



CHANGING AGRICULTURAL SCENARIO

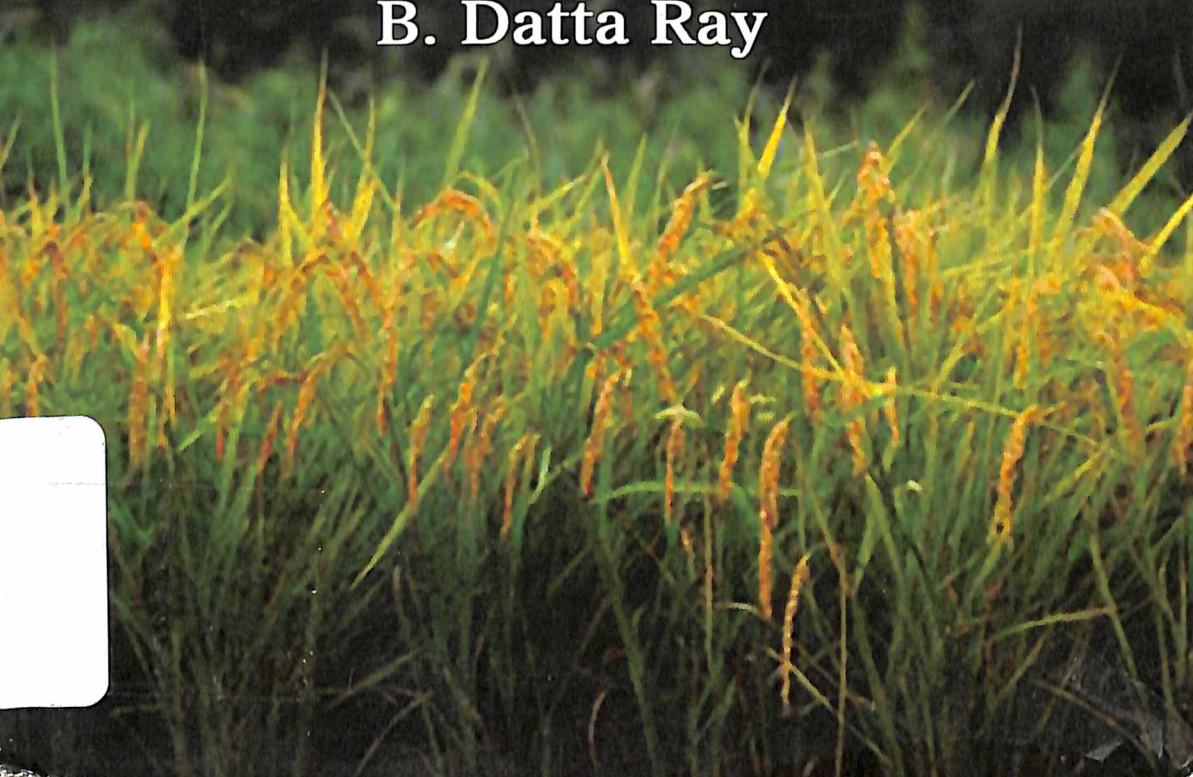
In

NORTH EAST INDIA

Edited by

Bimal J. Deb

B. Datta Ray



**CHANGING AGRICULTURAL
SCENARIO
IN
NORTH-EAST INDIA**



Edited by
BIMAL J. DEB
B. DATTA RAY

CONCEPT PUBLISHING COMPANY, NEW DELHI-110059

Cataloging in Publication Data—DK

Courtesy: D.K. Agencies (P) Ltd. <docinfo@dkagencies.com>

**Seminar on Changing Agricultural Scenario in North East India
(2004: Shillong, India)**

Changing agricultural scenario in North-east India /
edited by Bimal J. Deb, B. Datta Ray.

p. cm.

Papers presented at the Seminar on Changing Agricultural Scenario
in North East India, held at Shillong during 12-13 December 2004.

Includes bibliographical references.

Includes index.

ISBN 8180692647

I. Agriculture—India, Northeastern—Congresses. 2. Agriculture—
Economic aspects—India, Northeastern—Congresses. I. Deb, Bimal J.
II. Datta Ray, B. (Basudeb), 1925- III. Title.

DDC 630.954 1 22

All rights reserved. No part of this work may be reproduced, stored in
a retrieval system, or transmitted in any form or by any means,
electronic, mechanical, photocopying, recording or otherwise, without
the prior written permission of the copyright owner and the publisher.

Call No.....630.954 1

ISBN 81-8069-264-7

Acc. No.....8019

First Published 2006

© NEICSSR, Shillong

Published and Printed by

Ashok Kumar Mittal

Concept Publishing Company

A/15-16, Commercial Block, Mohan Garden,
NEW DELHI-110059 (India)

Phones: 25351460, 25351794

Fax: 091-11-25357103

Email: publishing@conceptpub.com

FOREWORD

North East India is endowed with rich natural resources of good soil and climate. But because of some social and economic constraints, and for some biophysical limitation, the land resources are not being used properly for agricultural development.

In all the hills, the land system is governed by and large by traditions and customs. Assam, Tripura and Manipur have codified land laws and manuals relating land ownership.

In the hill areas, the terrain is difficult and fertility of the soil is low. There is the problem of soil erosion because of heavy rains and inputs are meagre and primitive. Nearly 80 per cent of the population of the hill areas are hardly able to raise the minimum of their food requirements.

The problems of agriculture in North East India are manifold. The lack of uniformity of soil condition, the continuance of the practice of shifting cultivation in wide areas, the absence of irrigation facilities, the serious problem of flood affecting large areas of agricultural land and the lack of marketing and credit facilities for the agricultural produce are only few of them. The scope of large scale mechanisation and wide use of electric power for agricultural development in the region is very limited. Agro-industrial development in North East India is a distant dream.

The economy of North East India is dominated by primary sector, that too of the rudimentary nature with small land holdings due to continuing fragmentation of land over time as a consequence of population pressure.

There has been a changing agricultural scenario with some vital inter-related issues like land-use, land relations, land reforms, landless labourers emerging. The politics of land reform constitute an integral part of the scenario. A rational solution of these issues will help agricultural development. Agriculture in both plain and in the hills of North East India has been undergoing some changes in the last two decades. This changing agricultural scenario is affecting

population growth, migration and health of the rural people. We need to take an integrated approach to the multidimensional problems of changing agricultural scenario. The introduction in limited scale of modern technology in agriculture has brought about some changes in crop pattern and production in different areas of North East India where both settled and shifting cultivation are practiced. The social and economic background of the peasants and the ecological characteristics have to be given due weightage for understanding the degree of change and sustainability of gainful agriculture.

North East India Council for Social Science Research, the premier social science research organisation of North East India held a two-day seminar on Changing Agricultural Scenario in North East India on 12-13 December, 2004. His Excellency Mr. M.M. Jacob, Governor of Meghalaya, inaugurated the seminar. We thank him for his help and patronage.

Professor K. Alam, Professor T.B. Lahiri, Mr. S.K. Tewari, Professor B.C. Bhowmick, Professor A.C. Mahapatra and Professor N.N. Bhattacharya presided over the academic sessions. Professor Keya Sen Gupta, Dr. Sutapa Sen Gupta and Dr. Sushmita Das were rapporteurs of the seminar. We would like to thank them with our gratitude.

We take this opportunity to thank profusely Mr. C. Pynghope, Mr. S.K. Tewari, Mr. B.K. Dev Varma, Mr. P.C. Chakraborty, Mr. S.S. Gupta, Mr. K.L. Tariang, Mr. B.K. Panda, Mr. S.K. Sen and Mr. B. Dutta of the administration and Government of Meghalaya for their support and help to make the seminar a great success.

27th January, 2005

R.P. ATHPARIA,
Joint Secretary,
North East India Council,
For Social Science Research,
Shillong

CONTENTS

<i>Foreword</i>	5
<i>List of Tables</i>	10
<i>List of Appendix Tables</i>	16
<i>List of Figures</i>	17
<i>List of Contributors</i>	18
<i>Introduction</i>	21
1. WTO and Agricultural Development in Backward Regions — <i>A.K. Neog</i>	25
2. Has Agriculture Changed in the Land of Seven Sisters? — <i>A.C. Mohapatra</i>	43
3. Rethinking of Agricultural Development Need of North-East Farmers — <i>D.N. Chakravarty</i>	57
4. Status of Agricultural Sector in North-East India: Problems and Prospects — <i>C. Hazarika</i>	63
5. Transition in Agricultural Growth of North-Eastern Hill Region of India — <i>B.K. Sarma, S.B. Singh and P.P. Pal</i>	75
6. Changing Agricultural Scenario in North-East India — <i>P.C. Dutta and B.C. Pradhan</i>	93
7. Changing Agricultural Scenario in North-East India in the Era of Globalisation — <i>Pranay Jyoti Goswami</i>	111
8. Agriculture in the Twenty-first Century in the North-Eastern States—Challenges and Opportunities — <i>Amalesh Banerjee</i>	128
9. Prospects of Drip Irrigation in North-Eastern Hill Region — <i>R.K. Singh, K.N. Agrawal and K.K. Satapathy</i>	136

10. Surface Covered Cultivation for Higher Production
in North-Eastern Hill Region 150
— *K.N. Agrawal, R.K. Singh and K.K. Satapathy*
11. Crop Diversification Pattern and Disparities in
Agriculture in North-East India 163
— *Umesh Chandra Saharia*
12. Women and Agriculture: Their Overall Role 175
— *Susmita Das*
13. Agricultural Planning and Information Bank (APIB):
A Social Enterprise for the Unemployed in NER 182
— *P.P. Nageswara Rao*
14. Agriculture in Assam: Emerging Micro-trends 189
— *Gorky Chakraborty*
15. Agriculture and Sustainable Development: A Case
Study of Assam 206
— *B.P. Sahu*
16. Opening Up of Agricultural Sector and its
Implications in Assam 230
— *Alok Sen*
17. Changing Pattern of Agriculture in Assam with
Special Reference to Rice Production System 240
— *B.C. Bhowmick, B.C. Borah and N. Borthakur*
18. Farm Size and Land Productivity: A Study of the
Tea Gardens in Upper Brahmaputra Valley, Assam 269
— *T. Chand Daimari*
19. The Impact of Urban Growth on the Land-Use Pattern
in Rural Areas of Assam: With Special Reference to
Agricultural Holdings 275
— *Upala Barua*
20. Land Ceiling Act in Assam with Special Reference to
Agrarian Reforms 282
— *Shabeena Yasmin Saikia*
21. Mass Migration of Agricultural Population and its
Effect: A Study in the Laharighat Block 293
— *Nilofar Jasmin*

<i>Contents</i>	9
22. Women in Agriculture: A Case Study of the Mishing Tribe in Dhemaji District of Assam — <i>M. Goswami, P.J. Sharma, B.S. Mipun and P.C. Sarma</i>	301
23. Economics of Potential Agro-Horticulture Systems in Mid Hills of Meghalaya — <i>S.B. Singh, S.V. Ngachan and L.K. Mishra</i>	313
24. Agricultural Scenario in the North-East with Special Reference to Mizoram — <i>Sukhendu Mazumder</i>	323
25. Changes in Agricultural Scenario in Arunachal Pradesh — <i>R.P. Bhattacharjee</i>	337
26. Production of Agricultural Crops and Food Security in Manipur: An Analysis — <i>Rajmani Singh</i>	348
<i>Index</i>	354

LIST OF TABLES

1.1.	Average Value of Land Yield	39
2.1.	Area, Production and Yield of Rice	48
2.2.	Index Number of Rice Yield	49
2.3.	Size of Operational Holdings and Ginni Ratios (1995-96)	51
2.4.	Unemployment in North-Eastern States	53
2.5.	Rural Poverty in North-Eastern States (1987-88, 1993-94 and 1999-2000)	54
4.1.	Geographical Land to Man Ratio (Hectares/Person) as on 1991	64
4.2.	Average Size of Holding (in Hectares) 1990-91	65
4.3.	Cultivation Practices in North-Eastern States during 1995-96	66
4.4.	Progress of Agriculture (Foodgrains) in the North- Eastern States	67
4.5.	Per Capita Availability of Foodgrains in the North- Eastern States Based on the 1991 Population Census	68
4.6.	Shifting Cultivation in North-East Region	69
4.7.	Changes in Cropping Pattern in North-East States	71
5.1.	Share (%) of Agriculture in Net Domestic Product and Employment in NEH States	76
5.2.	Changes (%) in Agrarian Structure in Green Revolution for NEH States (number of holdings)	77
5.3.	Changes (%) in Agrarian Structure in Green Revolution for NEH States (area in '000 ha)	78
5.4.	Changes in Land-Use Pattern in NEH States (%)	79
5.5.	Changes in Cropping Pattern in NEH States (%)	80
5.6.	Trend in Area (A), Production (P) and Productivity (Y) of Rice, Maize and Total Foodgrains in NEH States	82
5.7.	Trend in Area (A), Production (P) and Productivity (Y) of Total Pulses and Oilseeds in NEH States	83

<i>List of Tables</i>	11
5.8. Trend in Milk, Fish, Egg, Cattle, Buffalo and Poultry in NEH States	85
5.9. Trend in Fertiliser (Nitrogen and Phosphorus) Consumption in NEH States	86
5.10. Veterinary Hospital and Dispensaries in NEH States	88
5.11. Infrastructure of Agriculture and Allied Sectors in NEH States (as on 2002)	88
6.1. Population Trend in North-East Region (in '000)	99
6.2. Forest Cover in NER of India (sq. km.) During the Period 1987-1997	101
6.3. Agricultural Development in NER	102
6.4. Recommended Dietary Requirements in Grams	105
6.5. Per Capita Foodgrain Production, Consumption of Electricity and Percentage of Households having Electricity, Safe Drinking Water in N.E. States	106
6.6. Per Capita Availability of Cereals and Pulses (in gms.) per Day in NER	106
6.7. Per Capita per Day Availability of Foodgrains, Growth Rate of Population and Production of Foodgrains	107
7.1. Land Utilisation in North-East India	113
7.2. Net Sown Area, Cropped Area and Irrigated Area of Different States of North-Eastern Region	114
7.3. Number of Holdings by Size Groups in the States of NER	115
7.4. Average Size of Operational Holdings (in hectares) in the States of North-East India	116
7.5. Shifting Cultivation in North-East India	116
7.6. Change of Forest Cover (sq. km.)	117
7.7. Yield Rate of Different Crops in NER and India as a Whole	119
7.8. Yield Rate of Different Crops in North-Eastern States	120
7.9. Area under Different Crops	121
7.10. Consumption of Plant Nutrients per Unit of Gross Cropped Area	123
7.11. Credit to Agriculture in the States of NER	124
7.12. Area Under High Yielding Varieties in North-Eastern Region	125
8.1. Poverty Ratio in 1973-74 and 1999-2000	130

8.2.	Poverty Reduction and Growth Targets: Potential of the States in the Tenth Plan	130
8.3.	Comparative Position of Per Capita Flows to States 1999/2000/2001—N.E. and Leading States	131
9.1.	Water Saving and Yield Enhancement due to Drip Irrigation	139
9.2.	Area Covered under Drip Irrigation in NEH Region	141
9.3.	Area and Production of Horticultural Crops (1999-2000)	141
9.4.	State-wise Area and Production of Major Horticultural Crops in NEH Region	142
9.5.	Recommended Numbers and Discharge of Drippers/Micro Jets/Micro Sprinklers for Different Crops, Spacing and Soil Type	148
10.1.	Cost Estimate of the Low Cost Green House	155
10.2.	Crops Suitable for Growth in the Green House/Poly House	156
10.3.	Comparison of the Low Cost Green House and Steel/ Aluminium Framed Fully Controlled Green House	158
10.4.	Benefits of Plastic Mulch for Different Crops	161
11.1.	Crop Diversification Index (Gibb's Martin Method)	166
11.2.	Co-efficient Variation of Agricultural Variables	168
11.3.	Proliferation of Crop Intensity	169
11.4.	Correlation Matrix in the Agricultural Variables	171
12.1.	Percentage Share of Female-Male Workers in Meghalaya (2001)	176
12.2.	Share of Women as Cultivators and Agricultural Labourers in Meghalaya (2001)	179
14.1.	Estimated Growth of Small Tea Growers in Assam (1990-91 to 1999)	192
14.2.	Size of Small Tea Holdings	193
14.3.	Estimated Area Under Small Tea Garden (1999)	194
14.4.	Floricultural Holdings, 1987	196
14.5.	Floricultural Holdings, 1997	198
14.6.	Production of Loose Flowers	198
15.1.	NSD Product at Factor Cost by Industry of Origin at Constant (1993-94) Prices	209
15.2.	Decadal Population engaged in Agriculture	212

16.1.	Annual Growth Rates of Food and Non-food Crops in Selected SAP-implementing Countries in SSA	233
16.2.	Selected Items of Agricultural and Marine Output 1991-92 to 1995-96	235
16.3.	Crop-wise Yields and Growth Rates	236
16.4.	Agricultural Production (percentage change over previous year)	238
17.1.	Population Dynamics in the State of Assam	241
17.2A.	Land-Use Dynamics in the State of Assam	241
17.2B.	Rice Area by Ecosystem in Assam	242
17.3.	Compound Growth Rate of Rural Population and Agricultural GDP in Assam	244
17.4.	Percentage Contribution of Agriculture Towards State Domestic Product (SDP)	244
17.5.	Poverty Scenario in Assam (% BPL)	244
17.6.	Per cent Area under Different Crops in Assam (Cropping pattern) Triennium Average	245
17.7.	Changes in Overall Cropping Pattern in Assam over Decades	245
17.8.	Distribution of Districts in Each Zone and Share of Rice Area and Production	246
17.9.	Relative Importance of Rice Culture by Season in Assam (%)	246
17.10A.	Decadal Change in HYV Rice Area in Assam	246
17.10B.	Area under Rice in Assam by Season	247
17.10C.	Per cent Share of Rice Area by Season and Zones	247
17.11.	Relative Importance of Rice (% State area) by Agro-ecological Zones 1990-1997	247
17.12.	Growth Rate of Area, Production and Productivity of Rice in Assam by Season	249
17.13.	Distribution of Farms amongst Different Size Groups	249
17.14.	Average Farm Size by Different Category (ha)	250
17.15.	General Household Characteristics in Sample Area	250
17.16.	Average Area by Farm Size Category and Land Type in Sample Districts (ha)	251
17.17.	Cropping Intensity (CI) in Assam by Farm Size Category (% GCA)	253
17.18.	Irrigated Area under Different Sources in Sample Districts	253

17.19.	Adoption of Modern Variety of Rice by Season and Farm Size	254
17.20.	Weighted Rice Yield (t/ha)	255
17.21.	Yield Differences in MV and TV (t/ha) of Rice	255
17.22.	Yield of Rice by Soil Type (t/ha)	256
17.23.	Index of Crop Diversification	257
17.24.	Summary of Cost and Return of Rice Cultivation by Variety	258
17.25.	Fertiliser Use Pattern by Different Rice Variety (kg of NPK/ha)	259
17.26.	Average Annual Income by Sources (Detailed)	260
17.27.	Decomposition of Income Inequality and Marginal Effects by Income Source	261
17.28.	Changes in the Levels of Living (% of responses)	262
17.29.	Changes in Rice Yield (% of responses)	263
18.1.	Farm Size and Land Productivity	272
19.1.	How Agricultural Land Decreased in Towns	277
19.2.	Break-up of the Agricultural Area Converted in Towns	278
19.3.	Conversion of Agricultural Lands in Villages	279
20.1.	Ceiling Limits in Different States	286
20.2.	Distribution of Ceiling Acquired Lands in Different States of India (2003)	288
21.1.	Migration of People from Laharighat Block	295
21.2.	Migration and Distance	296
21.3.	Past Occupation and Income	296
21.4.	Present Occupation and Monthly Income	296
21.5.	Size of the Family	297
21.6.	Causes of Migration shown by the Respondents	297
21.7.	Constraints Faced by the Farmers	298
21.8.	Productivity Trend of Different Crops	299
22.1.	Distribution of Main and Marginal Workers in Dhemaji District of Assam	306
22.2.	FWPR in Agriculture in relation to Age	309
22.3.	FWPR in Agriculture in relation to Education	310
22.4.	FWPR in Agriculture in relation to Land Holding	311
23.1.	Influence of Fruit Species on Yield of Intercrops (Q/ha) During 12 Years in Meghalaya State	316

23.2.	Effect of Inter-crops on Yield of Fruit Trees in Meghalaya State	317
23.3.	Average Cost of Production of Mandarin-based Agro-horticulture Systems in Meghalaya State	318
23.4.	Average Cost of Production of Guava-based Agro-horticulture Systems in Meghalaya State	319
23.5.	Financial Indicators of Selected Agroforestry System in Meghalaya State	320
24.1.	Mizoram: Report on Third Minor Irrigation Census 2000-2001	328
24.2.	How Far Mizoram is Self-Sufficient in Rice Production	328
24.3.	Final Area and Production of Important Crops of Mizoram State for the Years 1998-1999 to 2000-2001	329
24.4.	Survey of Cultivated Area and Production of Paddy in Mizoram during 2001-2002	330
24.5.	Estimated Area and Production of Agriculture Crops in Mizoram 2003-2004 (District-wise)	331
24.6.	Average Land Holding Size of Farmers in Mizoram	333
24.7.	Year-wise Rainfall Report of Mizoram (in mm) 1986-2000	334
24.8.	Land-Use Statistics of Mizoram—1998-1999, 1999-2000, 2001-2002 and 2002-2003	335
25.1.	Land-Use Pattern in Arunachal Pradesh	339
25.2.	Cropping Pattern in Arunachal Pradesh	341
25.3.	Yield Rate of Main Agricultural Crops	342
25.4.	Level of Foodgrain Production in Arunachal Pradesh	343
25.5.	Contribution of Agriculture in NSDP of Arunachal Pradesh	344
26.1.	Decennial Growth Rate of Population	349
26.2.	Area and Production of Rice and Maize from 1980-81 to 2001-02 of Manipur State	350
26.3.	Physical Target and Achievement of Area and Production of Crops during 2001-2002	351

LIST OF APPENDIX TABLES

A.11.1. Distribution of Crops in North-Eastern Region	173
A.11.2. Variation of Agricultural Factors in North-East India, 1995	173
A.11.3. Co-efficient of Variation of Agricultural Variables	174
A.11.4. Co-efficient of Variation and Correlation of Agricultural Variables in North-East India	174
A.15.1. Classification of Area in Assam	228
A.15.2. Cropping Area	228
A.15.3. Ground Water Resources and Utilisable Potential in Assam	228
A.15.4. Production of Different Crops in Assam	228
A.15.5. Average Yield of Different Crops in Assam	229
A.15.6. Area of Different Crops in Assam	229

LIST OF FIGURES

9.1.	Trends of Growth of Drip Irrigation	140
10.1.	Low Cost Green House- <i>cum</i> -Rain-shelter (after Barua, 2003)	153
10.2.	Low Cost Green House made for Terraced Land in Umiam	154
11.1.	Pattern of Crop Diversification in North-East India (1994-95 to 1995-96)	167
11.2(a).	Average monthly Rainfall and Temperature in North-East India (1986-95)	170
11.2(b).	Yearly Percentage Departure from Mean Rainfall (1986-95)	170
12.1.	Percentage of Female/Male Employed in Agriculture	178
13.1.	A Schematic of APIB	184
15.1.	Contribution of Agriculture to NSD	209
15.2.	Classification of Area in Assam	212
15.3.	Land Utilisation Pattern of Different Crops in Assam	213
15.4.	Ground Water Resource and Utilisation	214
15.5.	Production of Crops	215
15.6.	Average Yield of Crops	216
15.7.	Production Area of Crops	217
17.1.	Triennium Average Area of Rice in Assam (1951-1998)	247
17.2.	Triennium Average Area of Non-Rice Crops in Assam (1951-1998)	248
22.1.	Per cent of Female Workers in Villages having Ethnic Population more than 80 per cent	307
24.1.	Mizoram showing Agriculture District	327
24.2.	Monthly Average Rainfall, 2002	336

LIST OF CONTRIBUTORS

- Agrawal, K.N.**, Scientist SS (FMP), Division of Agricultural Engineering, ICAR Research Complex for NEH Region, Umiam, Meghalaya
- Banerjee, Amalesh**, Jadavpur University, Kolkata
- Barua, Upala**, Cotton College, Guwahati
- Bhattacharjee, R.P.**, Joint Director (RD), Government of Arunachal Pradesh, Itanagar
- Bhowmick, B.C.**, Professor, Department of Agricultural Economics, Faculty of Agriculture, Assam Agricultural University, Jorhat
- Borah, B.C.**, Principal Scientist, NCAP, New Delhi
- Borthakur, N.**, Associate Professor, Assam Agricultural University, Jorhat
- Chakraborty, Gorky**, Teachers Economics in Doom Dooma College, District Tinsukia, Assam
- Chakravarty, D.N.**, Retd. Dean, Assam Agricultural University, Jorhat
- Daimari, T. Chand**, Head, Department of Geography, Union Christian College, Barapani, Shillong
- Dutta, P.C.**, Department of Statistics, S.S. College, Hailakandi, Assam
- Goswami, M.**, Lecturer, Department of Geography, Morigaon College, Morigaon, Assam
- Goswami, Pranay Jyoti**, Selection Grade Lecturer, G.C. College, Silchar, Cachar, Assam
- Hazarika, C.**, Associate Professor, Department of Agricultural Economics, Assam Agricultural University, Jorhat

Jasmin Nilofar, Lecturer, Department of Anthropology, Morigaon College, Morigaon, Assam

Mazumder, Sukhendu, Scholar, C/o 99 APO

Mipun, B.S., Professor & Head, Department of Geography, NEHU, Shillong

Mishra, L.K., Division of Agroforestry, ICAR Research Complex for NEH Region, Umiam, Meghalaya

Mohapatra, A.C., Professor, Department of Geography, North-Eastern Hill University, Shillong.

Neog, A.K., Senior Member of the Indian Economic Service

Ngachan, S.V., ICAR Research Complex for NEH Region, Manipur Centre, Lamphelpat, Imphal

Pal, P.P., ICAR Research Complex for NEH Region, Umroi Road, Umiam, Meghalaya

Pradhan, B.C., Department of Statistics, S.S. College, Hailakandi, Assam

Rao, P.P. Nageswara, Deputy Director, North-Eastern Space Applications Centre, Shillong, Meghalaya

Saharia, Umesh Chandra, Selection Grade Lecturer, M.D.K.G. College, Dibrugarh

Sahu, B.P., Lecturer, UACE, NEHU, Shillong

Saikia, Shabeena Yasmin, O.K.D. Institute of Social Change and Development, Guwahati

Sarma, B.K., ICAR Research Complex for NEH Region, Umroi Road, Umiam, Meghalaya

Sarma, P.C., VAS, AH & Vety. Department, BCPP Scheme, Guwahati

Satapathy, K.K., Principal Scientist (SWCE), Division of Agricultural Engineering, ICAR Research Complex for NEH Region, Umiam, Meghalaya

Sen, Alok, Cachar College, Silchar

Sharma, P.J., Lecturer, Department of Geography, Morigaon College, Morigaon, Assam

Singh, R.K., Scientist (SWCE), Division of Agricultural Engineering, ICAR Research Complex for NEH Region, Umiam, Meghalaya

Singh, Rajmani, Manipur University, Imphal

Singh, S.B., ICAR Research Complex for NEH Region, Manipur Centre, Lamphelpat, Imphal

Singh, S.B., ICAR Research Complex for NEH Region, Umroi Road, Umiam, Meghalaya

INTRODUCTION

The state of agriculture in North-East India along with its potentialities and development thrust has been an inseparable part of the planning process over the years, a fact which initiated administrative measures for necessary impetus and some alternative strategies, wherever needed, for productivity and diversification. The North-Eastern region's identity is characterised by diverse geological, physiographic and agro-climatic features and except in some parts of Assam, Manipur and Tripura, the landscape is not alluring for cultivation. As a result, agro-climatic advantages which generate potentialities for cultivation of various types of agricultural and horticultural crops are overshadowed by drudgeries associated with field work. In addition, certain extreme agro-climatic conditions such as high rainfall, high humidity and low winter temperature also negate developmental efforts.

Today, agricultural economy of the region is on the brink of backwardness and stagnation aggravated by infrastructural bottlenecks, institutional weaknesses and technological lag. The factors which traditionally hampered agricultural productivity whether in the plains or in the hills have remained, by and large, unaddressed. No wonder, the persistence of traditional subsistence economy and rural poverty go hand in hand in most parts of the region, some of which are further affected by intra-regional disparities. It is difficult to ignore the fact that when governmental commitment to support agricultural process was at its height, the North-Eastern States could not rise to the occasion to give impetus to productivity and alternative choices. This was particularly true in the yester years of planning and nation building when the beginning could have been made in eventually releasing the economy from the vortex of stagnation. Now with the ascendancy of neo-liberal state, any expectation of massive state support has receded to the background. Nevertheless, agriculture remains the focal point of Indian planning. A growing awareness exists in different States of the region on the imperative

need to overcome the impediments to agricultural development and make the economy self-reliant and vibrant so as to reduce its dependence on the rest of the country. However, a clear strategy is yet to evolve. As a first step, a macro-management approach through integration of 27 Centrally Sponsored Schemes has to be given a fair trial. In the changing scenario, agricultural development and food security are closely interlinked and in the ultimate analysis there is no better option than sustainable agricultural development.

Out of 2.55 lakh square km of the region, as low as 0.33 lakh square km is engaged in agriculture which forms 12 per cent of the total area. At the same time, of the 10.6 million main workers in the North Eastern economy, about 8 million are directly engaged in agricultural pursuits as cultivators and agricultural labourers. It is revealing that of the 22.5 million hectares of the region where land-use pattern is recommended, only 16.5 per cent (3.72 million hectares) is the net sown area for the purpose of cultivation. Significantly, a considerable large area of the region comes under shifting cultivation and the total number of families practicing shifting cultivation is about 4.4 lakhs. It may be stated that cropping intensity is 1.4 and the gross cropped area turns out to be 5.2 million hectares. In assessing the region's agricultural productivity, what is of great importance is the fact that the area covered by irrigation is negligible and it has been estimated that only 16 per cent of the gross cropped area is irrigated. The rest however remains embedded in the gamble of monsoons. At the same time, consumption of fertilisers is unusually low which is about 9.5 kg per hectare of gross area sown as against 67 kg per hectare at the national level.

In the North-Eastern Region, the share of agriculture in Gross State Domestic Product (at constant 1993-94 prices) varies from 20.17 per cent in Manipur to 30.5 per cent in Assam which undoubtedly corroborates the prevalence of subsistence economy. A fact which makes the situation so obvious is the pre-dominance of small and marginal farmers (about 80% of total holdings). Situation is worse in Assam where 83.12 per cent of total holdings are small and marginal operating upon 44.33 per cent of holdings. Inevitably, there is low agricultural productivity. An example from Assam shows that the yield of foodgrains per hectare in 2001-02 was 1,465 kg compared to 4,040 kg in Punjab.

According to one estimate, nearly one-sixth of the rural families in the region is landless and nearly one-half of the farmers including the landless hold less than ten bighas per family. It is well known that the average size of holdings is an important variable for agricultural sector. In the prevalent situation, mechanisation of agriculture through adoption of modern farming practices is ruled out. Further, roughly 28 per cent of the region's area is plains and the remaining 72 per cent is covered by mountain plateau and hills. At the same time, in the promotion of agricultural development land reforms initiated in the plains have so far been half-hearted, the hills remaining out of its purview out and out.

All this has had the cumulative effect of perpetuating low productivity giving no scope whatsoever for commercial surplus. Each State of the region has deficiencies peculiar to its terrain, fragility, inaccessibility and marginality of hill and mountain ecosystem coupled with traditional land-use system. In fact, six agro-climatic zones form the primary basis for development of agriculture in the region. Hence, a concerted move at the regional level may have the desired effect of ushering a common orientation to land-use and cropping pattern in the region. It is generally acknowledged that there are two ways to increase the production: increase in either productivity or cropping intensity. However, intensive farming with yield improvement strategies, crop diversification, development of cash crops and high valued crops hold the initial key to development of agriculture. Any such effort has to be supported obviously by institutional credit support, marketing facilities and input delivery. Further the abundance of ground water can easily facilitate a viable irrigation mechanism to guarantee higher yield. In fine, the emphasis has to be on ensuring a higher quality of life through maintaining a balance between productivity function and conservation activities.

This book is the outcome of joint efforts by academicians, planners and agricultural scientists to highlight the agricultural potentialities of the region against the backdrop of half-a-century of planning.

BIMAL J. DEB
B. DATTA RAY

WTO AND AGRICULTURAL DEVELOPMENT IN BACKWARD REGIONS

— A.K. NEOG

Introduction

Agricultural development policy in many countries of the world has been rooted in maintaining food security and achieving self-sufficiency. As a result, agriculture was virtually excluded from the General Agreement of Tariffs and Trade (GATT). It, however, came under the main disciplines of the World Trade Organisation (WTO) under Uruguay Round (1986-94) of the GATT. With the intention of aligning agricultural trade rules with those applying to trade in other goods, the Uruguay Round negotiators agreed that all import barriers, other than those in place for health and safety reasons, should take the form of transparent tariffs. Before agreeing on tariff reductions, all border measures had to be converted into their tariff equivalents, a process known as “tariffication.” The Agreement on Agriculture (AoA) forms a part of the final Act of the Uruguay Round of Multilateral Trade Negotiations, which came into force on 1st January, 1995.

The basic objectives of the WTO Agreement on Agriculture (AoA) are to (i) establish a fair and market oriented trading system, and (ii) provide for substantial progressive reduction in the support and protection to agriculture resulting in correcting the distortions and preventing restrictions in world agricultural markets. In other words, the AoA aims at improving global trade, raising prices of agricultural products and ensuring higher living standard for farmers. The three main elements (also known as pillars) of the Agreement

are market access, domestic support and export competition concerning the agriculture sector. A familiarity with these elements is necessary to comprehend the Agreement.

Market Access

Under the Agreement, market access has two sub-elements, viz., (a) tariffication of all non-tariff barriers, and (b) setting up of a minimum level for imports of agricultural products by member countries as a share of domestic consumption.

Tariffication implies replacement of non-tariff trade barriers [like quantitative restrictions (QRs), export and import licensing, etc.] by tariff measures in order to provide the same level of protection. Under the AoA, the QRs were to be withdrawn over a 6-year period ending 31st March, 2003. Tariffs, resulting from this tariffication process together with other tariffs on agricultural products, are to be reduced by a simple average of 36 per cent in the course of 6-year by the developed countries, and by 24 per cent during 10 years by the developing countries.

'Tariff binding' is an important aspect of WTO regime. It is a commitment made by member countries not to raise particular tariffs above a specific or bound level (i.e., ceilings on tariff rates). As against this, applied (tariff) rates are rates of import duty which are actually applied. Applied tariff can be raised at any time provided they do not exceed bound rates.

Beginning in 1994, trade liberalisation was extended to agricultural products in India. There are now few restrictions on exports. Restrictions, however, remain on import of grains, oil seeds, and edible oils.

India has bound all its agricultural tariffs; its binding tariffs range from 0 per cent on primary agricultural commodities to 150 per cent for processed items, and edible oils upto 300 per cent. India can raise its applied rates in case of any surge in imports. However, according to estimates made by the Planning Commission, the weighted average import duty rates in Indian agriculture has gradually declined from the level of 47 per cent in 1991-92 to 14 per cent in 1997-78. Thereafter, it rose to 24.4 per cent in 1999-2000 and further to 57.7 per cent in 2001-02, due to imposition of various surcharges.

It may be mentioned that the tariffs are subject to progressive reduction commitments, except for rice and some staples that are subject to minimum access commitments, called Tariff Rate Quota (TRQ). TRQ is a measure under which a product is subject to a Most Favoured Nation (MFN) tariff, but a certain quantity (Quota) is admitted at a lower or zero tariff.

Domestic Subsidy

Commitments on domestic subsidy are expressed in terms of “Total Aggregate Measurement of Support” and “Annual and Final Bound Commitment Levels”. The former refers to the sum of all domestic support or subsidy provided to agricultural producers (calculated on product-by-product basis), including the support for basic agricultural products (e.g., procurement price), non-product specific support (e.g., subsidies on fertilisers, power, credit, etc.) and all other supports to agricultural producers. The “Annual and Final Bound Commitment Levels” refer to the maximum support permitted to be provided during any year of the implementation period thereafter. WTO commitment requires a 20 per cent reduction in “Total Aggregate Measurement of Support” by developed countries over a period of 6-year, 13.3 per cent by developing countries over 10 years, and no reduction by the least developed countries.

The thrust of the domestic support commitments is on shifting away from trade-distorting measures and agricultural policy towards ‘openness’, transparency and competition. They are largely aimed at the developed countries where the levels of domestic agricultural support have accelerated in the recent years.

Under the Agreement, there are, however, provisions for some exemptions like government assistance on research, disease control, training, extension, advisory services, food security, domestic food aid, environmental programmes, regional development programmes, direct payment to producers like participation in income insurance and safety nets, relief from natural disasters (known as ‘green box’ subsidy in WTO jargon). Green box subsidies are permitted: they have no trade-distorting effect, hence non-actionable under WTO. They are for production restructuring and direct payments to producers. Similarly, there are ‘amber box’ subsidies (subsidies that distort production and trade) which are to be reduced. They include

measures to support prices, or subsidies directly related to production quantities. These are subject to limits: “de minimus” minimal supports are allowed, i.e., total support of 5 per cent of agricultural production for developed countries and 10 per cent for developing countries. ‘Blue box’ subsidies are the “amber box with conditions”—conditions designed to reduce distortion. Any amber box support that requires farmers to limit production come under blue box. There are also exemptions for developing countries given under the Special and Differential (S&D) treatment (i.e., the S&D box), including those in Article 6.2 of the AoA. Examples are investment subsidies and agricultural input services generally available to income and resource poor producers.

Export Subsidy

Export subsidies are prohibited under the WTO. Members are required to reduce the value of direct export subsidies to a level of 36 per cent below that during 1986-90 base period in the course of a 6-year implementation period. The quantity of subsidised exports is to be reduced by 21 per cent over the same period. For developing countries, the reductions are two-thirds of those of the developed countries over a 10-year period, and there are no reductions for least developed countries. Export subsidies on agriculture are virtually non-existent in India and, hence, reduction is not relevant for the country.

The developing countries have a special ten-year period for protection from action by developed countries under the ‘Peace clause’ given in Article 13 of the AoA. It restricts the right to take action that might otherwise be possible against domestic support measures and export subsidies in agriculture. Under this clause, no countervailing (duty) action can be taken against permitted measures. However, this clause is scheduled to expire by 31st December, 2003. With its expiry, the developing countries can impose countervailing duties on import of developed country products that are heavily subsidised causing injury to domestic producers. In the Draft Ministerial Text at Cancun, there was a proposal for extending the validity of the peace clause.

Implication of WTO agreement on agriculture for India needs to be viewed basically in terms of (a) opening up of markets and facilitation of exports of our agricultural products, and (b) degrees of freedom to pursue domestic policies.

India's Position

Domestic support to agriculture in India continues to be provided through subsidised inputs and support prices for rice, wheat, oil seeds, etc. It is worth mentioning that in the 1986-88 base period for the determination of commitments under the AoA, India's Aggregate Measure of Support (AMS) for each product was below the 10 per cent 'de minimus' level limit. Hence, India has no total AMS reduction commitment under the Agreement. Nevertheless, India is required to make regular annual notification to the WTO on its domestic AMS, and on its direct export subsidies.

India submitted its negotiating proposals in respect of agriculture on 15th January, 2001, covering domestic support, export subsidies, market access, and S&D treatment including food and livelihood security. The proposal calls upon the developed countries to reduce tariff peaks and eliminate tariff escalation, simplification of administration of tariff rate quotas, prohibition of dumping, elimination of export subsidies and substantial reduction of their domestic support. It also calls for abolition of 'peace clause' for developed countries.

Doha Declaration

It is to be noted that in respect of agriculture, Doha Ministerial Conference in November 2001 agreed to substantially reduce domestic support, reduce (with a view to phasing out) export subsidies, substantially improve market access, and stated that S&D treatment shall be an integral part of all elements of the negotiations, and non-trade concerns, such as animal welfare, shall be taken into account. Further negotiations are to be concluded by 1st January, 2005.

Pre-Cancun Exercises

Negotiations on agricultural tariff reduction was to follow in the light of formula approach. The widely discussed formula were the Swiss formula, Uruguay round formula and Harbinson proposal. The Swiss formula was proposed in the Seventh Round (1973-79) of GATT held at Tokyo. It envisages steeper cuts on higher tariffs. The Uruguay Round (1986-94) formula envisages linear reduction in

tariff lines which call for equal percentage for all, irrespective of the prevailing tariff rates.

The Harbinson proposal, named after Stuart Harbinson, the Chairman of the WTO negotiating group on agriculture takes a middle line. For developed countries, it proposes average tariffs cuts of 60 per cent on bound tariffs with above 90 per cent binding level; a 50 per cent cut on bound tariffs between 15 and 90 per cent; and a 40 per cent cut on bound tariffs below 15 per cent. For developing countries and for non-strategic products, it proposes average cuts from bound rates of 40 per cent for tariffs above 120 per cent; a cut of 35 per cent for tariffs between 60 per cent and 120 per cent; a cut of 30 per cent for those between 20 per cent and 60 per cent; and an average reduction of 25 per cent in tariffs below 20 per cent. Under the proposal, reductions are to be implemented in equal instalments over five years by the developed countries and over ten years by developing countries. Harbinson proposal implies substantial tariff cuts by US and EU.

Cancun Ministerial

The Fifth Ministerial Conference (coming once in every two years) of WTO was held at Cancun in Mexico from 10th to 14th September, 2003, participated by 146 members, where liberalisation of international trade in agriculture was an agenda item, *inter alia*. Arriving at Agreement on the item envisaged reduction of domestic support and phasing out of export as per Doha declaration.

It may be mentioned that the Cairns Group (Australia, New Zealand, etc.) has been pushing for steep cut in subsidy as well as tariffs since they are strong in agriculture. But the rich countries like US, EU are reluctant in subsidy reduction. On the other hand, average agricultural tariffs in rich countries are several times higher than those on their manufactured goods. Tariff peak is as high as 1000 per cent, for example, on rice in Japan.

India, in alliance with other developing countries like Argentina, Brazil, China, South Africa, etc. (a group of about 22 countries), presented a plan in the Ministerial envisaging more subsidy cuts and tariff reductions by the rich countries compared to poor countries, thereby removing trade barriers and making a fair deal for farmers.

The core issue in Cancun was cut in farm subsidies which was in pursuance of commitment at Doha. But the US and EU were rigid on their stand against subsidy reduction. Agreement was “too near, yet so far” at Cancun. Hence no agreement was arrived at. Outstanding issues, *ipso facto*, get postponed. This implies that the rich countries will continue to maintain large domestic support to farmers and for export.

Views on Cancun Outcome

Several views have been aired about the impact of Cancun failure on India. Professor T.N. Srinivasan of Yale University in an article published in *Financial Express* dated 4th September, 2003 has expressed—“we should aspire to be viewed by the rest of the world as an economy from which it can buy a range of quality products at competitive prices, and to which it can sell its products in a stable market and policy environment with few barriers”. WTO is a forum for continuous multi-lateral negotiations. It does not prevent a member from autonomous/unilateral liberalisation. Prof. Srinivasan also says, “since unilaterally opening our markets to international competition is in our own interest regardless of whether our access to markets of others is enhanced, getting such enhanced access in return in negotiations is a bonus”. Where bilateral deals are feasible, India should start negotiating the same. However, net gains from negotiations would be minimal *vis-à-vis*, our competitors if our infrastructure like irrigation, are not strengthened, law and order are not improved, and other domestic constraints on international competitiveness are not addressed. This needs agricultural reform.

Another view expressed is that Cancun is merely a mid-term review of the on-going negotiations under Doha agenda. There would be no harm on Indian economy, particularly agriculture, as our primary objective is to safeguard our farmers’ interest. Indian agriculture is largely competitive; net agricultural imports have been almost constant and has nothing to gain in agro-exports. However, this view is a *status quo* one and suffers from myopia. They consider trade as a ‘zero-sum’ game. It may be mentioned that a globalised free market is premised on the principle of dynamic comparative advantage. In a borderless world, each individual economy is

supposed to gain from global trade by focusing/specialising on areas where it has inherent advantages. Hence, trade is a 'positive sum' game in which everyone can win. WTO must ensure that global trade is equitable.

An Evaluation of Trade

It is necessary to take a look at India's overall foreign trade to assess its strength, weakness, opportunity and threat (SWOT). According to WTO's World Trade Report (2003), in world merchandise trade in 2002 India ranked 30th in the list of exporting countries with a share of 0.8 per cent and 24th in the list importing countries with similar share of 0.8 per cent. This shows an improvement from India's 0.5 per cent share in World export in 1990 and 0.6 per cent in 1995.

Role of WTO is envisaged to enhance the degree of openness of an economy. One measure of openness is the ratio of a country's exports to the sum of its GDP at current prices and its imports. In the case of India, this ratio had been about 8.16 per cent in 1993-94, 8.59 per cent in 1996-97, 9.47 per cent in 2000-01, 8.94 per cent in 2001-02 and 9.96 per cent in 2002-03. This shows that during the liberalisation era India's openness has been rising.

Looking at the share of agriculture and allied products in India's total exports, it is observed that it has steadily come down from about 20.5 per cent in 1996-97 to 12.26 per cent in 2002-03. It may be mentioned that agricultural commodities suffer from low income elasticity and high price elasticity of demand. However, their share in total imports have risen marginally from 3.5 per cent in 1996-97 to 4.31 per cent in 2002-03. Their ratio of exports to imports have fallen from 5.01 in 1996-97 to 2.43 in 2002-03, though value of exports of agricultural and allied products are higher than their imports.

Global Agricultural Scenario

Global agriculture is characterised by heterogeneity. Agricultural policy scenario in global context is best presented by World Bank in its report "Global Economic Prospects 2004: Realising the Development promise of the Doha Agenda". Some of its stylised findings are furnished below:

(i) Trade in agriculture is important to the world's poor but agricultural policies have often worked against the poor

Developed country agricultural reforms have been modest despite the inclusion of agriculture under the WTO. The result of their policies has been overproduction and price declines in many commodities, reducing opportunities for many developing countries to expand exports and penalising the world's poor. During the 1990s, the growth of developing country agricultural exports to industrial countries slowed as exports to other developing countries accelerated.

The benefits of global liberalisation in agriculture through elimination of all border barriers and subsidies are estimated to be very large for industrial and developing countries alike, topping \$ 350 billion for the world. With liberalisation, agricultural production would marginally shift from North to South, and the highly depressed world prices for many commodities would increase by 10 to 20 per cent each for cotton and ground nuts, 20 to 30 per cent for dairy products, 33 to 90 per cent for rice, and 20 to 40 per cent for sugar.

(ii) Agriculture is the livelihood of the world's poor

Using the \$ 1-a-day measure of poverty, the Report says that most of the world's poor live in India, China and other lower-middle-income countries.

(iii) Poverty is more common in rural areas

Poverty in rural areas is closely correlated with distance to local and national markets. Without improvements in the functioning of local and national markets, economic gains for the poor may reach only one-fourth of their potential. Hence, improvements in trade policies alone may not be sufficient to restore sustained growth in the agricultural sector without better transport infrastructure and other reforms.

(iv) Farmers in industrial countries earn above average incomes

By implication, developing country farmers will not be in a position to compete with them. It, therefore, calls for level playing field.

(v) High border protection in rich countries frustrates development

Border protection in rich countries continues to be high, non-transparent, and anti-development. Tariff peaks as high as 500 per cent confront imports from developing countries. Tariffs also increase by degree of processing; creating a highly escalating tariff structure that limits access for processed foods.

(vi) Agricultural subsidies in rich countries distort global income distribution

The subsidy programmes prominent in current food and agriculture policy are not targeted to keeping small and marginal farms in business but instead provide hefty rents to large farmers. Nor are current production-based policies effective in achieving their various other objectives (such as environmental sustainability and rural development). By increasing land prices they also lead to the creation of larger farms and the elimination of small farms. Their spillover effects on global markets, and on other countries, are large and negative. When subsidies depress prices the impacts in poor countries can be severe.

(vii) Global markets are important for sustained income growth in developing countries

For countries with a relatively small urban population, agricultural exports can produce faster growth than can domestic market demand. In such cases, the international market provides growth opportunities. Export growth contributes significantly to the growth of non-export agriculture by providing cash income that can be used to modernise farming practices. For those leaving the farm, growth and modernisation of agriculture create jobs in agro-processing and marketing.

(viii) Product trends in exports differ

Static markets in industrial countries for traditional developing country products such as coffee and tea seem to have contributed to declining import growth rates in developed countries, as did the decline in their GDP growth rates, combined with low elasticity of demand.

The protection rates for food processing in industrial countries are extremely high, far above those of any other manufacturing sub-sector. The developing countries have not gained market share in food processing.

(ix) The evolving structure of trade is towards non-traditional products with lower rates of protection

Export product groups that showed significant declines during, 1980-81 and 2000-01, were grains (14.3 to 9.5%); coffee, cocoa and tea; sugar and sugar products and textile fibres—all of which are among the traditional exports of developing countries. The declines were caused by a combination of price declines, low demand elasticities; and in the case of sugar, grains, meats, and milk by high rates of protection and expanded production in industrial countries. Export of fruits, vegetables, cut flowers, fish, seafood, alcoholic and non-alcoholic drinks gained significantly during the period.

(x) Global agricultural protection is a bias against development

Protection in agriculture has taken different forms like tariff protection, subsidies, tariff peaks, Tariff Rate Quota (TRQs), tariff escalation, and opaque tariffs. These are often inter-linked. The entire inter-linked system of protection, even when used by other developing countries, is heavily biased against developing countries and against the world's poor.

It is envisaged that elimination of tariffs and subsidies on agriculture would lead to rise in product prices due to free play of market forces, and benefit the farmers. If the current level of tariff on a product is lower than the anticipated global price increase, then there may not be direct consumer benefit as the post-reform consumer price would be higher. However, higher market price would attract the farmers to produce more.

National Agricultural Scenario

The following are some of the main features of India's agricultural scenario and its performance:

- (i) There are 1,155.8 lakh number of holding operating on 1,633.57 lakh hectares in India as per 1995-96 Agricultural

Census. Of these, 928.22 lakh number (80.31%) are small and marginal holdings operating on 588.43 lakh hectares (36.02%) area only.

- (ii) As per provisional data of population census 2001, the number of cultivators in India stands at 1,276.00 lakh and agricultural labourers at 1,075.00 lakh.
- (iii) As per Central Statistical Organisation (CSO), India's agriculture and allied sector accounts for 23.8 per cent of GDP at factor cost in real terms in 2000-01 (23.9% QE in 2001-02) which have gradually declined from 31.0 per cent in 1993-94.
- (iv) While the overall agricultural growth during the last four decades has been more or less constant, the relative contribution of area expansion and of improvement in output per hectare has progressively shifted in favour of the latter. In the fifties, the major part of increase in output was from area expansion, at present almost the entire increase in output is from more intensive cropping of available land and from higher yields per hectare.
- (v) There are vast inter-crop and inter-regional differences in performance, the fastest growth has been in the wheat growing regions of North-West India which have benefited from the advent of HYVs and well-developed irrigation facilities. Despite HYVs, growth has, however, not been impressive in the predominantly paddy growing areas, especially in East and North-East India.
- (vi) While the inter-regional disparities in output per hectare have not widened, the disparities in terms of output per head of agricultural population has been widening progressively.
- (vii) In general, productivity per hectare is increasing mainly on irrigated land; productivity of unirrigated land seems to be more or less stagnant in most of the States.
- (viii) While HYVs and fertiliser use have spread, the level of yields achieved is, in general, considerably below the potential demonstrated to be attainable with proven technology.
- (ix) Indications are that the incremental returns on the irrigation-fertiliser-improved seed package are declining.

- (x) Though inequality in land distribution has not worsened, there is sharp decline in average size of holdings on account of rise in population. The average size of holdings in 1990-91 was 1.57 hectares which declined to 1.41 hectares in 1995-96. Disguised unemployment persists in Indian agriculture.

India occupies second position (China first) in world agriculture during 2000 in the production of rice (22.4% of world) and wheat (12.8%). However, India's yield per hectare of rice is lower at 3,008 kg. compared to Egypt's 9,086 kg. (highest in the world) or China's 6,234 kg. Likewise, India's wheat yield is 2,777 kg. per hectare compared to UK's 8,006 kg. (highest) or China's 3,729 kg. In pulses, India occupies first position (23.6%). In groundnut production India's position is second (17.1%), next to China. However, its yield per hectare is lower at 859 kg. compared to China's 3,329 kg. (highest). The huge gap in yield reflects not only agro-climatic factors but also the differences in technology.

Regional Economic Scenario

India ranks first in the world in the production of tea, producing about 25 per cent of world output in 2000. Of particular interest to the regional economy of the North-East (NE) India is the export of tea. Share of tea in India's total exports was about 0.87 per cent in 1996-97, 1.62 per cent in 1998-99, and it stood at 0.64 per cent in 2002-03. Total export of tea in India has increased annually by 2.3 per cent at compound growth rate during 1996-97 and 2002-03. Its import started from 1999-2000 (US\$ 5.9 million). However, imported tea was US\$ 25.7 million in 2002-03 compared to its export at US\$ 336.0. With the removal of QRs from 1-4-2001, tea can be imported from any country without any licence. Tea import is accelerating.

WTO is universal. No region of a member country of WTO can remain out of its orbit. As per 1995-96 agricultural census, the total number of holdings in the seven States (Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland and Tripura) has been 36.06 lakh (i.e., 3.12% of all-India) with operating area of 48.55 lakh hectares (i.e., 2.97% of all-India).

North-Eastern region has the following unique features:

- (i) Share of agriculture in Gross State Domestic Product (at constant 1993-94 prices) was 30.5 per cent (highest in the region) in Assam in 2001-02, in Manipur 20.1 per cent (lowest in the region) in 2000-01. The growth of gross agricultural SDP was 0.2 per cent in 2001-02 for Assam; 2.8 per cent and 2.9 per cent respectively for Manipur and Tripura in 2000-01, while 8.8 per cent in Arunachal Pradesh but negative for Meghalaya. For the other States data are not available.
- (ii) Agricultural dualism with highly modern tea plantation co-exists with subsistence farming in the peasant sector.
- (iii) Pre-dominance of small and marginal farmers (about 80% of total holdings) operating on about 38 per cent of the area compared to all-India average of 36 per cent area. It can be mentioned that in Assam as per 1995-96 agricultural census, 83.12 per cent of total holdings are small and marginal, operating upon 44.33 per cent of total operational holdings.
- (iv) Abundance of surface and ground water potential. However, a significant part of the region is flood-prone (compared to all-India figure of 12 per cent land vulnerable to flood), and all the States including Assam suffer from major soil erosion/land slide problems.
- (v) The region is characterised by low agricultural productivity and input use. In Assam, the yield of foodgrains per hectare in 2001-02 was 1,465 kg. compared to 4,040 kg. in Punjab. Areas covered under irrigation in 1999-2000 was mere 7.6 per cent compared to 96.6 per cent in Punjab.
- (vi) The entire region is characterised by weak agricultural institutions like credit, marketing, input delivery.

Within the region, Assam accounts for 74.40 per cent of the holdings with operational area accounting for 64.63 per cent of area. Most of the farms are marginal and small. In the hill areas, *jhum* (shifting) cultivation is widely practised. While tea cultivation follows the market-oriented agricultural model, the model followed in the case of crop farming, by and large, is the traditional subsistence. Around 50 per cent of the area under paddy during 1995-96, which

is the main crop in Assam, has been said to be covered under High Yielding and improved varieties.

As per 2001 census, the number of cultivators in the region stood at 60.83 lakh (i.e., 4.77% of all-India) and agricultural labourers at 19.42 lakh (i.e., 1.81% all-India). The number of cultivators in Assam stood above 37.42 lakh (i.e., 61.52% of the region) and agricultural labourers 12.90 lakh (i.e., 66.43% of the region). These two categories together account for 52.65 per cent of total workers in Assam. Hence, within the region, WTO has got more implication for the livelihood of workers in Assam.

According to Planning Commission's data, average value of land yield (value of output divided by the cropped area) which is also a measure of agricultural productivity has moved as under for the selected States (given for reference) during the given period. It may be noted that value tends to vary depending on the type of crops grown and their prices. Hence average yield will be higher in respect of high value crops like plantation, horticulture and commercial crops than common foodgrains.

Table 1.1: Average Value of Land Yield

State / Period	Average Yield (Rs./Hectare) at 1990-93 Constant Prices	
	1980-83	1992-95
Kerala	12,333.85	15,625.96
Punjab	9,707.65	13,597.22
West Bengal	5,943.81	9,958.45
Assam	6,906.69	8,196.82
All-India	5,090.42	7,388.05

Source: Planning Commission, *Tenth Five Year Plan (2002-07)*, Vol. III, p. 78.

As per the data, yield per hectare is the highest in Kerala (followed by Tamil Nadu); Punjab and Haryana occupies third and fourth position respectively. Though Assam's figures are higher than all-India, its increase (1.44% compound growth rate) in productivity during 1980-95 has been much lower than all-India growth rate of 3.15 per cent. In fact, Assam's growth rate is the second lowest. West Bengal registered the highest growth rate at 4.39 per cent followed by Haryana, 4.13 per cent. The Plan document has also

stated that the States in which agricultural production has increased significantly are the States in which there has been a rapid decline in poverty. In view of this, it can be said that success or failure in agriculture sector as a result of the WTO regime has got serious economic implications.

The above figures need some comments. The annual yield per hectare of Rs. 8,196.82 (at constant price) translates to Rs. 683.07 per month for Assam. When divided by an average family size of five, the monthly earnings per head stands at Rs. 136.61. For a two-hectare farm in Assam, which is preponderant, the monthly earnings per head is Rs. 273.23. This shows the subsistence character of agriculture in the State. Low farm productivity results in high unit costs of food, and lower farm income.

Suggestions

Agricultural development is basically a function of six elements (6 'I's), viz., Institutions (including land tenure, R&D, training, marketing, credit, stock exchanges in agricultural goods, etc.), Infrastructure (including power, irrigation, cold storage, transport, etc.), Investment, Inputs (seed, fertilisers, etc.), Incentives and Information (on technology, prices, costs, quality, etc.). Agricultural reform programme should take into account these elements. Agriculture is subject to diminishing marginal productivity of labour and returns to scale. Programmes to invest in 'public goods' such as Research and Development (R&D), human resources, improving safety nets, which are also permissible under the WTO, enhance productivity, reduce farm risk and uncertainty. Crop diversification, which is basically a function of research, helps in minimising farmer's risk and uncertainty.

Agriculture is a State subject under the Constitution of India. Expansion of trade opportunities is an important ingredient of trade liberalisation. Policies assuring the small and marginal farmers their access to the above elements can facilitate their participation in markets and in exploiting export opportunities.

Poor infrastructure is the Achilles heel of the North Eastern region. The Green Revolution in Punjab is basically due to its sound infrastructure, particularly in irrigation. Its highest yield of foodgrains per hectare is attributed to irrigation, which covers 96.6 per cent of

the cropped area. Irrigation is, therefore, a *sine qua non*. It should come from the public sector and/or public-private partnership.

In a peripheral economy, individual farmers under globally open economic system are highly exposed to global shocks and swings. The small and marginal farmers should form Associations so that their voices about their stakes are better heard in political circles under the WTO regime and can strike better bargains for protection.

In the hill areas where there is no cadastral survey, the land is community-owned and institutional credit is absent, 'contract farming' can offer a solution in commercial production, supply chain management and marketing. Contract farming is an agreement between farmers and sponsors, i.e., government bodies/corporate/processors/entrepreneurs to coordinate and promote production and marketing. The traditional farming is based on the strategy of "supply creates its own demand", *a la Say's law*. Contract farming reverses this as production is demand/market driven. Farmers have to produce as per sponsor's requirement; the latter also supplies inputs and credit, and procure the products at fixed/contract price. Punjab Agri Export Corporation Ltd. is a pioneer in contract farming. In this respect, partnership between farmers' association and MNCs, share holding companies in land can be established. However, these require institutional reforms, particularly in customary and land laws. Wherever feasible, farmers in order to optimise returns from tiny plots, should switch over from subsistence farming to high-valued crops like vegetables, fruits, medical and aromatic plants, floriculture. These products are labour intensive and require less land per unit of output. They are suitable for land-scarce, labour-abundant economy and hill areas. These are high-valued, income elastic products and have global markets. However, they may need support of modern technology, intensive care, cold storage and quick marketing.

The NE region is surrounded by foreign countries. This offers opportunity for border trade through which 'surplus products' can be exported. Export promotion industrial parks, border trade centres, etc. have already been identified or are in the process of establishment in selected parts of the region. Under the Exim Policy, forty-eight Agri-Export Zones were approved till July 2003 by the government. Such projects (one each), for ginger in Assam and for Pineapple in Tripura are coming up. Success of such projects lies on the

'partnership' envisaged among Governments, farmers, entrepreneurs and exporters. The other States should also come forward with proposals for Agri Export Zones to gain from competitive advantage so that exports from the region bloom.

The WTO is omnipresent. Opening of agricultural sector brings global competition, which is looming large everywhere, and which small and marginal farmers will also have to face. To transform the laggard agricultural economy into a vibrant one, the governments will have to provide infrastructure and usher in institutional reforms. The farmers have to raise their competitive strength through diversification and higher their productivity and yield per plot in order to seize the emerging opportunities.

REFERENCES

- Baishya, P. *et al.* (ed.), *Development Issues of North-East India*, Lawyer's Book Stall, 1997.
- Chattopadhyay, M. *et al.* (ed.), *Planning and Economic Policy in India*, Sage Publications India (P) Ltd., 1996.
- Goswami, P.C. (ed.), *Agriculture in Assam*, Assam Institute of Development Studies, 1989.
- Goswami, P.C., *The Economic Development of Assam*, Kalyani Publishers, 2003 (Revised by A.K. Neog).
- Government of India, Department of Agriculture and Cooperation, *Agricultural Statistics at a Glance*, 2003.
- Hoekman, B. *et al.* (ed.), *Development, Trade and the WTO*; World Bank, 2002.
- Neog, A.K., "Intra-regional Trade and its Potentiality for North-East India" in Gauhati University, *Journal of Commerce*, Vol. V & VI, 1998.
- Neog, A.K., "New World Trade Agreement" in D. Bhorali (ed.) *GATT Agreement or Dunkel Draft Treaty*, Mittal Publications, 1994.
- Passah, P.M., *et al.*, *Agricultural Transition in the Hill Areas of the North Eastern Region* (4th Conference of the NEEA), published by B. Syiem, Shillong College, 2002.
- Srinivasan, T.N., "India must stop being purely defensive in WTO," in the *Financial Express*, 4th September, 2003.
- World Bank, *Global Economic Prospects 2004: Realising the Development Promise of the Doha Agenda*, 2003.

HAS AGRICULTURE CHANGED IN THE LAND OF SEVEN SISTERS?

— A.C. MOHAPATRA

Background

Decidedly changes do occur through time, for better or for worse. It is societal evaluation and judgement that morality can be assigned to events, whether such changes are good for people or not, whether the processes and their correlates desirable, or for that matter whether the process is progressive, moving the society to a higher plane of achievement. And how can we make such a judgement? In fact, the bases of such moral judgements are to be sorted out before we go for evaluation. The intention in this chapter is to address such bases of evaluation, and then to evaluate whatever is happening in the agricultural situation in the region.

First is the question of quantitative growth in agriculture. Decidedly this does not happen in agriculture in isolation from other sectors of the economy, nor without competitive influences from other regions of the country. But, nevertheless, higher growth, especially led by higher productivity of land (yield) is generally accepted as a better situation. This is principally, for two reasons: (a) Since, a very large proportion of the population are farmers, larger production and productivity is assumed to make the small farmers have access to food from their own labour and the little bigger farmers will have a better disposable income at their hands, therefore, increasing their economic and social welfare; (b) the region being chronically short of food in relation to what is locally produced, it provides a comfort level of regional food security.

Our society's rich cultural activities are associated with rice culture. Biodiversity in rice culture is linked with cultural diversity of the region. In a book, *Our World's Heritage*, published by National Geographic Society (1987), 322 numbers of well-linked cultural and natural diversities are recorded. We must start our study for development of technology from work engagement of the people in the society, which is the basic for development. It is actually an attractive idea of understanding the present in terms of the past. It is worth examining the continuity between tradition, myth and reality. A better understanding of the power of tradition and its hold in the society's collective consciousness is necessary.

Development of agricultural technology is only a sub-system of overall development. Both food and non-food items assume importance in determining the nutritional security of a society. While we succeed in the diligent development of technological and productivity potentials we could lose all the advantages for backlog or disadvantages in other sub-systems such as lack of inputs, unavailable water and power supply, inadequate communication facility and transportation and lack of other facilities. The scientific community need to voice their concerns in public affairs with the administration and play a more significant role in ensuring an integrated development of the economic progress and quality of life of the rural people.

STATUS OF AGRICULTURAL SECTOR IN NORTH-EAST INDIA

Problems and Prospects

— C. HAZARIKA

The North-Eastern Region reflects ecological and cultural contrast between the hills and the plains and yet there are also significant elements of continuity. The North-East is one of the most biodiverse regions in the world. This chapter attempts to study the agricultural scenario of the North-Eastern Region and to identify the problems and prospects of agricultural sector. Secondary information published by various sources were used for the present study.

Agriculture

The economy of the North-Eastern States is mainly rural and agrarian. The region offers scope for cultivation of a wide variety of agricultural crops because of its diversities in topography, altitude and climatic conditions. These products are mainly sold in the local markets, and mostly in the form of primary produce without significant value addition.

Land to Man Ratio

Land to man ratio is an important parameter of development of agricultural sector. The extent of cultivable land in the North-Eastern Region varies from State to State. Land is a critical resource in many of the North-East States and availability and management of land for agricultural activities are essential for raising the region's overall agricultural production and productivity. Table 4.1 presents the

geographical land to man ratio of the different North-Eastern States as on 1991. The region's agricultural system is predominantly traditional. The overall geographical land to man ratio for the North-Eastern Region (0.81 ha/person) is much higher than the national average (0.39 ha/person). Among the North-Eastern States the geographical land to man ratio is highest in Arunachal Pradesh (9.69 ha/person) and lowest in Assam (0.35 ha/person).

Table 4.1: Geographical Land to Man Ratio (Hectares/Person) as on 1991

State	Geographical area (Ha)	Population (No.)	Ratio
Arunachal Pradesh	83,74,300	8,64,558	9.69
Assam	78,43,800	2,24,14,322	0.35
Manipur	22,32,700	18,37,149	1.22
Meghalaya	22,42,900	17,74,778	1.26
Mizoram	21,08,100	6,89,756	3.06
Nagaland	16,57,900	12,09,546	1.37
Tripura	10,48,600	27,57,205	0.38
All North-Eastern States	2,55,08,300	3,15,47,314	0.81
All India	32,87,26,300	84,63,02,688	0.39

Size of Holding

Size of holding is another important variable for agricultural sector development. About 80.00 per cent of the farmers in the North-Eastern Region belongs to the small (< 1.44 ha) and marginal (< 0.40 ha) category. Moreover, with the increase in population, the average size of holding is gradually reducing over the years. Table 4.2 presents the average size of holding in North-Eastern States during 1990-91. The average size of holding for the North-Eastern States (1.60 ha) is higher than the all India (1.57 ha) average. Among the North-Eastern States the average size of land holding is highest in Nagaland (6.92 ha) and lowest in Tripura (0.97 ha). About 55.60 per cent of the holdings are of size only 0.43 ha or less. This is primarily because hilly terrain constitutes nearly two-thirds of the region's geographical area, and large sized holdings are not feasible. The average plot size is too small for mechanisation of agriculture and adoption of modern farming practices. Subsistence farming, therefore, is predominant in the North-Eastern Region and there is hardly any commercial surplus.

Total operational land in the North-Eastern Region is 53.4 lakh ha which is 3.22 per cent of total operational land in the country. The highest operated area of 31.6 lakh ha is in Assam and the lowest (0.8 lakh ha) is in Mizoram. Nagaland has the unique characteristics of highest size of operational holding at 6.92 ha, which is much higher than the average holding size of the region (1.60 ha) and the average holding size of all India (1.57 ha).

Table 4.2: Average Size of Holding (in Hectares) 1990-91

State	Marginal	Small	Semi-medium	Medium	Large	Average holding size
Arunachal Pradesh	0.60	1.50	2.81	5.76	18.43	3.62
Assam	0.41	1.39	2.70	5.23	74.17	1.31
Manipur	0.55	1.37	2.56	5.01	12.16	1.24
Meghalaya	0.54	1.38	2.54	5.46	13.00	1.81
Mizoram	0.62	1.57	2.78	4.00	0.00	1.34
Nagaland	0.69	1.43	2.92	6.34	16.85	6.92
Tripura	0.40	1.53	2.69	5.14	121.57	0.97
All North-Eastern States	0.43	1.41	2.70	5.56	25.20	1.60
All India	0.40	1.44	2.76	5.90	17.30	1.57

Cultivation Practices in North-Eastern States

Table 4.3 presents the cultivation practices in the North-Eastern States during 1995-96. The percentage of cultivable area over the geographical area in most of the North-Eastern States (24.69%) is less than the national average (59.22%). The percentage of cultivable area over the geographical area is highest in Meghalaya (47.88%) and lowest in Arunachal Pradesh (3.60%). The percentage utilisation of cultivable area in the North-Eastern region (62.04%) is less than the national average (73.05%) and mono cropping is the predominant method of cultivation. In the absence of multi-cropping, little or no surplus is generated in the agricultural sector. The utilisation is lowest in Meghalaya (19.18%) and highest in Tripura (89.35%). Among all the North-Eastern States, Assam takes the highest position both in terms of available cultivable area and net sown area.

Table 4.3: Cultivation Practices in North-Eastern States during 1995-96

State	Total geo- graphical area (^{'000} ha)	Cultivable land (^{'000} ha)	% of geo- graphic area	Total crop area (^{'000} ha)	Area sown more than once (^{'000} ha)	Net sown area (^{'000} ha)	% of cultivable area used	Gross irrigated area (^{'000} ha)	% of gross cropped area
Arunachal Pradesh	8374.3	293	3.50	244	59	185	63.14	36	14.75
Assam	7843.8	3387	43.18	3938	1158	2780	82.08	572	14.53
Manipur	2232.7	164	7.35	182	42	140	85.37	75	41.21
Meghalaya	2242.9	1074	47.88	247	41	206	19.18	45	18.22
Mizoram	2108.1	445	21.11	109	0	109	24.49	9	8.26
Nagaland	1657.9	626	37.76	228	17	211	33.71	72	31.58
Tripura	1048.6	310	29.56	426	149	277	89.35	60	14.08
All NE States	25508.3	6299	24.69	5374	1466	3908	62.04	869	16.17
All India	328726.3	194680	59.22	186561	44346	142215	73.05	71510	38.33

Source: CMIE Report on Agriculture, 1997 and 1998.

Progress of Agriculture

Table 4.4 presents the progress of agriculture in terms of foodgrains in the North-Eastern States during the period from 1986-87 to 1996-97. Almost 90.00 per cent of the region's rural population is entirely dependent on agriculture. In the period of 1986-87 to 1991-92, for the North-Eastern States the CARG of agricultural area

Table 4.4: Progress of Agriculture (Foodgrains) in the North-Eastern States

State	Factors	1986-87	1991-92	*CARG	1991-92	1996-97	*CARG
Arunachal Pradesh	A	175.0	188.7	1.52	188.7	186.8	-0.20
	P	187.0	219.8	3.28	219.8	219.6	-0.02
	Y	1069	1165	1.73	1165	1176	0.19
Assam	A	2579.8	2749.9	1.29	2749.9	2728.7	-0.15
	P	2588.0	3379.2	5.48	3379.2	3532.1	0.89
	Y	1003	1229	4.15	1229	1294	1.04
Manipur	A	173.0	164.3	-1.03	164.3	172.5	0.98
	P	258.0	350.1	6.30	350.1	390.7	2.22
	Y	1491	2131	7.40	2131	2265	1.23
Meghalaya	A	138.8	133.5	-0.78	133.5	133.1	-0.06
	P	131.3	155.3	3.41	155.3	151.9	-0.44
	Y	946	1163	4.22	1163	1141	-0.38
Mizoram	A	52.7	66.0	4.60	66.0	77.5	3.26
	P	52.8	90.2	11.30	90.2	133.8	8.21
	Y	1002	1367	6.41	1367	1726	4.77
Nagaland	A	147.0	182.4	4.4	182.4	199.5	1.81
	P	93.0	203.6	16.97	203.6	211.9	0.80
	Y	633	1116	12.01	1116	1062	-0.99
Tripura	A	286.0	272.5	-0.96	272.5	272.7	0.01
	P	374.0	486.7	5.41	486.7	556.1	2.70
	Y	1308	1786	6.43	1786	2039	2.69
North-East	A	3552.3	3757.3	1.13	3757.3	3770.8	0.07
	P	3684.1	4664.9	5.80	4664.9	5196.1	1.24
	Y	1037	1300	4.62	1300	1378	1.17
All India	A	127197.0	121871.2	-0.85	121871.2	124509.5	0.43
	P	143419.0	168373.2	3.26	168373.2	199321.2	3.43
	Y	1128	1382	4.15	1382	1601	2.99

Note: * CARG = Compound Annual Rate of Growth.

A = Area ('000 ha), P = Production ('000 tonnes), Y = Yield (kg/ha)

Source: CMIE Report on Agriculture, 1997 and 1998.

(1.13%), foodgrain production (5.80%) and foodgrain yield (4.62%) were higher than the national average of the CARG of agricultural area (-0.85%), production (3.26%) and yield (4.15%). But significantly in the period of 1991-92 to 1996-97, for the North-Eastern States the CARG of agricultural area (0.07%), production (1.24%) and yield (1.17%) have come down compared to the national average of CARG of area (0.43%), production (3.43%) and yield (2.99%). In the period of 1986-87 to 1991-92, the performance of North-Eastern agricultural sector was quite good which could compete with the Indian agriculture, but in the period of 1991-92 to 1996-97, the North-Eastern agriculture could not maintain the pace of improvements of agriculture with the Indian agricultural scenario. This might be due to low usage of HYV seeds, fertilisers and other agricultural inputs like irrigation, credit, improved agricultural implements and use of primitive and outdated techniques.

Per Capita Availability of Foodgrains

The per capita availability of foodgrains (Table 4.5) in Arunachal Pradesh (254 kg/annum) is the highest among the North-Eastern States (164.71 kg/annum) and even higher than the national average (235.52 kg/annum). The per capita availability of foodgrains is lower than the national average in all the other North-Eastern States.

Table 4.5: Per Capita Availability of Foodgrains in the North-Eastern States Based on the 1991 Population Census (kg/annum)

State	Per capita availability of foodgrains (kg/annum)	
	1991-92	1996-97
Arunachal Pradesh	254.23	254.00
Assam	150.76	157.58
Manipur	190.57	212.67
Meghalaya	87.50	85.59
Mizoram	130.77	193.98
Nagaland	168.33	175.19
Tripura	176.52	201.69
All NE States	154.84	164.71
All India	198.95	235.52

Shifting Cultivation

Shifting cultivation (*jhum* cultivation) is the common practice of agricultural production in the hills. Recently terrace cultivation is encouraged through State government initiatives. The annual area under shifting cultivation is 3,809 sq. km. and minimum area under shifting cultivation in one time is 14,660 sq. km. and 4.43 lakh families are practicing it (Table 4.6). The *jhum* cycle varied from 3-10 years but due to pressure of population the same comes down to 2-3 years. Shifting cultivation has its own danger of soil erosion, soil degradation, loss of valuable forest products and flooding in river valley down below. All these cause ecological imbalance. Settled cultivation is encouraged through various programmes like:

1. Permanent settlement of *jhumia* cultivators through development of plantation crops in Karbi Anglong and NC hills of Assam.
2. Providing 2.0 ha of terrace land to *jhumia* family along with inputs and financial help for permanent cultivation in Meghalaya.
3. Pilot project in selected villages, land reclamation, minor irrigation, land improvement, provision of seeds, fertilisers and development of horticulture and cash crops in Mizoram.
4. Pilot projects in Nagaland to induce farmers to give up *jhum* cultivation and adopt terrace cultivation.

Table 4.6: Shifting Cultivation in North-East Region

State	Annual area under shifting cultivation (sq km)	Fallow period (years)	Minimum area under shifting cultivation one time or other (sq km)	No. of families practising shifting cultivation
Arunachal Pradesh	700	3-10	2100	54000
Assam	696	2-10	1392	58000
Manipur	900	4-7	3600	7000
Meghalaya	530	5-7	2650	52290
Nagaland	190	5-8	1913	116046
Tripura	223	5-9	1115	43000
All NE States	3809 (1.5%)		14660 (5.7%)	443336

Source: Basic Statistics, NEC.

Changes in Cropping Pattern

Rice is the main crop in the North-East Region covering around 61 per cent of gross cropped area. Maize is the next important crop for all the hill States except Tripura and Assam. Oilseed is another important crop. During the period 1970-71 and 1995-96 changes in cropping pattern was observed (Table 4.7). This period is marked by onset of Green Revolution in seventies, commercialisation in agriculture and tremendous increase in production due to adoption of improved technology and yield increasing strategies, introduction of cash crops and intensive cultivation practices. In the North-East Region the main changes were as follows:

1. Rice continued to remain as the major crop in all the States. However, the proportionate area declined in Assam and Tripura, remained stable in Manipur but increase in Mizoram and Meghalaya.
2. Oilseeds are the next important crop covering around 6-8 per cent of area except Manipur, Meghalaya and Tripura. Rape and mustard was the only oilseed crop till seventies but after that new oilseed crop like linseed, castor, sunflower, groundnut has entered into the cropping pattern.
3. Wheat is grown mainly in Assam with tremendous area expansion in the late seventies due to Green Revolution. But since 1985-86, wheat area is declining due to lack of irrigation facilities, problem of pre-harvest sprouting in the event of early showers and problem of post-harvest processing.
4. Pulse area is remaining stagnant in Assam due to problem of soil moisture stress in the sowing season, poor management, disease and pest, etc. this crop is newly entered in Arunachal Pradesh, Mizoram, Nagaland and Tripura in eighties.
5. Jute and sugarcane are the two important cash crops of the region. Due to problem of retting, processing and marketing the jute area is declining. Rice is substituting jute area.
6. Potato is gaining priority in all the States except Mizoram.

Table 4.7: Changes in Cropping Pattern in North-East States

(Area in lakh ha)

Crops	Period	Arunachal Pradesh	Assam	Manipur	Nagaland	Tripura	Mizoram	Meghalaya
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Rice	1970-71	0.60 (46.15)	21.37 (73.97)	1.50 (80.21)	0.60 (58.82)	2.65 (74.44)	0.05 (6.41)	0.34 (17.08)
	1995-96	1.18 (47.2)	24.93 (62.63)	1.52 (81.28)	1.37 (63.13)	2.48 (53.91)	0.65 (60.75)	1.03 (43.09)
Wheat	1970-71	—	0.13 (0.45)	—	—	—	—	—
	1995-96	0.05 (2.00)	0.82 (2.06)	—	—	0.03 (0.65)	—	0.04 (1.67)
Maize	1970-71	—	0.22 (0.76)	0.06 (3.21)	—	—	—	0.05 (2.51)
	1995-96	0.35 (13.56)	0.19 (0.48)	0.03 (1.82)	0.27 (12.44)	0.02 (0.43)	0.08 (11.76)	0.17 (7.11)
Total pulses	1970-71	—	0.90 (3.11)	—	—	0.03 (0.84)	—	0.02 (1.00)
	1995-96	0.05 (2.0)	1.08 (2.71)	—	0.11 (5.07)	0.10 (2.17)	0.05 (4.67)	0.03 (1.25)
Total oilseeds	1970-71	—	1.73 (5.99)	—	0.02 (1.96)	0.05 (1.40)	0.02 (2.56)	0.05 (2.51)
	1995-96	0.22 (8.8)	3.15 (7.91)	0.04 (2.42)	0.19 (8.75)	0.15 (3.26)	0.07 (6.54)	0.09 (3.76)

(Contd.)

Strategies for Agricultural Development

1. Intensive farming with yield improvement strategies, crop diversification, development of cash crops and high valued crops.
2. Extensive cultivation of prospective crops—expansion of area under summer rice, oilseeds, pulses, horticultural crops, development of medicinal and aromatic plants.
3. Infrastructure development—storage, processing, marketing, irrigation, rural development and communication, input delivery and credit supply.
4. Technology development for different agro-ecological situations—upland, hill areas, and flood effected areas.
5. Strengthening training and demonstration, on farm trials.

Above all, there is an urgent need for investment in agricultural sector in the North-Eastern Region of India. For this purpose, the main agenda should be to attract new investors to this region. In this context, it is imperative to popularise the avenues and opportunities for investment in North-Eastern Region.

Why Invest in North-East India?

- Rich mineral resources.
- Plentiful energy sources—Brahmaputra and its tributaries, forming the largest perennial water system in India, has immense potential for energy, irrigation and transportation.
- Fertile stretches of land.
- Storehouse of horticultural products/plantation crops/vegetables/spices and rare forest products.
- Abundant forest resources.
- Diverse tourist attractions.
- Reasonably priced and easily available labour.
- Growth centres, total tax free zones.
- Subsidies on transport, capital investment, interest on working capital are available for industries in North-East region.
- Close to Myanmar, the gateway to the ASEAN countries.

- South-East Asia is one of the fastest growing potential markets.
- Proximity to SAARC countries.

North-East India's locational advantage and rich natural resources provide a backdrop to its development as a base for foreign investors.

*Other Titles from
NEICSSR, Shillong*

- ☑ Reorganisation of North East India Since 1947
B. Datta Ray and S.P. Agrawal (Eds.)
- ☑ Sociological Constraints to Industrial Development in
North-East India
B.K. Datta Ray and Prabin Baishya (Eds.)
- ☑ Population, Poverty and Environment in North East India
*B. Datta Ray, H.K. Mazhari, P.M. Passah and
M.C. Pandey (Eds.)*
- ☑ Agenda for North East India
B. Datta Ray (Ed.)
- ☑ Development Priorities in North East India
Bimal J. Deb (Ed.)
- ☑ Linguistic Situation in North East India
Mrinal Miri (Ed.)
- ☑ Perspective of Security and Development in North East India
S.K. Agnihotri and B. Datta Ray (Eds.)
- ☑ Ethnic Issues, Secularism and Conflict Resolution in North
East India
Bimal J. Deb (Ed.)

CONCEPT PUBLISHING COMPANY

A/15&16, Commercial Block, Mohan Garden
New Delhi-110 059

Ph. : 25351460, 25351794 Fax : +91-11-25357103
Cable: CONPUBCO Email: publishing@conceptpub.com

Showroom: Building No. 4788-90, Street No. 23,
Ansari Road, Darya Ganj, New Delhi-110 002
Ph. 23272187

ISBN 81-8069-264-7



9 788180 692642

Rs. 600