



2nd

Edition

DRYLAND TECHNOLOGY

M.L. Jat • S.R. Bhakar
S.K. Sharma • A.K. Kothari



Dryland Technology

ABOUT THE AUTHORS



Dr. M.L. Jat was born into an agriculture family on January 1st, 1958 in Bhilwara district of Rajasthan state, India. Graduating from CTAE, Sukhadia University, Udaipur, Rajasthan. He Obtained M.E. (Ag.) in Irrigation Water Management from RAU, Bikaner. Presently Dr. Jat is working as Associate Professor (SWE) in AICRP on Dryland Agriculture at DFRS, Arjia, Bhilwara, MPUAT, Udaipur (Rajasthan). The author has vast experience in the field of prediction of drought and its management, ground water also in rainwater management while working in AICRP on dryland agriculture and agrometeorology. He has received Outstanding Book Awards in 2008 from Indian Society of Agricultural Engineers for his book on “Groundwater Hydrology”.



Dr. S.R. Bhakar is Head and Associate Professor of the Department of Soil and Water Engineering, College of Technology and Engineering, Maharana Pratap University of Agriculture and Technology (MPUAT), Udaipur, Rajasthan. He did his B.E. (Ag) from Sukhadia University, Udaipur (Rajasthan); M.Tech. (Water Resources, Development and Management) from the Indian Institute of Technology, Kharagpur and Ph.D. (SWCE) from the MPUAT, Udaipur. He has received Outstanding Book Awards in 2006 and 2008 from Indian Society of Agricultural Engineers for his book on “Sinchai Ke Sidhant” and on “Groundwater Hydrology”.



Dr. Shanti Kumar Sharma is presently working as Associate Professor (Agronomy) at MPUAT, Udaipur. He has been a recipient of PG Gold Medal and ICAR Junior and Senior Research Fellowship. He obtained Ph.D. degree from Indian Agricultural Research Institute, New Delhi, specializing in sustainable agriculture. He was awarded Jawahar Lal Nehru Young Scientist Award of Indian Council of Agricultural Research in 2002 for outstanding work in the field of Agronomy. He authored the first Distance Education Course on “Jaivik Krishi” (Organic Agriculture) in six volumes launched by RAU, Bikaner. For his contribution Dr. Sharma received Bikaner District Administration and RAU Vice-chancellor’s award. He served as Member of the Board of Management, RAU, Bikaner.



Dr Anil Kumar Kothari is presently working as an Associate Professor, Soil and Water Engineering in AICRP on Operational Research Project on Dryland Agriculture since January, 2006. He obtained his Ph.D. Degree from MPUAT, Udaipur in 2007. He had received Gold Medal during his master degree. He has 27 years experience in the field of Dryland agriculture and handled seventeen projects funded by central and state government and ICAR like NICRA, RADP, NATP” Dryland mechanization”, NATP “In-situ rain water conservation and water harvesting, a state government project “Action research Project on Drip irrigation in Cotton in Bhilwara district of Rajasthan”.

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M.L. Jat

Associate Professor (SWE)
DFRS, Arjia, Bhilwara
MPUAT, Udaipur (Raj.)

S.K. Sharma

Associate Professor (Agro.)
DFRS, Arjia, Bhilwara
MPUAT, Udaipur (Raj.)

S.R. Bhakar

Associate Professor (SWE)
Department of SWE
CTAE, MPUAT, Udaipur (Raj.)

A.K. Kothari

Associate Professor (Agril. Engg.)
DFRS, Arjia, Bhilwara
MPUAT, Udaipur (Raj.)



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Dr. O.P. Gill
Vice-Chancellor



Phone # 91-294-2471101 (O)

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Fax: 2470682

**Maharana Pratap University of Agriculture & Technology,
University Campus, Udaipur-313 001 (Raj.) INDIA**

FOREWORD

Rainfed farming will remain the main stay for the livelihood support of millions of small and marginal farmers across the country even after realizing the complete irrigation potential. Further, climate change is posing a major challenge for rainfed agriculture and the constraints in further expansion of irrigated area in country. Impacts of climate change agriculture are being witnessed all over the world, but countries like India are more vulnerable in view of the high population pressure on agriculture and natural resources with poor coping mechanisms. Rainfall pattern is expected to create further moisture stress in area under dryland agriculture. Thus, for moderation of moisture to improve productivity of both crops and rainwater is essential. This can be achieved with the aid of application of dryland technology for livelihood security of dryland farmers. Thus, Dryland technology is the most important component for rainwater management and is the critical component of rainfed farming for livelihood security of dryland farmers.

The scope of dryland farming is wide and varied. It covers diversified areas such as understanding of dryland engineering, dryland farming and its concept, rainwater management for drought proofing and mitigation, risk management under drought situation, water harvesting either *in-situ* or *ex-situ* and their efficient recycling, reduction of water losses, design of water harvesting structures and irrigation systems and value addition of agricultural products, development of improved implements for different field operations and watershed management for better utilization of rainwater. This book deals with all these aspects. It amply serves a widely felt need for a suitable and comprehensive book on dryland engineering with emphasis on water harvesting either *in-situ* or *ex-situ*, the analysis of rainfall and water balance, efficient crop planning stress to enhance productivity, storage of grain, value addition of agricultural products and use of improved implements for energy minimization.

I very much appreciate the efforts made by Drs. M.L. Jat, S.R. Bhakar, S.K. Sharma and A.K. Kothari for bringing out this book on “Dryland Technology” which I hope will be useful for students, teachers and researchers, policy makers and other having interest in the areas related to Dryland Agriculture and Technologies.

10th May, 2012

(Prof. O.P. Gill)

PREFACE (2nd Edition)

The authors are greatly encouraged by the acceptance of the First Edition of Dryland Technology by students, professional engineers, scientists and readers from various areas of Dryland areas of India and other developing countries of Asia and Africa as well as many institutions globally. The need for revising the book was felt to make some corrections where ever necessary.

Dryland technology broadly involves several disciplines comprised of soil and water engineering (SWE), farm machinery and power engineering, hydrology, processing and agricultural sciences. It is equally urgent to agricultural scientists dealing with crop and animal husbandry, foresters, regional planners and extension workers. The main focus is to enhance productivity under Dryland ecosystem for livelihood security of Dryland farmers. For integrated management of land water resources in Dryland agriculture, the scientific knowledge of all these areas is required. Thus an attempt has been made to provide such a perspective to all stakeholders, students, scientists and planners. Basic knowledge of mathematics will be required for better understanding of some chapters dealing with design of rainwater harvesting structures either in situ or ex situ and irrigation method, rainfall characteristics, water balance, implement design, alternate land use planning etc.

The author wishes to make particular mention of the major contributions made by the publisher, Scientific Publishers (India), Jodhpur in the processing and editing of the book as well as providing excellent marketing support.

Authors

PREFACE (1st Edition)

This book is intended for students of agricultural engineering and agriculture studying in different institutions in India. It would also be useful for scientists, extension workers help to understand dryland agriculture to enhance productivity under dryland ecosystem for livelihood security of dryland farmers.

Dryland Technology broadly involves several disciplines comprised of Soil and Water Engineering (SWE), Farm machinery and Power Engineering, hydrology, processing and agricultural sciences. It is equally urgent to agricultural scientists dealing with crop and animal husbandry, foresters, regional planners and extension workers. The main focus is to enhance productivity under dryland ecosystem for livelihood security of dryland farmers. For integrated management of land and water resources in dryland agriculture, the scientific knowledge of all these areas is required. Thus an attempt has been made to provide such a perspective to all stakeholders, students, scientists and planners. Basic knowledge of mathematics will be required for better understanding of some chapters dealing with design of rainwater harvesting structures either *in situ* or *ex situ* and irrigation method, rainfall characteristics, water balance, implement design, alternate land use planning etc.

Indian agriculture is being described even today as a gamble of the monsoon and every year farmers' fate oscillate with the behaviour of monsoon. At present nearly 2/3rd of total area occupied under rain fed ecosystem in the country. Different types of droughts of varied intensities experienced at different growth stages such as early, mid and terminal season are common basic features of rain fed ecosystem. Thus, an attempt has been made to present the topics relevant to the needs of the dryland technology in different parts of country. All readers are welcomed for valuable criticism and suggestions to make this book more useful.

Authors

CONTENTS

	<i>Foreword</i>	<i>v</i>
	<i>Preface (2nd Edition)</i>	<i>vii</i>
	<i>Preface (1st Edition)</i>	<i>ix</i>
1	Introduction	1-8
1.1	Introduction	1
1.2	Importance of Dryland Farming	1
1.3	Classification of Dryland Agriculture	2
1.3.1	Dry Farming	2
1.3.2	Dryland Farming	2
1.3.3	Rain fed farming	2
1.4	Characteristics of Dryland Farming	3
1.4.1	Rainfall	3
1.4.2	Major soil groups	4
1.4.3	Crops	4
1.5	Crop Planning and Climate Analysis	5
1.6	Main Constraints of Dryland Areas for Improving Productivity	6
1.7	Policy Issues in Dryland Farming	6
	References	7
	Exercises	8
2	Climatic Classification of Dryland Areas	9-26
2.1	Introduction	9
2.2	Climatic and Agroclimatic Regions	9
2.3	Some Important Terms	10
2.4	Techniques of Agroclimatic Regionalisation	10
2.5	Climatic Classification	11
2.5.1	Methods of comparing agricultural potentials	11
2.5.2	Selianinov's method	11
2.5.3	Uchijima (1962) method	12
2.5.4	Thran and Broakhuiizen method	13

2.5.5 Hargreaves Methods	13
2.5.6 OMAI index	14
2.5.7 Papadakis method	14
2.5.8 Lang's Classification	15
2.5.9 De Martonne's classification	15
2.5.10 Koppen's classification	15
2.5.11 Gaussen's classification	16
2.5.12 Emberger's classification	16
2.5.13 Thornthwaite (1948) classification	16
2.5.14 Modified climatic classification of Thornthwaite and Mather (1955)	18
2.5.15 Troll's classification	19
2.6 Techniques for Agro Climatic Regionalisation for Small Geographical Areas	19
2.6.1 Krishnan and Singh's Methods	19
2.6.2 Cocheme and Franquin method	20
2.6.3 NCA method	21
2.6.4 Duggal's method	21
2.6.5 Sharma, Singh and Yadav's method	22
2.6.6 Mavi and Mahi's method	22
2.7 Soil Climatic Zone	24
References	24
Exercises	25
3 Rainfall and Water Balance Analysis	27-70
3.1 Introduction	27
3.2 Some Important Definitions	27
3.3 Sample Statistics	28
3.3.1 Measure of central tendency	29
3.3.2 Measure of variation	29
3.4 Measures of Symmetry	30
3.5 Measure of Peakedness or Flatness	30
3.6 Different Types of Probability Distributions	31
3.6.1 Probability distribution of discrete random variable	31
3.6.1.1 Binomial distribution	31
3.6.1.2 Geometric distribution	31
3.6.1.3 Poisson distribution	31
3.6.2 Continuous probability distributions	31
3.6.2.1 Normal distribution	31

3.6.2.2	Log-Normal distribution	32
3.6.2.3	Pearson type–III Distribution (PT3)	33
3.6.2.4	Log Pearson Type III Distribution (LP3)	33
3.6.2.5	Gamma Distribution	34
3.6.2.6	Truncated Gamma distribution	35
3.6.2.7	Extreme value type I or Gumbel distribution	35
3.6.2.8	Gumbel Extreme Value Distribution	39
3.6.2.9	Log Pearson Type III Distribution	40
3.6.2.10	Log Normal distribution	41
3.7	Markov chain	47
3.7.1	To Fit the Markov Model and to Test the Goodness of Fit	47
3.7.2	Steps to be followed in the Estimation of Markov chain Model	47
3.7.3	Practical Situation where Markov Model can be Applied	48
3.8	Rainfall Characteristics	50
3.8.1	Onset of effective monsoon (OEM)	50
3.8.2	Withdrawal of effective monsoon (WEM)	51
3.8.3	Length of rainy season	53
3.8.4	Dry spells	53
3.8.5	Wet spells	55
3.9	Water Balance	56
3.9.1	Concept of water balance	56
3.9.2	Water balance methods	56
	(a) Thornthwaite’s water balance method	56
	(b) FAO model	60
	(c) Versatile soil moisture budget	61
	References	65
	Exercises	68
4	Climate and Weather Forecasting	71-100
4.1	Introduction	71
4.2	Classification of Atmosphere	71
4.2.1	Atmospheric structure	72
4.3	Weather Elements	74
4.3.1	Solar Radiation	74
4.3.2	Air temperature	75
4.3.3	Atmospheric pressure	77
4.3.4	Wind	77

4.3.5 Humidity	78
4.3.6 Evaporation	79
4.3.7 Precipitation	79
4.3.8 Clouds	84
4.4 Hydrologic Cycle	85
4.5 Monsoons	85
4.5.1 South-West Monsoon	86
4.7.2 North-East Monsoon	87
4.6 Seasons	87
4.6.1 Cold Weather Period	87
4.6.2 Hot Weather Period	88
4.6.3 South-West Monsoon Period	88
4.6.4 North-East Monsoon Period	88
4.7 Weather Abnormalities	88
4.7.1 Floods	88
4.7.2 Droughts	89
4.7.3 Other Abnormalities	89
4.8 Weather Forecasting	89
4.9 Weather Forecasting Organisations	90
4.10 Weather Elements and Time Factor	90
4.11 Types of Weather Forecasting	91
4.11.1 Application of short range forecasting in agriculture	91
4.11.2 Application of extended forecast in agriculture	91
4.11.3 Application of long range forecast	92
4.12 Meteorological Satellite Based Weather Forecasting	93
4.13 Preparation of a Weather Outlook for the Farmers	94
4.14 Operational Forecasts	96
4.15 Methods of Forecasting	97
4.15.1 Synoptic Method	97
4.15.2 Statistical Methods	98
4.15.3 Numerical Weather prediction Method	98
4.16 Weather Modification	98
4.16.1 Artificial rain making	98
4.16.2 Reduction of wind velocity and its losses	99
References	99
Exercises	100

5	Arable Land Resources Management	101-144
5.1	Introduction	101
5.2	Land Capability Classification	101
5.3	Soil and Land Capability Suitability Surveys	103
5.4	Land Capability and Their Suitability Classification	105
5.5	Soil Erosion	107
	5.5.1 Soil erosion by water	108
	5.5.2 Soil erosion by wind	108
5.6	Controlling Soil Erosion	108
5.7	Arable Land Resources Management (ALRM)	109
	5.7.1 Mechanical measures	109
	5.7.1.1 Land levelling and grading	110
	5.7.1.2 Contour bunding	111
	5.7.1.3 Graded bunding	119
	5.7.1.4 Terracing	122
	5.7.1.5 Bench terracing	124
	5.7.1.6 Grade stabilization structures	131
	5.7.1.7 Bench terraces with stone walls	133
	5.7.1.8. Safe disposal structure for runoff water	134
	5.7.1.9 Detention reservoir	139
	5.7.1.10 Agronomic practices	139
	5.7.2 Conservation practices	139
	References	142
	Exercises	143
6	Nonarable Land Resources Management (NALRM)	145-184
6.1	Introduction	145
6.2	Gully	147
	6.2.1 Gully Formation	147
	6.2.2 Gully classification	147
6.3	Measures for non-arable land Resource Management (NALRM)	148
	6.3.1 Contour trenching	148
	6.3.2 Small boring pits	151
	6.3.3 Bamboo geogrid	151
	6.3.4 Gradonies	152
	6.3.5 Box-cum pit method	152

6.3.6	PRT (Puerto Rico Terrace)	153
6.3.7	Gully Control Measures	153
6.3.7.1	Vegetative control measures	154
6.3.7.2	Temporary gully control structures	155
6.3.7.3	Semi permanent gully control measures	162
6.3.7.4	Permanent gully control structures	165
6.4	Gully and Ravine Reclamation Measures	178
6.4.1	Construction of graded contour and peripheral bunds	178
6.4.2	River/nalla bank protection	179
6.4.3	Gully plugging	179
6.4.4	Percolation embankment	179
6.4.5	Prevention of grazing and other biotic interferences	180
6.5	Reclamation of Gullies	180
	References	181
	Exercises	182
7	Water Resource Management	185-230
7.1	Introduction	185
7.2	Water Conservation Principle	185
7.3	Water Resources Management Techniques	185
7.4	Inter-terrace Management Techniques	186
7.4.1.	General smoothening of lands	186
7.4.2.	Zing-terracing	186
7.4.3.	Compartmental bunding	186
7.4.4.	Tied ridging	186
7.4.5.	Scooping	187
7.4.6.	Ridge and furrow system	187
7.4.7	Bed and furrow system	187
7.4.8	Bedding system	189
7.4.9	Corrugations	189
7.4.10	Ridge and furrow and bedding systems	190
7.5	Engineering Measures	191
7.5.1	Conservation terraces	191
7.5.2	Contour terracing and contour trenching	196
7.5.3	Stone Terracing	197
7.5.4	Contour bunding	197
7.6	Cultivation and Cropping System	198

7.6.1	Contour cultivation	198
7.6.2	Strip cropping	198
7.6.3	Crops and cropping systems	199
7.6.4	Live bunds	201
7.6.5	Tillage practices	201
7.6.6.	Weeding and hoeing	202
7.7	Rain Water Harvesting	202
7.7.1	Classification of rain water harvesting techniques	203
7.7.1.1	Run off harvesting short term storage	203
7.7.1.2	Flood water Harvesting–Short term Storage	205
7.7.1.3	Floodwater-Harvesting Long–term Storage	205
7.8	Farm Ponds	206
7.8.1	Types of ponds	206
7.8.2	Components of a farm pond	207
7.8.3	Design of farm ponds	207
7.8.3.1	Site selection	207
7.8.3.2	Capacity of the pond	207
7.8.3.3	Rainfall-runoff relationships	208
7.8.3.4	Procedure for the design of water harvesting pond (WHP)	209
7.8.3.5	Design of embankment	211
7.8.3.6	Spillway for farm ponds	212
7.9	Reduction of Water Losses	213
7.9.1	Evaporation from water surface and soil surface	214
7.9.1.1	Reducing evaporation from water surface	214
7.9.1.2	Reducing evaporation from soil surface	214
7.9.2	Reducing seepage losses	217
7.9.3	Reducing transpiration	217
7.9.3.1	Factors affecting transpiration	217
7.9.3.2	Reduction of Transpiration losses	218
7.9.4	Reducing deep percolation	218
7.9.5	Reducing evapotranspiration	218
7.10	Frequency Analysis for Rainwater Management	218
7.11	Drought Analysis for Rainwater Management	221
	References	227
	Exercises	229

8	Crop Water Requirements and Irrigation Scheduling	231-276
8.1	Introduction	231
8.2	Some Important Process and Definition	231
8.3	Measurement of Evapotranspiration	234
8.3.1	Lysimeter experiments	234
8.3.2	Field experimental plots	235
8.3.3	Soil moisture depletion method	236
8.3.4	Water balance method	238
8.3.5	Estimation of evapotranspiration from climatological data	238
8.3.5.1	Methods using single weather parameter	238
8.3.5.2	Methods using two weather parameters as input	239
8.3.5.3	Combination method	243
8.4	Irrigation Scheduling	246
8.4.1	How Much to Apply	246
8.4.2	When to Irrigate (Irrigation Frequency)	246
8.4.3	Irrigation Period	247
8.5	Irrigation Scheduling Techniques	249
8.5.1	Irrigation scheduling based on soil moisture Content	249
8.5.2	Irrigation scheduling based on Plant Characters	262
8.5.3	Irrigation scheduling based on Weather parameters	266
	References	268
	Exercises	273
9	Efficient Utilization of Rain Water	277-320
9.1	Introduction	277
9.2	Water Use Efficiency	277
9.3	Need for Increasing Water Use Efficiency	278
9.4	Principles of Improving Water Use Efficiency	279
9.5	Measures for Improving Water use Efficiency	279
9.5.1	Climatic conditions	279
9.5.2	Agronomic measures	279
9.5.3	Crop geometry and crop management	282
9.5.4	Reduction of water losses	287
9.5.4.1	Measure to control transpiration	288
9.5.4.2	Reduction of deep percolation losses	289
9.5.4.3	Mulching	290

9.5.4.4 Use of shelterbelts	291
9.6 Recycling of Harvested Water	292
9.6.1 Response of life saving irrigation	292
9.6.2 Response of method of irrigation	293
9.7 Irrigation Application Methods	294
9.7.1 Furrow irrigation	294
9.7.2 Sprinkler Irrigation	296
9.7.3 Drip Irrigation	305
References	315
Exercises	319
10 Crop Planning	321-344
10.1 Introduction	321
10.2 Crop Planning	321
10.2.1 Rainfall and its distribution	322
10.2.2 Length of growing season	322
10.2.3 Water demands of crop/ cropping system	324
10.2.4 Matching the length of growing season and duration	325
10.3 Cropping Systems	326
10.4 Aberrant Situation	329
10.5 Contingent Crop Planning	329
10.5.1 Crop panning under normal season	330
10.5.2 Crop panning under aberrant weather conditions	332
10.5.2.1 Early season stress	332
10.5.2.2 Mid-season stress	333
10.5.2.3 Terminal stress	335
10.5.2.4 Delayed onset of monsoon	335
10.5.2.5 Early withdrawal of monsoon	338
10.5.2.6 Extended monsoon	338
10.6 Crop Diversification for Aberrant Weather	338
10.7 Contingent Crop Planning for rabi with Weather Aberrations	340
10.8 Crop Planning for Alternate Land Use	340
(i) Silvi-pasture (Tree+Pasture)	340
(ii) Agri-silviculture (Tree + crops)	341
(iii) Agro-horticulture (Fruit trees + crops)	341
(iv) Alley cropping (Hedges + crops)	341
(v) Ley farming	341

References	341
Exercises	344
11 Tillage and Sowing Implements	345-391
11.1 Introduction	345
11.2 Seedbed Preparation for Upland Crops	346
11.3 Classification of Tillage Operation	346
11.4 Tillage Requirements under Different Agro-Climatic Conditions	347
11.5 Traditional Tillage Implements	347
11.6 Improved Tillage Implements	349
11.6.1 Animal drawn implements	349
11.6.2 Tractor drawn implements	350
11.7 Selection of Power and Machinery	351
11.8 Measures to Improve Productivity of Drylands	352
11.9 Need for Improved Implements	354
11.9.1 Timeliness	354
11.9.1.1 Timely weed control	354
11.9.1.2 Timely fertilizer application	354
11.9.2 Precision	355
11.9.2.1 Seeding	355
11.9.2.2 Placement of fertilizer	355
11.10 Forces Acting on a Tillage Tool or Implement	356
11.11 Mechanics of Tillage	358
11.12 The Field Capacity of Implement	359
11.12.1 Factors affecting field capacity	359
11.12.2 Time losses in turning	360
11.12.3 Time losses due to machine reliability	361
11.13 Analysis of External Forces	362
11.14 Factors Affecting Design of Tillage Tool	364
11.15 Tractor Hitches	364
11.16 Mechanics of Hitching	365
11.17 Disc Ploughs and Harrows	367
11.18 Sowing and Planting Implements	377
11.18.1 Traditional Sowing Methods	378
11.18.2 Function of seed-drills and Planters	378
11.18.3 Seedbeds for seeding and Planting	378
11.18.4 Seed Metering Devices	378

11.18.5	Furrow openers	380
11.18.6	Factors Affecting Seed Germination and Emergence	382
11.18.7	Seed rate adjustment	382
11.19	Improved Animal Drawn Mustard Drill (HAU)	383
	References	386
	Exercises	386
12	Weeding Implements	392-413
12.1	Introduction	392
12.2	Types of Weeding Tools	392
12.2.1	Manual weeding Tools	392
12.2.2	Animal Drawn Multipurpose Hoe	402
12.2.3	Tractor Mounted Earthing cum Interculture Equipment	407
12.2.4	Power operated weeding tools	408
12.3	Requirements and Adjustment of Weeding and Intercultural Tools	409
12.4	Performance of Weeding and Inter-cultivation Tools	409
12.5	Other Techniques for Weeding	410
12.5.1	Flame Weed Control	410
12.5.2	Chemical Weed Control	410
12.6	Rotavator	411
	References	412
	Exercises	413
13	Plant Protection Equipments	414-435
13.1	Introduction	414
13.2	Types of Equipment and Field Crop Sprayers	415
13.2.1	Types of Equipment	415
13.2.2	Types of field crop sprayers	415
13.3	Atomizing Devices	418
13.3.1	Hydraulic Nozzles	419
13.3.2	Flow Rates and Spray Angles	420
13.4	Factors Affecting Droplet Size	420
13.5	Distributions and Determination of Droplet Size	421
13.5.1	Distribution of droplet size	421
13.5.2	Determination of droplet size distribution	421
13.6	Classification of Spraying Techniques	422
13.7	Types of Agitation	423

13.7.1 Mechanical Agitation	423
13.7.2 Hydraulic Agitation	424
13.8 Hydraulic Sprayers	425
13.9 Hand Operated Sprayers	425
13.10 Types of duster	428
References	435
Exercises	435
14 Energy Utilization Pattern	436-453
14.1 Introduction	436
14.2 Energy Utilization from Different Sources	437
14.3 Energy Use Patterns	438
14.3.1 Energy Use Pattern in Domestic	438
14.3.2 Energy Use Pattern in Agriculture	439
14.4 Labour Input for Different Operations	440
14.5 Energy Input Output under Different Cropping Systems	442
14.6 Energy Inputs for the Production, Formulation, Packaging, and Transport of Various Pesticides	446
14.7 Estimation of energy in Farm Machinery and Buildings	447
14.7.1 Estimation of Energy Embodied in the Farm Machinery	447
14.7.2 Farm Service Buildings	450
14.8 Energy Conservation Measures in Dryland Areas	450
References	451
Exercises	452
15 Sources of Energy	454-461
15.1 Introduction	454
15.2 Classification of Energy Sources	454
15.3 Environmental Consequences	456
15.4 Different Options of Energy Resources	456
15.4.1 Nuclear Fission	456
15.4.2 Fusion power	457
15.4.3 Direct Conversion	458
15.4.4 Wind Power	459
15.4.5 Hydro Power	459
15.4.6 Biomass	460
15.5 Energy Substitution	460

References	461
Exercises	461
16 Harvesting and Threshing Implements	462-530
16.1 Introduction	462
16.2 Effect of Harvesting Methods on Quality of Product	462
16.3 Time of Harvesting	463
16.4 Principle of Cutting	465
16.5 Method of Harvesting	466
16.5.1 Traditional method of harvesting	466
16.5.2 Mechanical harvesting equipment	466
16.6 Different type of harvesting tools/equipment, suitability for crops and their limitations	467
16.7 Factors Affecting Performance of Harvesting Machines	468
16.8 Suitability of Harvesting Methods for Different Crops	468
16.8.1 Cereal crops	468
16.8.2 Pulse crops	469
16.8.3 Oilseed crops	469
16.9 Mechanical Harvesting Machines	470
16.9.1 Flail Mowers	470
16.9.2 Mower	471
16.9.2.1 Types of mower cutter bar and Functional parameters	471
16.9.2.2 Conventional Mower Cutter bar	472
16.9.2.3 Knife drive system	472
16.9.2.4 Knife clearances and cutting velocities	473
16.9.2.5 Cutter bar Alignment	474
16.9.3 Reaper	475
16.9.4 Reaper-cum-binder	475
16.9.5 Combine	478
16.9.5.1 Some important terms	481
16.9.5.2 Size relations for functional components	482
16.9.5.3 Different operations of combine	482
16.9.5.4 Straw Walker performance	484
16.9.5.5 Walker length	486
16.9.5.6 The cleaning shoe	487
16.9.5.7 Shoe separation principles	488
16.9.5.8 Combine performance	490
16.9.5.9 Power requirements in combine	492

16.10	Other Mechanical Harvesting Machines	496
16.10.1	Corn Harvesting Machines	496
16.10.1.1	Components of corn picker	497
16.10.1.2	Adjustment in corn picker	498
16.10.2	Cotton harvesting machines	498
16.10.3	Sugar beet harvesters	503
16.10.4	Peanut harvesters	504
16.10.5	Potato harvesters	504
16.10.6	Tomato harvesters	504
16.10.7	Green peas harvester	505
16.10.8	Fruit harvester	505
16.10.9	Sugarcane Harvesters	506
16.10.10	Chaff cutter and forage harvesters	507
16.11	Problems in Harvesting	508
16.12	Threshing and Winnowing	508
16.12.1	Thresher	508
16.12.1.1	Types of threshing mechanisms	509
16.12.1.2	Working principle of a Thresher	510
16.12.1.3	Different types of threshers and their suitability for crops	511
16.12.1.4	Performance of Combine Threshing Cylinder	514
16.13	Other Machines	524
16.13.1	Maize sheller	524
16.13.2	Sugarcane crusher	526
16.13.3	Jute crusher	526
16.13.4	Groundnut decorticator	527
16.13.5	Feed grinder	527
	References	527
	Exercises	529
17	Communication Facilities, Agribusiness and Resource Centre	531-544
17.1	Introduction	531
17.2	Status and Perspective of Communication and IT in Agriculture	532
17.3	Issues and Key Factors for Communication and IT in Agriculture	532
17.4	Key to Convince Farmers of the Potential Decision Support System (DSS)	532
17.4.1	Efficient data collection	532
17.4.2	Case-based decision support	532
17.4.3	Easy user interface	533

17.4.4 Distributed system	533
17.5 Communication and IT for Agribusiness	534
17.5.1 Meaning and types of E-agribusiness	534
17.5.2 Scope and Advantages of E-Agribusiness	535
17.5.3 E-agribusiness: global scenario	536
17.5.4 E-agribusiness: Indian perspective	537
17.5.5 E-agribusiness and WTO	537
17.5.6 E-agribusiness : constraints and remedial measures	538
17.6 Use of Electronic Mass Media in India for Agriculture Extension	538
17.6.1 Role of information technology in Indian scenario	539
17.6.2 Increasing the use of information technology (IT)	539
17.6.3 Use of IT in agriculture marketing	539
17.6.4 Private information shops/kiosks	539
17.6.5 Role of Portal in Various Agricultural Activities	539
17.6.6 Present constraints in use of electronic mass media	541
17.7 Resource Centre	541
17.8 Opportunities of Communication	542
References	543
Exercises	544
18 Value Addition of Agricultural Products	545-552
18.1 Introduction	545
18.2 Concept	545
18.3 Scope in India	546
18.4 Strategies for Value Addition	547
18.5 Forms of Processing	548
18.6 Value Addition of Different Agricultural Commodities	548
18.7 Constraints and Actions for Value Addition in Food Sector in India	550
18.8 Recent Trends for Value Addition In Food Sector	551
18.9 Strategies for Growth and Development of Food Sector in India	551
References	552
Exercises	552
19 Storage of Grain	553-596
19.1 Introduction	553
19.2 Factors Affecting Storage	553
19.3 Thermodynamic Properties of Moist Air	554

19.4	Moisture Content of Agricultural Products	556
19.5	Equilibrium Moisture Content (EMC)	556
19.6	Sources and Insect Infestation	557
19.7	Drying	557
19.8	Drying Principles	558
19.9	Thermal efficiency (Heat Utilization Factor)	559
19.10	Heat and Mass Transfer	561
19.11	Artificial Drying with Unheated Air	562
19.12	Kind of Storage	569
19.13	Principles of Storage	571
19.14	Classification and Design of Grain Storage Bins	571
19.15	Storage of Seeds	576
19.15.1	Providing safe storage conditions	578
19.15.2	Kinds of storage	578
19.15.3	Storage management	579
19.15.4	Stacking management	579
19.16	Storage of Fodder	580
19.16.1	Hay	580
19.16.2	Silage	581
19.16.3	Design of silo	583
19.17	Design of Elevator	588
19.17.1	Trough belt	588
19.17.2	Screw conveyor	590
19.17.3	Bucket Elevator	591
	References	592
	Exercises	594
20	Food and Livelihood Security of Dryland Farmers	597-618
20.1	Introduction	597
20.2	Livelihood Security in India	597
20.3	Livelihood security – A Review	598
20.4	Context and Definition of Food Security	599
20.5	Food and Nutritional Security	600
20.6	Factors Affecting Food Security in Drylands	600
20.6.1	Income poverty	600
20.6.2	National food supply	601
20.6.3	Drought and household food security	601

20.6.4 Violent conflicts	602
20.6.5 Education and status of women	602
20.7 Strategies to Enhance Livelihood Security	603
20.7.1 Livelihood promotion (Development-oriented Programming)	603
20.7.2 Livelihood Protection (Rehabilitation/ mitigation-oriented Programming)	603
20.7.3 Livelihood provisioning (Relief-oriented Programming)	604
20.8 Measures and Issues	604
20.9 The Vision and the Strategy	606
20.9.1 Maintenance of natural resources	607
20.9.2. Resource conservation technologies	607
20.9.3. Post-production management and value addition	608
20.9.4. Precision farming	608
20.9.5. Gender equity issues	608
20.9.6. Globalization of agriculture	609
20.9.7 Transfer of technology through new extension approaches	609
20.9.8 Enhancing nutritional quality	609
20.9.9. Food and nutrition programmes	610
20.9.10. Growth on a sustainable basis	610
20.9.11. Accessibility to balanced food	610
20.10 Conclusion	611
References	612
Exercises	618
21. Alternate Landuse Planning	619-654
21.1 Introduction	619
21.2 Need for Alternate Landuse	620
21.3 Classification of Alternate Landuse Systems	622
21.4 Alternatice Landuse Pertaining to Degraded Lands	623
21.4.1 Agrisilviculture (trees + crops)	624
21.4.2 Silvipasture (trees + grass)	625
21.4.3 Silvi pastoral system (Trees + forages)	626
21.4.4 Alley cropping (Tree or shrub + crops)	628
21.4.5 Ley farming	631
21.4.6 Selection of tree species for agri-silvi systems	631
21.5 Alternate Landuse Pertainin to Agri-horti System/silvi-horti System	632
21.6 Alternate Landuse Pertaining to Meditonal Industrial and Aromatic Plants	634

21.6.1	Meditional plants	634
21.6.2	Industrial biomass production	635
21.6.3	Aromatic plants	636
21.7	Techniques of Alternate Landuse Planning	637
21.7.1	Agroecological approach	638
21.7.2	FAO approach	641
21.7.3	Actual and potential productivity	643
21.8	Sustainable Landuse Planning	643
21.9	Constraints in cultivation and Adoption of Alternate Landuse	648
21.10	Land Evaluation for Development of Alternate Landuse Plans	649
	References	649
	Exercises	653
22	Watershed Management and Evaluations	655-676
22.1	Introduction	655
22.2	Watershed Management	655
22.3	Objectives of the Integrated Watershed Management	656
22.4	Participatory Watershed Management	656
22.5	Watershed Characteristics and Factors Affecting Watershed behaviour	657
22.6	Watershed Planning	657
22.7	Controlling Sedimentation of Reservoirs	659
22.8	Watershed Work Plans	660
22.9	Evaluation Procedure	662
22.10	Indicators of Watershed Development	663
22.10.1	Bio-Physical indicators	663
22.10.2	Economic indicators	665
22.10.3	Other economic indicators	667
22.10.4	Technical and ecological indicators	667
22.10.5	Other technical indicators	671
22.10.6	Water Resources development indicators	671
22.10.7	Peoples' participation index	672
22.10.8	Satellite imagery	672
22.10.9	Other social and behavioural indicators	673
22.10.10	Criteria and indicators for group performance of SHGs, UGS and WDCs	673
	References	675
	Exercises	676

APPENDICES	677-702
A Specifications of some commonly available sprinkler equipment	677
B Performance of rotary sprinklers	679
C Definition of standards and equivalents	686
D Symbols, dimensions and derived units of standard quantity	687
E Conversion factors for common and not-so-common units	689
F Standard relationships for conversion ID units	690
G Mathematical Symbols and the Greek Alphabet	696
H Mathematical Formula	697
I Values of Trigonometric Functions	701
Subject Index	703