

# CONTENTS

<i>Particulars</i>	<i>Page No.</i>
<i>Declaration</i>	(i)
<i>Certificate</i>	(ii)
<i>Acknowledgement</i>	(iii-iv)
<i>Contents</i>	(v-viii)
<i>List of Tables</i>	(ix)
<i>List of Maps and Figures</i>	(x)
<i>List of Appendices</i>	(xi)
<i>List of Abbreviations</i>	(xii-xiii)
<b>CHAPTER 1: AN INTRODUCTORY ANALYSIS</b>	<b>1-8</b>
1.1 Introduction	1
1.2 Concept of Crop Diversification	3
1.3 Crop Diversification at India Level	4
1.4 Crop Diversification in Case of Punjab	4
1.5 Rationale and Objectives of the Study	5
1.6 Structure of the Thesis	7
<b>CHAPTER 2: REVIEW OF LITERATURE</b>	<b>9-28</b>
2.1 Introduction	9
2.1.1 Literature Review on: Nature, Trends, and Patterns of Crop Diversification	9-14
2.1.1.1 <i>Global context</i>	9
2.1.1.2 <i>Indian context</i>	11
2.1.1.3 <i>Punjab specific</i>	14
2.1.2 Literature Review on: Determinants of Crop Diversification	16-20
2.1.2.1 <i>Global context</i>	16
2.1.2.2 <i>Indian context</i>	18
2.1.2.3 <i>Punjab specific</i>	20
2.1.3 Literature Review on: Crop Diversification and Economic Efficiency	21-27
2.1.3.1 <i>Global context</i>	21

2.1.3.2 <i>Indian context</i>	24
2.1.3.3 <i>Punjab specific</i>	25
2.1.4 Issues and Research Gap	27

**CHAPTER 3: A TEMPORAL ANALYSIS OF CROP DIVERSIFICATION IN  
PUNJAB'S AGRICULTURE 29-50**

3.1 Introduction	29
3.2 Background and Literature	32
3.3 Material and Methods	34-40
3.3.1 <i>Exponential growth rate and quadratic growth rate</i>	34
3.3.2 <i>Rank analysis</i>	36
3.3.3 <i>Index of rank concordance</i>	37
3.3.4 <i>Decomposition of sources of growth</i>	38
3.3.5 <i>Determinants of crop diversification</i>	39
3.3.6 <i>Measures of crop diversification</i>	40
3.4 Results	40-48
3.4.1 <i>Shift in cropping pattern</i>	40
3.4.2 <i>Exponential and quadratic growth rate</i>	42
3.4.3 <i>Estimation of crop diversification index</i>	43
3.4.4 <i>Inter-temporal movement analysis of crops</i>	44
3.4.5 <i>Decomposition of sources of growth in agricultural output</i>	46
3.4.6 <i>Determinants of crop diversification</i>	48
3.5 Conclusion and Policy Implications	49

**CHAPTER 4: WEATHER SHOCKS, CROP PRODUCTIVITY, AND CROP  
DIVERSIFICATION: ADAPTATION PRACTICES IN PUNJAB 51-69**

4.1 Introduction	51
4.2 Data Sources and Descriptive Statistics	55-61
4.2.1 <i>Data sources</i>	55
4.2.2 <i>Onset of the rainy season and precipitation index</i>	57
4.2.3 <i>Evidence on climate change</i>	59
4.2.4 <i>Diversification measures</i>	61

4.3 Empirical Frameworks	61-63
4.3.1 <i>Extreme monsoon onset day and crop productivity</i>	62
4.3.2 <i>Monsoon onset day, crop productivity, and crop diversification</i>	63
4.4 Empirical Results	63-66
4.4.1 <i>Model specification test</i>	64
4.4.2 <i>Impact of extreme monsoon onset day on crop productivity</i>	65
4.4.3 <i>Impact of delayed monsoon arrival and crop diversification as adaptation measure</i>	66
4.5 Conclusions	68
<b>CHAPTER 5: ECONOMIC EFFICIENCY OF AGRICULTURE IN PUNJAB</b>	<b>70-96</b>
5.1 Introduction	70
5.2 Methodological Frameworks	73-78
5.2.1 <i>Measurement of farm efficiency: CCR and BCC DEA models</i>	74
5.2.2 <i>Super-efficiency model</i>	76
5.2.3 <i>Cost efficiency and allocative efficiency</i>	77
5.2.4 <i>Impact of crop diversification on economic efficiency</i>	78
5.3 Data and Specification of Variables	78-80
5.3.1 <i>Descriptive statistics</i>	80
5.4 Empirical Results of Crops Cultivation	81-87
5.4.1 <i>Efficiency score and scale operations in crops production</i>	81
5.4.2 <i>Decomposition of OTE: PTE and SE</i>	84
5.4.3 <i>Discrimination of efficient tehsils</i>	85
5.4.4 <i>Discrimination of inefficient tehsils</i>	87
5.5 Efficiency Improvement: Slacks and Targets Setting Analysis	88
5.6 Allocative and Cost Efficiency Analyses	93
5.7 Impact of Crop Diversification on Economic Efficiency	94
5.8 Conclusions	95

<b>CHAPTER 6: MAJOR FINDINGS AND POLICY IMPLICATIONS</b>	<b>97-103</b>
6.1 Introduction	97
6.2 Major Findings	97-99
6.2.1 <i>Findings based on third chapter (A Temporal Analysis of Crop Diversification in Punjab's Agriculture)</i>	97
6.2.2 <i>Findings based on fourth chapter (Weather Shocks, Crop Productivity, and Crop Diversification: Adaptation Practices in Punjab)</i>	98
6.2.3 <i>Findings based on fifth chapter (Economic Efficiency of Agriculture in Punjab)</i>	99
6.3 Policy Implications	100
6.4 Limitation and Directions for Future Research	103
<b>Bibliography</b>	<b>104-133</b>
<b>Appendices</b>	<b>134-138</b>