- Loan from moneylenders and other informal sources should be included while evaluating indebtedness status. It will always be difficult to verify informal loans. However, this can be reduced if the operation of moneylenders is regulated.
- Independent of indebtedness status, crop loss should also be another criterion for providing compensation. It is generally observed that crop loss can be village specific or localised in a group of villages, but situation leading to crop loss by an individual farmer due to theft, fire or other reasons should also be considered.
- **Minimizing error:** While administering any compensation there can be two possible errors: (1) not giving compensation to a deserving case and (2) providing compensation to an undeserving case. Both errors should be minimized, but their nature is such that minimizing one might increase the error of the other. While striking a balance, decisions should be taken to minimize the former error, which we consider to be more serious.
- **Quick processing:** The time taken for scrutiny and receipt of compensation should be streamlined and minimised. An appropriate routine may be designed for this. For instance, the last Monday of every month can be allotted for this and decision taken through a single window. Once decision is taken it should be conveyed electronically or by fax to the districts and there should be standing order for the district administration to proceed immediately.
- **Help all suicide case households:** Whether an individual is eligible/ineligible for receiving compensation, the vulnerability of the surviving members of a household increases and more so if the deceased happens to be one of the major income earners. In fact, it would be appropriate to provide help to all suicide case households. Preference may be given under existing welfare schemes that provide some regular income earning opportunities for the other members (particularly, spouse). Older family member may be considered for receiving pension. Children of the household should be admitted to government run boarding schools to ensure schooling till at least 14 years of age.

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