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INDIA RURAL DEVELOPMENT REPORT 2012|13

India Rural Development Report 2012|13

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IDFC Foundation

Centre for Economic and Social Studies (CESS)

Institute of Rural Management Anand (IRMA)

Indira Gandhi Institute of Development Research (IGIDR)

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Foreword

I am pleased to introduce the first edition of the *India Rural Development Report*. This Report, prepared by the IDFC Rural Development Network, will be of interest to anyone looking to understand the complex currents and transformations at play in rural India today.

The Report is perhaps a first of its kind in its sheer scope—it discusses in one place, the multifarious dynamics of rural India—from livelihoods to sustainability, social inclusion, infrastructure, governance and participation. Through inputs from its network partners, outside experts and a synthesis of research and evaluation studies, this Report brings together a range of perspectives on rural India. In covering these aspects, the Report takes an integrated view, recognising and highlighting the critical interrelationships between various sectors. It asks for instance, how we can—and we must—create productive livelihoods, while protecting the natural resources that sustain us.

The Report also highlights some key reasons why government programmes have not been as effective in achieving their goals. The one thing that is clear based on evidence is the important role of greater decentralisation and people's participation in improving the implementation of our programmes. This is indeed the direction in which we are moving. We are introducing greater flexibility in centrally sponsored schemes (CSSs) by giving state governments greater discretion in adapting schemes to local needs. We are strengthening Panchayati Raj Institutions (PRIs) so that they can play a bigger role in implementing and monitoring government programmes. To facilitate this, we have decided to allocate one per cent of our Ministry's budget for capacity building of PRIs. The newly launched Direct Benefits Transfer (DBT) platform will ensure we remove several layers of intermediaries in Government-to-Citizen (G2C) payments, including wage payments of the Mahatma Gandhi NREGA and Pensions.

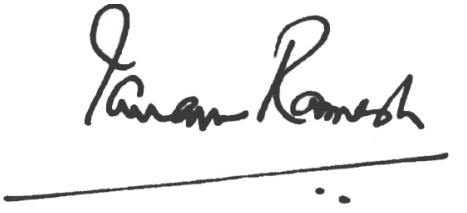
We also believe that we need to look more closely at evidence on an ongoing basis in informing our policies and programmes. We are therefore setting up an independent Concurrent Evaluation Office that will provide us continuous evaluation and feedback to help us improve all our rural programmes.

I am pleased to see the emphasis on data in this Report, especially the extensive compilation of time series, state-wise data from various sources that should be invaluable to researchers as well as citizens at large. We will make this data available on our website so that it is readily accessible by all.

Finally, I thank the IDFC Rural Development Network for taking on this initiative. I also thank the Advisory Council, chaired by Dr Mihir Shah, and comprising some of the foremost rural experts in the country, for providing excellent guidance to the Report.

I hope this Report will become an annual feature that will help us reflect and review; and where necessary, renew and revamp our approach to rural development.

September 2013



Jairam Ramesh
Minister of Rural Development

Preface

The dynamics of political, economic and social change in rural India are complex and have been gaining prominence. In this context, the *India Rural Development Report* aims to understand these diverse forces and explore what can spur growth and development. Several challenges, however, stand out. Commercialisation in agriculture has benefitted many farmers, but it has also left out many small-holder or dryland farmers. The move towards non-farm livelihoods is now a reality, but it is usually on insecure terms. The multiple dimensions of poverty—health, education and basic infrastructure—are increasingly becoming concentrated in certain areas and amongst certain socially excluded communities. Only a fifth of the rural population has access to *all* three basic services—drinking water within their premises, latrines and electricity—and another fifth does not have access to *any* of them. With rising rural consumption and aspirations, we can no longer fail to provide our rural population basic services and opportunities to enhance their livelihoods.

This Report is unique in both its scope and process. The IDFC Foundation has partnered with CESS, IGIDR and IRMA, and involved other scholars and experts to undertake this project. The Report takes a wide and comprehensive sweep of rural issues over several decades, and is based on a rigorous analysis of secondary data, our own field survey, synthesis of literature and debates, government Working Groups, and evaluations of on-ground initiatives by communities and state governments. The Statistical Annex, which accompanies the Report, provides an extensive database that covers the rural sector.

The Report has also benefitted immensely from the guidance and inputs of its Advisory Council, which comprises eminent academics and practitioners. The Report is presented in two parts—the first is a review of the state of rural development while the second is an in-depth study of a particular area of focus for the year. This year's focus is on MGNREGA.

The recurring themes that underpin this Report are sustainability, inclusion and governance. The sustainability of rural livelihoods often hinges on the sustainability of natural resources. Land degradation and depletion of groundwater have directly impacted farm livelihoods. And, government-led forest conservation has disenfranchised forest dwellers and Scheduled Tribes who traditionally protected the forests and whose livelihoods depended on them. Implementation of recently enacted legislation that acknowledges community management and rights of forest dwellers has been hesitant at

best. Ensuring that infrastructure assets, such as water supply projects, are built to last and are properly maintained by the communities themselves is just as vital to livelihoods as to conservation.

MGNREGA, the topic of focus for this year, embodies the themes of sustainability, inclusion and governance in its vision. Through employment generation, the Act aims to create development-oriented assets that provide communities sustainable benefits. And by mandating active gram sabha participation, MGNREGA seeks to empower local governments. While it has reduced poverty, particularly amongst the most disadvantaged, it has also faced several problems, ranging from unfulfilled requests for work, corruption, a lack of planning capacity, and delays in wage payments. Overall, performance has been weak in the poorer states. But where it has succeeded, MGNREGA has demonstrated its true transformative potential to promote inclusive, participatory growth whose benefits can be reaped and sustained over time.

Another underlying question throughout the Report is why, in six decades, have results fallen short in public delivery of services and why have some states done better than others? Lack of accountability is clearly a key reason. Social audits, increased use of performance-based incentives, and conditional cash transfers would significantly improve outcomes. Administrative capacity too must be strengthened and institutional overlap and fragmentation of responsibilities streamlined for effective delivery. The greater democratic participation that was envisioned through panchayats has not always materialised due to entrenched interests and poor capacity. But when it has worked, community participation in planning, implementing and maintaining village infrastructure projects has promoted sustainable and equitable use of the assets created. Yet, fundamental to all change lies the question of the political economy, of the motivation of *sarpanch*s to release the stranglehold of caste and class inequalities and for them and other rural development agencies to see past more myopic short-term gain.

I would like to congratulate those who contributed to the production of this Report, under the aegis of the IDFC Rural Development Network. I also thank Dr Mihir Shah and the other Advisory Council members. It is my sincere hope that this Report provides the inputs to catalyse a discussion on the various challenges and opportunities that lie ahead for the rural sector.

September 2013

Rajiv B. Lall
Executive Chairman
IDFC Limited

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Ritu Anand

Ritu Anand
On behalf of the IDFC Rural Development Network

Abbreviations

AAY	Antyodaya Anna Yojana
ABPS INFRA	ABPS Infrastructure Advisory Private Limited
AEPS	Aadhaar-enabled Payment System
AL	Agricultural Labour
APL	Above Poverty Line
APMC	Agricultural Produce Marketing Committee
APO	Additional Programme Officer
ASHA	Accredited Social Health Activist
ATMA	Agricultural Technology Management Agency
AWC	Anganwadi Centre
AYUSH	Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homoeopathy
BC	Business Correspondent
BCM	Billion Cubic Metres
BDO	Block Development Officer
BIMAROU	Bihar, Madhya Pradesh, Rajasthan, Odisha and Uttar Pradesh
BKU	Bharatiya Kisan Union
BOO	Build-Own-Operate
BOT	Build-Operate-Transfer
BPL	Below Poverty Line
BRGF	Backward Regions Grant Fund
BSNL	Bharat Sanchar Nigam Ltd.
CABE	Central Advisory Board of Education
CBO	Community-based Organisation
CCEs	Crop Cutting Experiments
CDB	Community Development Block
CDM	Clean Development Mechanism
CDP	Community Development Programme

CEA	Central Electricity Authority
CEGC	Central Employment Guarantee Council
CESS	Centre for Economic and Social Studies
CFT	Cluster Facilitation Teams
CGWB	Central Groundwater Board
CHC	Community Health Centre
CLTS	Community-led Total Sanitation
CMSA	Community Managed Sustainable Agriculture
CPIAL	Consumer Price Indices for Agricultural Labour
CPIIW	Consumer Price Indices for Industrial Workers
CPR	Common Property Resource
CRF	Central Road Fund
CRSP	Central Rural Sanitation Programme
CSC	Community Sanitary Complex
CSOs	Civil Society Organisations
CWC	Central Warehousing Corporation
DAC	Department of Agriculture and Cooperation
DBT	Direct Benefits Transfer
DDG	Decentralised Distributed Generation
DDP	Desert Development Programme
DDS	Deccan Development Society
DES	Directorate of Economics and Statistics
DLHS	District Level Household and Facility Survey
DPAP	Drought Prone Area Programme
DPC	District Planning Committee
DPEP	District Primary Education Programme
DPH	Directorates of Public Health
DRDA	District Rural Development Agency
EAS	Employment Assurance Scheme
EEZ	Exclusive Economic Zone
EG	Expert Group
EGA	Employment Guarantee Assistant
FA	Field Assistants
FAO	Food and Agriculture Organization
FCI	Food Corporation of India
FD	Forest Department
FMCG	Fast Moving Consumer Good
FPO	Farmer Producer Organisation
FPS	Fair Price Shop
FRA	Forest Rights Act
FSI	Forest Survey of India
FYP	Five-Year Plan
GAP	Ganga Action Plan
GBY	Grameen Bhandaran Yojana
GCF	Green Climate Fund
GDI	Gender-related Development Index
GDP	Gross Domestic Product
GEM	Gender Empowerment Measure
GER	Gross Enrolment Ratio
GIS	Geographic Information System

GM	Genetically Modified
GMV	Genetically Modified Variety
GP	Gram Panchayat
GPS	Global Positioning System
GRS	Gram Rozgar Sahayak
GS	Gram Sabha
ha	hectares
HBNC	Home-based Neonatal Care
HD	Health Department
HD	Human Development
HDI	Human Development Index
HLEG	High Level Expert Group on Universal Health Coverage
HUDCO	Housing and Urban Development Corporation
HYV	High Yield Variety
IAP	Integrated Action Plan
IAY	Indira Awaas Yojana
ICDS	Integrated Child Development Services
ICRIER	Indian Council for Research on International Economic Relations
ICTs	Information and Communication Technologies
IEC	Information, Education and Communication
IGIDR	Indira Gandhi Institute of Development Research
IGNDPS	Indira Gandhi National Disability Pension Scheme
IGNWPS	Indira Gandhi National Widow Pension Scheme
IHDR	India Human Development Report
IHHL	Individual Household Latrines
IMR	Infant Mortality Rate
IRDP	Integrated Rural Development Programme
IRMA	Institute of Rural Management Anand
ISF	Irrigation Service Fee
ISRO	Indian Space Research Organisation
ITCs	Industrial Training Centres
ITIs	Industrial Technical Institutes
IWDP	Integrated Wasteland Development Programme
IWMP	Integrated Watershed Management Programme
JADS	Jagrut Adivasi Dalit Sangathan
JE	Junior Engineer
JFM	Joint Forest Management
JFMC	Joint Forest Management Committees
JLG	Joint Liability Group
JRY	Jawahar Rojgar Yojana
JSY	Janani Suraksha Yojana
KCC	Kisan Credit Card
km	kilometre
KWA	Kerala Water Authority
KYC	Know Your Customer
LEB	Life Expectancy at Birth
LFPR	Labour Force Participation Rate
lpcd	litres per capita per day
LR	Literacy Rate
LSG	Local Self-government

MDG	Millennium Development Goals
MDM	Mid-day Meal
MF	Microfinance
MFI	Microfinance Institution
MGNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
MGNREGS	Mahatma Gandhi National Rural Employment Guarantee Scheme
mha	million hectares
MHUPA	Ministry of Housing and Urban Poverty Alleviation
MIDS	Madras Institute of Development Studies
MIS	Management Information System
MKSP	Mahila Kisan Sashaktikaran Pariyojana
MLA	Member of Legislative Assembly
MMR	Maternal Mortality Ratio
mmt	million metric tonne
MNAIS	Modified National Agricultural Insurance Scheme
MoEF	Ministry of Environment and Forests
MoRD	Ministry of Rural Development
MP	Member of Parliament
MPCE	Monthly Per Capita Expenditure
MPDO	Mandal Parishad Block Level Administrative Development Officer
MRP	Mixed Reference Period
MSP	Minimum Support Price
MTOE	Million Tons of Oil Equivalent
NABARD	National Bank for Agriculture and Rural Development
NAC	National Advisory Council
NAIS	National Agricultural Insurance Scheme
NAMP	National Aquifer Management Programme
NAPCC	National Action Plan on Climate Change
NAR	Net Attendance Ratio
NAS	National Accounts Statistics
NBA	Nirmal Bharat Abhiyan
NBS	Nutrient-based Subsidy
NBSS&LUP	National Bureau of Soil Survey and Land Use Planning
NCAER	National Council of Applied Economic Research
NCDC	National Cooperative Development Corporation
NCEF	National Clean Energy Fund
NCEUS	National Commission for Enterprises in the Unorganized Sector
NDP	Net Domestic Product
NFA	No Frills Account
NFBS	National Family Benefit Scheme
NFFW	National Food for Work
NFHS	National Family Health Survey
NFSA	National Food Security Act
NGO	Non-governmental Organisation
NGP	Nirmal Gram Puraskar
NHG	Neighbourhood Group
NIMF	National Irrigation Management Fund
NLCP	National Lake Conservation Plan
NMMI	National Mission on Micro Irrigation
NNMB	National Nutrition Monitoring Bureau

NOAPS	National Old Age Pension Scheme
NOFN	National Optic Fibre Network
NPA	Non Performing Asset
NPE	National Policy on Education
NPHSFG	National Policy on Handling and Storage of Food Grains
NP-NSPE	National Programme of Nutritional Support to Primary Education
NPOF	National Project on Organic Farming
NRCP	National River Conservation Plan
NRDWP	National Rural Drinking Water Programme
NREP	National Rural Employment Programme
NRHM	National Rural Health Mission
NRLM	National Rural Livelihoods Mission
NRRDA	National Rural Roads Development Agency
NSAP	National Social Assistance Programme
NSDC	National Skill Development Corporation
NSSO	National Sample Survey Organisation
NTFP	Non-timber Forest Products
NTP	New Telecom Policy
NUEPA	National University of Educational Planning and Administration
NWR	Negotiable Warehouse Receipt
O&M	Operations and Maintenance
OAEs	Own Account Enterprises
OBC	Other Backward Classes
ODF	Open Defecation Free
OG	Operational Guidelines
OL	Other Labour
OOP	Out of Pocket
OSD	Officer on Special Duty
PCI	Per Capita Income
PD	Project Director
PDI	Panchayat Devolution Index
PDO	Panchayat Development Officer
PDS	Public Distribution System
PEG	Private Entrepreneurs Guarantee Scheme
PESA	Panchayats (Extension to Scheduled Areas) Act, 1996
PG	Poverty Gap
PHC	Primary Health Centre
PIM	Participatory Irrigation Management
PIU	Programme Implementation Unit
PMGSY	Pradhan Mantri Gram Sadak Yojana
PO	Programme Officer
PPP	Public-Private Partnership
PRI	Panchayati Raj Institution
PSTN	Public Switched Telephone Network
PTR	Pupil-Teacher Ratio
R&D	Research and Development
R&R	Rehabilitation and Resettlement
RBC	Rural Building Centre
RBI	Reserve Bank of India
RD	Rural Department

RGGVY	Rajiv Gandhi Gram Vidyutikaran Yojana
RGPSA	Rajiv Gandhi Panchayat Sashaktikaran Abhiyan
RIDF	Rural Infrastructure Development Fund
RLEGP	Rural Landless Employment Guarantee Programme
RMSA	Rashtriya Madhyamik Shiksha Abhiyan
RNFE	Rural Non-farm Employment
RRB	Regional Rural Bank
RRR	Repair, Renovation and Restoration
RSBY	Rashtriya Swasthya Bima Yojana
RTE	Right to Education
RVE	Remote Village Electrification
SARC	Second Administrative Reforms Commission
SBI	State Bank of India
SC	Scheduled Caste
SDP	State Domestic Product
SEARCH	Society for Education, Action and Research in Community Health
SECC	Socio-economic and Caste Census
SEZ	Special Economic Zone
SFAC	Small Farmers' Agri-Business Consortium
SGSY	Swarnajayanti Gram Swarozgar Yojana
SHG	Self-help Group
SIFPG	Self-Initiated Forest Protection Group
SLWM	Solid and Liquid Waste Management
SMC	School Management Committee
SMF	Small and Marginal Farmers
SMT	Social Mobilisation Team
SoR	Schedule of Rates
SRI	System of Rice Intensification
SRIJAN	Self-Reliant Initiatives through Joint Action
SRLM	State Rural Livelihoods Mission
SRRDA	State Rural Road Development Agency
SS	Shetkari Sanghatana
SSA	Sarva Shiksha Abhiyan
SSAAT	Society for Social Audit, Accountability and Transparency
SSC	Sector Skill Council
ST	Scheduled Tribe
STP	Sewage Treatment Plant
SWC	State Warehousing Corporation
TA	Technical Assistant
TERI	The Energy and Resources Institute
TF	Task Force
TFC	Technology Facilitation Centre
TISS	Tata Institute of Social Sciences
TNMSC	Tamil Nadu Medical Services Corporation
TPDS	Targeted Public Distribution System
TRAI	Telecom Regulatory Authority of India
TSC	Total Sanitation Campaign
UEE	Universal Elementary Education
UHC	Universal Health Coverage
UN	United Nations

URP	Uniform Reference Period
USOF	Universal Service Obligation Fund
VC	Village Community
VEC	Village Education Committee
VHC	Village Health Committee
VHSC	Village Health and Sanitation Committee
VSA	Village Social Auditor
VWSC	Village Water and Sanitation Committee
WBCIS	Weather-based Crop Insurance Scheme
WDRA	Warehousing Development and Regulatory Authority
WSA	Wage Seekers Association
WUA	Water Users Association
YAP	Yamuna Action Plan
ZP	Zilla Parishad

Glossary

Aajeevika	A programme of the Government of India that aims to improve the rural poor's existing livelihood options, build marketable skills, and nurture the self-employed and entrepreneurs for micro enterprises
Adivasi	Tribal
Ahar-pyne	Term used for local rainwater harvesting system in Bihar
Anganwadi	Basic child-care and mother-care centre
Antyodaya Anna Yojana	A scheme of the Government of India to provide foodgrains to the poorest families at highly subsidised rates
Arhtiya	Middleman
Azolla	A type of aquatic fern
Basti	A settlement inhabited by poor people
Bazaar	Market
Bharat Nirman	A time-bound plan for developing rural infrastructure by the Government of India in partnership with the state governments and Panchayati Raj institutions
Bharatiya Kisan Union	Farmers' organisation
Bori Bandh	Small dam constructed using sand bags
Chaur	Term used for waterlogged lowlands in Bihar
Chullah	Stove
Dalit	Term used traditionally for those belonging to lower castes
Dhan Laxmi and Ladli	Schemes aimed at enhancing the social status of girl child
Dhara	Term used for local rainwater harvesting system in the Himalayan region
Erie	Term used for local rainwater harvesting system in Tamil Nadu
Gola/Kodambbae	Traditional food storage structure
Gram Panchayat	Village Council (local self-government at village level)
Gram Rozgar Sahayak/Sevak	Employment Guarantee Assistant

Gram Sabha	Village Assembly (consisting of all the adult electorate)
Grameen Bhandaran Yojana	A scheme of the Government of India to provide storage facilities for agricultural commodities for the farmers
Haat	Weekly market
Happa	Term used for a small tank constructed on private farming plots for rainwater harvesting in parts of West Bengal affected by continuous natural resource degradation
Harren	Traditional irrigation system prevalent in semi-arid areas of Rajasthan
Himayat	A placement-linked skill-development initiative for training and placement of youth of Jammu and Kashmir
Indira Awaas Yojana	A scheme of the Government of India to provide housing for the rural poor
Jajman	A landed higher caste patron
Jajmani	A traditional system whereby the landless service classes provide services to the landowning higher castes
Jalswarajya	A water supply programme of the Government of Maharashtra
Jamabandhi	An administrative mechanism introduced by the Government of Karnataka to improve the functioning of Gram Panchayats
Jan Sunwai	Public hearing
Janani Suraksha Yojana	A safe motherhood intervention of the Government of India under NRHM
Jat	A community in north India
Jati	Class
Jhum	Term used for shifting cultivation
Jowar/Bajra/Ragi	Forms of millets (coarse grains)
Jyotigram	A scheme of the Government of Gujarat to ensure availability of 24-hour power supply to rural areas
Kachcha	Temporary
Kameen	A person belonging to the landless service class
Kapildhara	A sub-scheme of MGNREGS to provide irrigation facility for SC/ ST/ BPL/ land reforms/IAY beneficiaries
Karnataka Rajya Ryota Sangha	Karnataka State Farmers' Association
Kudumbashree	A women-empowering programme launched by the Government of Kerala for wiping out poverty from the state through community action under the leadership of local self-governments
Mahila Sabha	Women's Assembly (consisting of all the adult women electorate)
Mandi	Market
Naka	Spot market
Nirmal Bharat Abhiyan	A programme of the Government of India to provide sanitation facilities in rural areas
Nirmal Gram Puraskar	An award-based incentive scheme of the Government of India for completely sanitised and open-defecation free Gram Panchayats, Blocks, Districts and States
Nistar	Community rights to collect, use and dispose of non-timber forest products
Nyaya Mitra	A personnel with a minimum qualification of a bachelors degree in law appointed to assist the Groundwater Grievance Redressal Officer
Panchayat Samiti/Taluk Panchayat/Mandal Parishad/Mandal Panchayat	Local self-government at the block level
Pani Panchayat	Form of water-user association responsible for equitable distribution of water
Pradhan Mantri Gram Sadak Yojana	A scheme of the Government of India to provide all-weather road connectivity in rural areas

Pradhanpati	Term used for the husband of the female elected head of Gram Panchayat (Village Council)
Pucca	Permanent
Rajiv Gandhi Gram Vidyutikaran Yojana	A rural electrification scheme of the Government of India
Rajiv Gandhi Panchayat Sashaktikaran Abhiyan	A scheme of the Government of India to strengthen Panchayati Raj system
Rashtriya Madhyamik Shiksha Abhiyan	A scheme of the Government of India to enhance access to secondary education and to improve its quality
Rashtriya Swasthya Bima Yojana	A scheme of the Government of India to insure poor families against hospitalisation costs
Rogi Kalyan Samiti	Patient welfare committee responsible for the management of public hospitals through community participation
Sarpanch/Mukhiya/Pradhan	Elected head of Gram Panchayat (Village Council)
Sarva Shiksha Abhiyan	A programme of the Government of India to universalise elementary education
Shetkari Sanghatana	Farmers' organisation
Sinchai Samiti	Irrigation committee
Swajaldhara	A rural water supply scheme of the Government of India
Swarnajayanti Gram Swarozgar Yojana	A scheme launched by the Government of India to provide sustainable income to the rural poor
Swavalamban	A central government pension scheme for the unorganised sector workers
Talab	Term used for local rainwater harvesting system in the Bundelkhand region
Tanka	Term used for local rainwater harvesting system in Rajasthan
Zamindar	Traditional landlord
Zamindari	The system of collecting taxes from peasants by traditional landlords
Zilla Parishad/Zilla Panchayat	District Council (local self-government at the district level)

PART 1

Image credit: Karan Gokani, 2013

CHAPTER 1

Rural Dynamics

Rural India is undergoing a sweeping transformation. The narratives of this transformation range from exciting stories of 'rural resurgence' and rapidly expanding rural consumption to acute agrarian distress and large numbers of farmers committing suicide. We hear that rural Indians are fighting corporate takeover of their land and that rural militancy poses the 'greatest threat to internal security'. Contemporary rural India actually is vastly complex, subject to several new forces of change, and does not fit neatly into any of these characterisations.

This chapter presents some of the most striking and critical changes affecting rural India through a series of empirically grounded, yet broad hypotheses and stories. While other chapters provide more granularity to these broad stories and shed light on the huge variations among regions and even within states, this chapter aims to present the broader trends that define the Indian rural landscape. In so doing, it and the rest of the report raise important questions and issues that stakeholders should deliberate, research and act upon as a new rural India emerges.

Contemporary rural India is vastly complex, with too many new forces of change to fit neatly into any single characterisation.

1.1 Increased Blurring of Rural-Urban Boundaries

Increasing Rural-Urban Interconnectedness

India, in effect, defines 'rural' as 'not urban'—urban areas are (a) Statutory towns, viz. those administratively notified, such as municipalities and cantonments; and (b) Census towns, viz. those with: (i) a minimum population of 5,000; (ii) at least 75 per cent of male workers engaged in non-agricultural pursuits; and (iii) a population density of at least 400 per sq. km (1,000 per sq. mile). Areas that do not meet these criteria are rural.

Sixty-nine per cent of India—833 million people—live in rural areas. The growth rate of this rural population has declined substantially to just 1.2 per cent during 2001–11 from 1.7 per cent per year during 1991–2001. Urban population growth, in contrast, was about 2.8 per cent per year during both periods (Census 1991; 2001; 2011). The markedly lower rural growth rate is largely due to a faster decline in rural fertility rates, rural-to-

urban migration and the reclassification of villages as urban units. At the same time, the proportion of rural persons under 14 is declining while that of people of working age and, to a lesser extent, of the ageing, is growing.

But rural India is far from homogeneous. Villages vary widely in size: while almost 2,20,000 villages, including some remote and isolated hamlets, had fewer than 500 people, over 54 per cent of the rural population lived in 18,768 villages of over 2,000 people (Census 2001). These larger villages are rapidly becoming classified as urban. Some of them have emerged as vibrant growth poles organically linked to urban centres and host to a range of occupations. Villages thus must be seen in the context of their changing and varied relationships with urban India.

Urban-rural relationships are multi-dimensional and evolving. The farm sector has long provided food for the urban population but the composition of agricultural produce has been changing in response to changing urban consumption patterns. Agricultural surplus is sold through commodity markets which, while always central to India's rural economy, have undergone-rapid transformation in recent years. New commodities, the modernisation of markets through commodity exchanges, future trading and the emergence of organised retail strongly linked to farming, have brought the rural and urban closer.

Linkage of Urban-Rural Labour Markets

Another, arguably more important, linkage is that of labour markets, facilitated in large part by expanded transport and communication networks—*pucca* roads and mobile phones. This illustrates how infrastructure can transform rural lives. Urban areas and growing small towns rely heavily on rural labourers who either commute daily or migrate for short periods. Agricultural wages have risen as rural workers move to better paying non-farm jobs, creating rural labour scarcity. Growing rural-urban integration is gradually changing villagers' horizons and gender roles in rural areas in both positive and negative ways. As men migrate to urban areas for work, for instance, women gain more independence and freedom in running their homes, farms and businesses. At the same time, as in Tripura and elsewhere, practices like dowry are spreading from urban to tribal communities that had not followed them earlier.

Urban areas and growing small towns rely heavily on rural labourers who either commute daily or migrate for short periods of time.

Growing Rural Purchasing Power and Rising Aspirations

Greater exposure raises rural aspirations for a better quality of life and arouses appetite for consumer goods. Recent data show that rural monthly per capita consumption expenditure (MPCE) grew at a rapid 5.5 per cent a year between 2009–10 and 2011–12 (NSSO 2012). While average rural MPCE remains about half of urban, the growth in rural income and expenditure is reflected in a sharp drop in rural poverty to less than 26 per cent from 34 per cent in just two years. With its growing purchasing power, the rural market is no longer a residual retail market. Products are being designed to cater specifically to rural demand. Rural India is making its presence felt.

Rural people are also increasingly looking at education as a means of social mobility, as a way out from the villages, and as a means to improving their livelihoods. School enrolment has gone up with near universal enrolment at the primary level and school attendance rates are rising. While rural literacy today is only 69 per cent compared to 85 per cent in urban areas, literacy in rural India increased by 14 percentage points between 1991 and 2001 and 10 percentage points between 2001 and 2011—double the increase for urban India in both periods. Often, rural people spend way above what they can actually afford, including for private schooling, to make sure their children have much better prospects than they had. But critically, the generally poor quality of education offered remains a serious concern. What the future holds for young unskilled workers in rural India remains on open question.

1.2 Smallholder Farming has become the Bedrock of Rural Life

Fragmentation of Landholdings

Agriculture remains at the heart of rural livelihoods even though the agrarian economy has changed in several fundamental ways. The biggest shock to the traditional village system came with the abolition of the *zamindari* system and the introduction of land reforms. Ironically, what land reforms did haltingly from the 1950s through the 1970s because of political pressures, demography and population increase accomplished somewhat comprehensively. Inter-generational transfers and sub-

division of holdings among children primarily drove landholding fragmentation. By 2010–11, roughly 67 per cent of landholdings were marginal (less than 1 hectare or 2.5 acres), up from 51 per cent in 1970–71. Including another 18 per cent of land held by small farmers (1 to 2 hectares) brings the total to 85 per cent of all land being held by small and marginal farmers, or 44 per cent of total operated area (MoA 2012).

As part of this process, the reach of large landowners has also come down. Even as late as 1970–71, certainly not the heydays of zamindars, big landowners controlled 31 per cent of total operated area. By 2010–11 this declined to less than 11 per cent. And what is called a large farmer in India—anybody with more than 10 hectares—is generous by international standards.

Need for New Collective Farming Arrangements

Small farms are more efficient, especially in cultivating labour-intensive crops or tending livestock, but landholdings are too small to generate sufficient household income.

The predominance of smallholder farming has several implications. Smallholder farms tend to rely on family labour and do not need or cannot afford outside labour, except perhaps during the peak harvesting season. In fact, larger families may choose to lease-in land to better employ available family members or to work on others' farms. Small farms have proven to be more efficient than large ones in using land and resources, and especially in cultivating labour-intensive crops or tending livestock, but the holdings are often too small to generate sufficient income to support a family. Crucially, small farmers suffer serious disadvantages in marketing and distribution. Their smaller outputs, fragmented landholdings and often distant location from major markets deprive small farmers of access to modern storage facilities for perishable items and distribution networks.

Smallholder farmers thus cannot survive if they stand alone. To ensure their viability, new arrangements—such as collectives or producer organisations—must evolve and be encouraged. State and private sector support in building supply chains and infrastructure that cater to small farmers is also critical.

Given the predominance of smallholder farmers, new arrangements—such as collectives or producer organisations—must evolve and be encouraged to ensure their viability.

1.3 Increasing Agrarian Commercialisation and Risk

Trend Towards Commercial Farming

Another important agrarian trend has been a shift away from subsistence farming towards commercial and high value-added crops, including horticulture. The area under cultivation of vegetables, fruits, spices and flowers has grown significantly over the past decades as has that of non-traditional crops like soybean. This move has brought farmers greater prosperity. The promised higher profitability of certain genetically modified (GM) cash crops such as cotton has also attracted farmers, though mainly larger ones.

Growing Importance of Livestock

Many farmers have also turned to livestock as an additional source of household income and a buffer against crop failure. All farm sizes and, in fact, overwhelmingly smaller farmers, are diversifying their output through livestock, especially dairy and poultry. Numerous studies in developing countries have shown that livestock serves as an important road out of poverty for smaller farmers (see for instance Birthal et al. 2013).

Many farmers have turned to livestock as an additional source of household income and a buffer against crop failure.

Risks of Commercial Farming

But commercial farming and commodity markets carry risks. While cash crops like cotton, sugarcane and soybean were always grown for markets, now even staples like wheat, maize and rice are traded. As these markets expand to reach previously untouched areas, a significant portion of the rural population is exposed to highly volatile commodity price movements, driven by global and local factors. Today more than 50 per cent of India's crop output (rice, ragi and jowar) is marketed, including as much as 45 per cent of even small farm produce (GoI 2002).

Commercial farming, started under the green revolution, relies heavily on commercial inputs such as purchased seeds, chemicals, fertilisers and tube wells, which increase cultivation costs. Being water-intensive, commercial farming is particularly risky in rainfed and dryland areas. Borrowing funds for inputs is risky in the event of crop failure, particularly for small and marginal

farmers who lack investible surplus and access to institutional credit, and must rely instead on extortionary moneylenders, sometimes because they lack collateral or clear land title. These farmers not only pay higher interest but also face coercive loan recovery means.

Indebtedness and lenders confiscating land were the main causes of the estimated 1,98,000 farmer suicides between 2001 and 2012, almost two-thirds of which were in Maharashtra, Andhra Pradesh, Karnataka, Madhya Pradesh and Chhattisgarh (NCRB n.d.). These issues persist. As borrowing increases, whether to cover agricultural needs or marriage or medical expenses, this remains a critical issue to address, along with insurance and social security.

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Need for New Farm Models

Because as much as 55 to 65 per cent of India's sown area is either dryland or rainfed, new models of commercial farming better suited to such areas must be developed. Cultivation of millet (jowar, bajra, ragi) and other dryland crops must be encouraged to ensure food, nutritional, and water security, community self-reliance, and bio-diverse and ecologically sound farming. This becomes even more important with the threat of climate change. One way of encouraging millet production is through greater public procurement of millet—which is currently extremely limited—and distribution through fair price shops. A successful and growing shift towards sustainable, chemical-free, natural farming that significantly decreases cultivation costs while sustaining or raising yields, also holds promise.

Because as much as 55–65 per cent of India's sown area is either dryland or rainfed, new models of commercial farming better suited to such areas must be developed.

1.4 Rise in Rural Non-farm Employment: Distress or Opportunity?

Rise in Rural Non-farm Employment

But rural livelihoods are not only agrarian. The number of households that depend on rural non-farm employment (RNFE) as their primary source of income has increased from nearly 32 per cent in 1993–94 to over 42 per cent in 2009–10 (NSSO 2011). Almost 40 per cent of rural labour households own land (MoLE 2011)—rural labourers, thus, are not just the landless. A person who farms his own land also works as a wage labourer on someone else's land, rears cattle, and migrates in search of work after the agricultural season ends. Such 'overlapping livelihoods' have become a marked feature of rural life as smallholder farmers are forced to combine different occupations in a desperate bid to survive.

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Shrinking farm sizes, increasing cultivation costs and declining returns have no doubt been factors in the growth of non-farm employment. Surveys show that cultivators are losing interest in agriculture because it is not profitable or too risky (NSSO 2005). The Census 2011 reports fewer cultivators than a decade ago in almost all states (with Maharashtra, Rajasthan, Assam, Himachal Pradesh and some of the north-eastern states being exceptions). The family farm is losing its esteem as a precious gift to be passed on in perpetuity. Growing aspirations for social and cultural mobility have also played a role. With the prolonged agrarian crisis starting from the mid-1990s, villagers believe that one of the most reliable ways of escaping their rural confines is to seek alternative work in towns. That is why villagers who migrate to cities are overwhelmingly from the poorer, uneducated and unskilled groups. This is simply because most poor farmers see little hope in their traditional occupations.

Rural Non-farm Employment: Opportunity or Distress?

Rural non-farm employment is not necessarily a sign of distress. Often RNFE increases in areas of high agricultural productivity. Highlighting the long-term relationship between high productivity and high RNFE, Chand (1996) argues that higher incomes increase demand for products and services, which lead to increased non-farm employment. RNFE also has other 'pull' factors. Urban growth, for example, increases the demand for labour which rural workers meet, either by short-term migration or daily commuting.

A marked feature of rising RNFE is that it is dominated by casual labour, which offers a better wage than agricultural labour. Former agricultural labourers, many of whom are from Scheduled Castes

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(SCs), have switched to non-farm casual work in large numbers. RNFE thus has given them social mobility that they never had before due to their lack of social and financial capital to start a business or get a regular job in the government or private sector. But casual labour unfortunately offers no job security or health, pension and other employment benefits.

1.5 The Declining Role of the Agrarian Economy: Social and Political Consequences

Are Caste and Gender Relations Showing Signs of Change?

As long as village relationships pivoted around agriculture, caste hierarchies played a significant role in rural India. The landed class in a village was at the top and its whims determined the status of the other *jati*s in the hierarchy (Gupta 2010). It was typical for the rich, landed farmers to have poor Dalits and the landless work as 'attached' labour year-round, tied to them by a cycle of indebtedness. As the size of landholdings shrank, it became the era of the family farm and that too, with many household hands available for work. As a result, if outside labour became necessary at all, it was only for short periods, typically during harvesting season. At the same time, increasing alternate non-farm employment opportunities have given agricultural labour an exit. An important consequence of these changes has been a gradual breakdown of the traditional hierarchies of cultivators and indebted labour.

This change in social relations, for example, has been reported in green revolution villages in Haryana (Jodhka 2012). While the upper and locally dominant castes (which include the upper layer of the other backward castes) continue to control the agrarian economy, relations between them and the labour class have changed considerably as the incidence of attached labour has significantly declined. Even if they are hired, attached labourers typically are from outside the village and the relationship is more formal. With the proliferation of family farms, and rising agricultural wages, the demand for labour is also declining. And Dalits are increasingly rejecting the subordination of agricultural labour jobs in favour of government jobs, entrepreneurship opportunities or even casual labour. All these represent a slow breakdown of the correspondence between castes and occupations, although more studies from other parts of India would be required to confirm these results.

There is a slow breakdown of caste hierarchies and associated occupations.

The declining importance of agriculture is lowering the power and prestige associated with land ownership in rural areas. Land ownership still counts in the rural power structure but less so as newer sources of power emerge, including access to education, urban jobs and links with the urban elite. As interest in agriculture as a source of livelihood declines, particularly amongst the younger generation, the rural elite move to urban areas with the surplus earned from farming and often lease out their land in parcels to smaller cultivators. This may also mean that they switch to non-farm occupations, including the service sector. Many wealthier farmers choose to have one son working in a city, for example, while another works on the farm.

The declining importance of agriculture is lowering the power and prestige associated with land ownership as newer sources of power emerge, including access to education, urban jobs and links with the urban elite.

Relations between women and men also are changing. As more men move towards non-farm jobs outside the village there has been a 'feminisation of agriculture'. While agriculture still has fewer women than men, 79 per cent of the rural female workforce worked in agriculture in 2009–10 compared to 63 per cent of the male workforce (NSSO 2011). Also, the share of men working in agriculture has declined much more compared to women since the 1980s, as men leave farms in the care of their wives and parents and migrate in large numbers in search of jobs, even for short periods. But while women remain highly dependent on agriculture, they own a disproportionately small percentage of land.

With men leaving farms increasingly in charge of their wives, the social status of women is gradually changing in some areas. They have greater decision-making power, even if decisions are coordinated with their husbands by mobile phone. In conservative villages in Bihar, for instance, studies show that while their workload has increased as a result of male migration, women now assume more visible roles and travel outside the village,

for example, to take children to a doctor or to go to the market (Rodgers and Rodgers 2011). They assume more responsibility for finances and even do wage work to supplement their income, which they would not have done earlier, partly incentivised by the narrowing wage gap between male and female labour.

Another development, the growth of self-help groups (SHGs), is also contributing to the changing role of women. SHGs, primarily composed of women, empower them, potentially broadening their horizons and expanding their capabilities (Shah et al. 2009), including inculcating saving and banking habits. SHGs have been growing in numbers and had nearly 57 million members by 2012.

Shifts in the Character of Rural Caste Politics

Since the late 1970s, once the landed class began declining, people who had earlier been subjugated found it easier to raise their voices against past injustices, often caste oppression. Castes with similar interests under the village power structure banded together. This began with mobilisation of SCs and then spread to other backward classes (OBCs). Communities that did not eat or smoke the *hookah* together thus frequently united as a political interest group. The era of vote banks for the old landed class disappeared as the landed class no longer had the power to determine village economy, and the political power of SCs and OBCs correspondingly grew.

Once the landed class began declining, people who had earlier been subjugated found it easier to raise their voices against past injustices, often caste oppression.

This brought about a major shift in rural politics. Earlier, agrarian unrest meant a face-off between landlords and landless. But since the late 1970s, farmer movements or agitations have been increasingly directed at forces outside village boundaries, especially the State and, more recently, corporate interests that impinge on their survival (Lindberg 1994; Chatterjee 2008a). Now, small, medium and large farmers demand lower input costs, higher minimum prices for their produce, and debt relief from the state. Their central argument is the existence of an urban bias encapsulated in the slogan 'Bharat versus India'. Some had strong charismatic leaders, such as the Shetkari Sanghatana (SS) in Maharashtra led by Sharad Joshi, the Bharatiya Kisan Union (BKU) in Uttar Pradesh led by Mahendra Singh Tikait, and the Karnataka State Farmers' Association or Karnataka Rajya Ryota Sangha (KRRS) led by Nanjundaswamy.

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They used various methods including demonstrations, blocking off the food transport system, denying officials access to villages, refusing to pay outstanding bills and withdrawing crops from local markets to raise prices (Brass 1994). While they brought together peasants from different castes, most commentators agree that these movements were dominated by rich and middle-income farmers and paid little attention to the conditions and needs of the rural labourers (Brass 1994; Assadi 2002). Certain interest groups also have specific demands—for example, landowning Jats demand power subsidies, while various caste groups demand more job reservations. All these changes in the character of rural politics and mobilisation are important aspects of the rural transformation of India.

1.6 Exploitation of Natural Resources

Another dimension to the shifting social order and rising tensions is the natural resource context in rural areas, which is closely linked to economic activities. Much of the unrest in rural areas is due to lack of access to basic resources to sustain livelihoods.

Competing Demands for Natural Resources

Natural resources are increasingly the subject of conflict. Land, the primary rural asset and livelihood resource, is now subject to competing demands from agriculture, industry and urban development. Land-use decisions are not driven solely by market processes. States often acquire land for 'public purposes', which is broadly defined and has included a range of activities from mining, dams and highways, to creating special economic zones (SEZs), even industry. In the process, many have been displaced and lost their livelihoods without adequate compensation and resettlement.[1]

[1]In fact, an unofficial estimate indicates that, in the period from Independence up to 2004, of the people displaced, 40 per cent were tribals, 20 per cent SCs and another 20 per cent OBCs. And, only one-third of displaced persons of planned development have been resettled (Fernandes 2008).

Forests have been another issue of keen conflict in tribal areas. The mineral resources of the country happen to be mostly located in areas which are forested and the exploitation of these resources calls for disruption of the livelihoods and displacement of the forest-dwelling tribal communities. So, the corporate quest for minerals, timber and land has led to land alienation and widespread discontent, and pitted rural populations in direct conflict with industry. Another dimension of tribal alienation has been as a result of forest reservation by the government, which curtailed the customary rights of the forest-dwelling communities for grazing, shifting cultivation and so on, thereby affecting their livelihoods.

Water has also been a source of contestation, with a spate of serious struggles over the construction of large dams which displace many people, access to water by different groups and the sharing of river waters among states. Growing urban and industrial water demands are often met by sourcing water from rural areas, depriving rural communities of irrigation water and sometimes even basic drinking water.

As a result, rural populations in some places have come together to protest being displaced and to demand their entitlements. The movement against dams on the Narmada, for instance, epitomises the growing opposition to large dams and mega irrigation projects, which continues even though some dams have already been constructed. In addition, recent farmer protests in Nandigram against the West Bengal government's forced acquisition of their land and protests by Mahuva farmers against corporate takeover of village wetland in Gujarat are examples of peasants pitted against corporations and the State and the success of the locals in these instances may portend a slow shift in the power balance. Similar struggles in many parts of rural India over forest rights are now redefining rural politics, and the 'left-wing extremism' is partly a manifestation of this tension.

These various conflicts have brought issues of resettlement of, and compensation for, people affected by development projects to the fore. Their challenges have slowly been recognised and their rights have been provided some legislative support. Recent legislation—such as the Panchayats (Extension to Scheduled Areas) Act (PESA) and Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act (FRA)—has granted communities rights to live in forests and collect and use minor forest produce, and prevent alienation of land in Scheduled Areas. But the actual implementation of these Acts has been hesitant and incomplete. Yet, the success of tribal protests against bauxite mining in the Niyamagiri hills in Odisha, with all twelve gram sabhas (GSs) rejecting the mining proposal in August–September 2013 under PESA, is a sign of their empowerment.

While recent legislations—such as the Panchayats (Extension to Scheduled Areas) Act and Forest Rights Act (FRA)—have granted communities rights over forests, actual implementation of these Acts has been hesitant and incomplete.

The new Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act is also trying to redress the power imbalance by providing the displaced with better compensation and, in addition, resettlement and reallowance in the form of land-for-land, housing, and employment or annuity payments. The Act also provides for those who may not own the acquired land but depend on it for their livelihoods.

Overexploitation of Resources

Rural agrarian livelihoods depend heavily on natural resources, but a vicious cycle of over-exploitation and degradation of resources has set in which negatively impacts livelihoods and health.

The severe degradation of land is a key concern, with 57 per cent of the total land area degraded on account of environmental and man-made reasons, such as soil erosion due to water run-off and loss of vegetative cover, over-use of chemicals in agriculture, and more intensive cultivation.

The pressure on natural resources has placed a great degree of stress on the countryside, with deep economic consequences and a high degree of social and political strife.

India is also facing an impending water crisis which threatens the availability of safe drinking water. While large surface irrigation projects continue to face resistance, the mode of irrigation has undergone a significant shift in the last 40 years—groundwater has replaced surface water as the major source of irrigation, now accounting for over 60 per cent of gross irrigated area. From a modest number of around 2,00,000 in 1960, the number of pump sets to extract groundwater exploded to over 20 million in 2009. This dramatic rise has been driven by green revolution policies and subsidies on irrigation pumpsets and electricity, as well as the greater control that groundwater gives farmers over timing and quantity of water. High levels of extraction have amounted to virtual groundwater mining

in many places, and the Central Groundwater Board has designated one-third of districts in the country as 'unsafe' (districts in which gross annual groundwater withdrawn exceeds 70 per cent of net annual recharge), up from 9 per cent in 1995 (Vijayshankar et al. 2011).

Groundwater over-exploitation also has led to intrusion of arsenic and fluoride, with severe health and environmental consequences. Indiscriminate contamination of our water sources due to untreated wastewater from industry, agriculture and households is putting strains on the country's already limited usable water resources. More than 70 per cent of India's surface water is unsafe for drinking and farming (MoEF 2009).

In the future, rural development strategies clearly cannot ignore the issue of natural resources and must address both their conservation and sharing. An appropriate balance must be struck between enhancing livelihoods and protecting natural resources.

1.7 Contours of Regional Inequality and Social Deprivation

Poverty is multidimensional and encompasses, apart from income poverty, deprivation of rights and freedoms including education, health, safety and access to basic amenities that support and foster human capability and empower people. In terms of consumption, poverty has declined rapidly over the past decade and, in particular, in the last couple of years. An important factor has been agricultural productivity and growth since the mid-2000s. Urban growth has also contributed significantly to reducing income poverty, not only in urban areas but also in nearby rural areas. Multidimensional poverty measured by the Multidimensional Poverty Index or MPI (which looks at multiple deprivations households face in education, health and standard of living) has also reduced, though not sufficiently rapidly.[2] But, the aggregate trends should not mask the ever-widening regional disparities.

Widening Regional Disparities

There has been an impressive decline in rural income poverty at the aggregate level, from 42 per cent in 2004–05 to 26 per cent in 2011–12. But a marked feature of the trend in poverty is its growing regional concentration. In 1993–94, Uttar Pradesh, Bihar, Assam, Jharkhand, Odisha, Chhattisgarh and Madhya Pradesh accounted for 50 per cent of the rural poor, and this share increased to 65 per cent by 2011–12.

A marked feature of the reduction in poverty is its growing regional concentration.

Even beyond income, these seven poor states along with Rajasthan generally fare worst on social indicators such as health, nutrition and education and have the poorest penetration of basic infrastructure such as drinking water, sanitation and electricity. And, in fact, between 1999 and 2006 poor states such as Bihar, Madhya Pradesh, Rajasthan and Uttar Pradesh, made the smallest improvements in multidimensional poverty measured using the MPI (Alkire and Seth 2013). Another indicator is the concentrated lack of basic services in large areas of these states. If all the districts in the country are grouped into quintiles according to their households' access to basic services (drinking water, sanitation and electricity) in rural areas, then almost all of the bottom two quintile districts are in Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Odisha, Rajasthan and Uttar Pradesh.

There are regions of deprivation even within more developed states. For instance, Andhra Pradesh, Karnataka and Maharashtra too have districts in the lowest quartile in the country in terms of both poverty and social indicators such as health, nutrition and education. Many of these regions are located in drought-prone rainfed areas.

Inter-district disparities in per capita income have increased in most states and within districts the blocks with higher shares of Scheduled Tribes often have much higher poverty.

A major concern is that disparities are growing—inter-state, intra-state, and even intra-district. Poor states have recorded high economic growth rates recently, but per capita income disparities between states have continued to rise. Over time, the inter-district disparities in per capita income have also increased in most states, including the poor states of the northern and central belt which have some pockets witnessing fast growth (Planning Commission 2013). And even within districts there are wide variations in poverty rates, with

[2]Alkire and Seth (2013) find the reduction in poverty measured by the Multidimensional Poverty Index between 1999 and 2006 was greater than that of income poverty. But even India's best-performing states, Kerala and Andhra Pradesh, progressed just over half as fast as Nepal or Bangladesh.

blocks with higher shares of STs often having a much higher incidence of poverty.

Caste and Gender Exclusion Remain a Stark Reality

Caste and gender inequalities, rooted in traditions, continue to perpetuate social exclusion. Dalits or SCs and adivasis or STs comprise close to 30 per cent of India's rural population (18.5 per cent are SCs and 11.3 per cent are STs (Census 2011)). These groups face high deprivation and oppression, although their challenges are somewhat different. Being integrated into the fabric of rural life, at the lowest rung, SCs face almost daily discrimination by upper castes, while STs suffer due to their often remote locations, although this offers them some degree of autonomy.

Of all social groups, STs have the highest level of poverty at close to 50 per cent followed by SCs at 42 per cent. Despite progressive legislation and political mobilisation, they continue to face severe discrimination which not only limits their participation in the economic, social and political spheres but also their access to education, healthcare and other social goods.

STs are by far the most deprived of most public services due to which they have the worst education and health outcomes. SCs are also often deprived in essential services and are still discriminated against in employment and wages, in setting up their own businesses and in access to village resources such as common land or fair price shops. Upper castes within the village or the administration often violate the civil rights of these marginalised groups by denying them access to justice and even physically assault them where they attempt to assert their rights (Planning Commission 2008). STs suffer political exclusion, often due to a lack of finances to contest elections or, like SCs, are rendered 'token' when they are appointed to reserved panchayat seats.

The subjugation of and discrimination against women is another pervasive aspect of the social inequities. Though numerous legislations ensure formal equality with men, women continue to be discriminated in terms of property rights, wages and political representation and even in access to basic services such as e ducation, healthcare and nutrition. In particular, SC and ST women routinely face harassment, sexual exploitation and violence without provocation or merely for using public lands (Planning Commission 2008). Lower caste women often find even the process of filing a complaint at a police station to be fraught with danger. Sadly, socially degrading practices like manual scavenging, the *devadasi* system, and trafficking of women and children continue (Planning Commission 2008).

Caste and gender inequalities, rooted in traditions, continue to perpetuate social exclusion.

1.8 The Gradual but Irrevocable Movement Towards Political Decentralisation

The State is seen as both benefactor and 'adversary' in rural lives. The central government, on the one hand, has recently focused on improving the assets, capabilities and livelihood security of the rural population, with increased public spending in rural areas (estimated at around Rs 1 lakh crores in 2012–13) through centrally-sponsored programmes.[3] The central government has increasingly adopted a rights-based approach, guaranteeing five critical rights to the poor over the past decade—right to information, to work, to education, forest rights to tribals and other traditional forest dwellers, and more recently the right to food. But there have been numerous implementation challenges that have prevented the translation of these rights into improving outcomes and empowering populations on the ground.

In many instances, the state's track record of providing adequate compensation and rehabilitation to those displaced by land acquisition and in protecting the rights of vulnerable forest dwellers has not been encouraging, notwithstanding legislation (PESA and FRA) to that effect. The failure to adequately address and alleviate landlessness and discrimination against Dalits and tribals has led to the emergence of insurgent groups such as the Naxals, fighting for the rights of these marginalised populations.

Since 2009–10, the government has stepped forward to increase investment in areas affected by left-wing extremism through the Integrated Action Plan

[3]These include Bharat Nirman, Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS), National Rural Livelihoods Mission (NRLM), Rajiv Gandhi Panchayat Sashaktikaran Abhiyan (RGPSA), Pradhan Mantri Gram Sadak Yojana (PMGSY), Integrated Watershed Management Programme (IWMP), National Rural Drinking Water Programme (NRDWP), Nirmal Bharat Abhiyan (NBA) (formerly Total Sanitation Campaign), and National Rural Health Mission (NRHM).

(IAP) that focuses on building basic infrastructure. Besides this and other special area programmes, the government also addresses regional inequalities through favourable norms of financial assistance in the centrally sponsored schemes, but this has not resulted in desired outcomes in part due to their weak institutional and governance structures.

Failure in Public Provision of Vital Social Services

Overall, the impact of government interventions has fallen short often due to poor delivery, resulting in inadequate basic infrastructure, poor health outcomes and low learning levels among school children. Over half the students in class V could not read a class II text and three quarters could not do simple division in 2012. And learning levels have worsened since 2010 when the Right to Education became effective, partly because it has been input focused addressing the underlying causes of poor outcomes (ASER 2013).

Rural health outcomes, as judged by child and maternal mortality rates and the high levels of malnutrition, are also alarming. Forty-eight per cent of children under five are stunted (too short for their age), indicating half the country's children are chronically malnourished (IIPS and Macro International 2007). While the maternal mortality rate halved over the past 30 years, it still remains unacceptably high, and India has the highest percentage of anaemic pregnant women in the world—a staggering 87 per cent (Planning Commission 2011). Improving outcomes requires providing food and medical care and, equally importantly, ensuring environmental hygiene and also providing safe water and sanitation. But despite increased fund allocations to rural infrastructure, access to and the quality of infrastructure has been disappointing. Twenty per cent of rural households have none of the three basic services—safe drinking water, sanitation and electricity—and only 18 per cent have access to all three.

The failure of public services has, in most places led to a growing dependence on private providers for social services. While barely 3 per cent of rural school-going children in 1993 attended private schools, today about 28 per cent of rural primary school age children attend private schools and 23 per cent receive private tuitions (NCERT 1998; ASER 2012). Given the abysmal state of public health provision, private healthcare entities have mushroomed and about two-thirds of rural households obtain healthcare from private providers.

With a breakdown in government delivery of vital services—health and education—rural households increasingly turn to the private sector.

What are the underlying causes of the poor public services? Among the main causes for poor service delivery is lack of accountability. The system of public delivery of services is plagued by corruption across sectors and at all levels. Lack of accountability in the provision of vital social services is also reflected in the high rate of absenteeism among government teachers and healthcare providers and even those that attend put in very little effort. In the case of infrastructure too there, government programmes have, until recently, followed a top-down approach with little community involvement and weak monitoring and accountability. And where the government has tried to focus on the most vulnerable, effective targeting has been a challenge and there have been significant inclusion and exclusion errors where non-poor households have benefitted and genuinely poor households have been neglected.

Recognising the importance of well-defined monitoring and evaluation of programmes, the government is setting up a Concurrent Evaluation Office at the MoRD to help learn how well programme objectives are achieved and whether programme design or policy needs to be modified. In addition, to improve beneficiary selection it has undertaken a socio-economic and caste census (SECC) 2011, for the first time collecting data on the multiple social and economic deprivations that constitute poverty. The census results will be verified by GSs and be used to identify potential beneficiaries of different welfare and entitlement-based schemes, regardless of whether they have a (below poverty line) BPL card.

The government is also trying to introduce mechanisms to ensure greater transparency and accountability through initiatives such as social audits, wall painting and other transparency safeguards, as well as the use of technology for improving delivery. Much of the accountability rests on community involvement, and hence there is increasing emphasis on decentralisation in implementation and monitoring of government programmes.

The Move Towards Political Decentralisation

A major change in the governance structure that could transform rural life is the gradual but irrevocable movement towards political decentralisation since the enactment of the 73rd Amendment to the Constitution. Local self-government or panchayati raj institutions

A major change in the governance structure that could transform rural life is the gradual but irrevocable movement towards political decentralisation.

(PRIs) now play a major role in the implementation of most centrally-sponsored development programmes. More functions and funds are being transferred to PRIs.

But while their decision-making power seems to be rising, PRIs in many parts of the country are ill-equipped to serve in the roles entrusted to them. Recently, the Ministry of Rural Development (MoRD) allocated 1 per cent of its budget to the Ministry of Panchayati Raj to strengthen infrastructure, build capacity and monitor PRIs. An underlying aim of a number of programmes, MGNREGS and NRLM-Aajeevika in particular, is to strengthen the voice of people so that they can demand greater accountability and results from local and state administration. PRIs thus serve as important platforms for political mobilisation and grievance redressal. Their severe lack of capacity needs to be addressed immediately for them to be agents of transformation. So, one plank of the government approach is to build the capacity of PRIs and incentivise greater devolution to develop and implement plans in a participatory way.

Another plank is to give greater flexibility to state and local governments in the use of funds in centrally-sponsored schemes (CSSs). The Central government has also recently set up a Rural Development Flexi-Fund, which is intended to give state governments the flexibility and additional resources to address state-specific needs especially for innovative social sector services, and empowering PRIs.

In Conclusion

The many facets of rural India are complex and the ones discussed above are by no means all. Rural transformation varies across regions in manner and pace and its impact on pre-existing caste-community-class configurations is also highly varied. Subsequent chapters will attempt to shed light on the regional diversity within the broader stories outlined here. This *India Rural Development Report* attempts to bring together and share certain lessons and experiences of rural development and provide the 'big picture' of rural India.

Bibliography

Acharya, Shankar, Robert Cassen and Kirsty McNay. 2004. 'The Economy: Past and Future'. In *Twenty First Century India: Population, Economy, Human Development and the Environment*, ed. Tim Dyson, Robert Cassen and Leela Visaria. New York: Oxford University Press.

Alkire, Sabina and Suman Seth. 2013. 'Multidimensional Poverty Reduction in India between 1999 and 2006: Where and How?' Working Paper No. 60, Oxford Poverty & Human Development Initiative (OPHI), University of Oxford.

ASER (Annual Status of Education Report). 2012. *Annual Status of Education Reports (Rural)*. Facilitated by PRATHAM.

———. 2013. *Annual Status of Education Reports (Rural) 2012*. Facilitated by PRATHAM.

Assadi, Muzaffar. *2002*. 'Globalisation and the State: Interrogating the Farmers' Movement in India'. *Journal of Social and Economic Development* 4 (1). January–June 2002.

Basu, D. N. and S. P. Kashyap. 1992. 'Rural Non-Agricultural Employment in India: Role of Development Processes and Rural-Urban Employment Linkages'. *Economic and Political Weekly* 27 (51&52): A178–89.

Baviskar, Amita. 1998. *In the Belly of the River*. Delhi: Oxford University Press.

Birthal, P. S., P. K. Joshi and A. V. Narayanan. 2013. 'Agricultural Diversification in India: Trends, Contribution to Growth and Small Farmer Participation'. In *Transforming Indian Agriculture-India 2040*, ed. Marco Ferroni. UK: Sage Publications.

Brass, Tom. 1994. Introduction: The New Farmers' Movements in India. *The Journal of Peasant Studies* 21 (3–4): 3–26.

Census of India. 1991. Ministry of Home Affairs, Delhi: Government of India.

———. 2001. Ministry of Home Affairs. Delhi: Government of India.

———. 2011. Ministry of Home Affairs. Delhi: Government of India.

Chaddha, G. K. 2003. 'Rural Non-Farm Sector in the Indian Economy: Growth, Challenges and Future Direction'. Mimeo. Paper presented in the joint Jawaharlal Nehru University and IFPRI Workshop, 25–26 March, New Delhi.

Chand, Ramesh. 1996. 'Agricultural Diversification and Farm and Non-Farm Employment in Himachal Pradesh'. *The Indian Journal of Labour Economics* 39 (4): 841–50.

Chand, Ramesh, P. A. Lakshmi Prasanna and Aruna Singh. 2011. 'Farm Size Productivity: Understanding the Strengths of Small holders and Improving their Livelihoods'. *Economic and Political Weekly* 46 (26 & 27): 5–11.

Chatterjee, Partha. 2008a. 'Peasant Cultures of the Twenty-first Century'. *Inter-Asia Cultural Studies* 9 (1).

———. 2008b. 'Democracy and Economic Transformation in India'. *Economic and Political Weekly* 43 (16): 53–62.

———. 2008c. 'Classes, Capital and Indian Democracy'. *Economic and Political Weekly* 43 (46): 89–93.

Craig, Jeffrey. 2000. 'Democratisation Without Representation? The Power and Political Strategies of a Rural Elite in North India'. *Political Geography* 19: 1013–36.

Epstein, T. Scarlett. 1973. *South India: Yesterday, Today and Tomorrow*. London: Macmillan.

Fernandes, Walter. 2008. 'The Human Cost of Development-Induced Displacement'. In *India's Social Development Report*. Delhi: Oxford University Press.

Ghosh, Jayati. 2012. 'Structural Imbalances'. *Frontline*, 5 October.

Goswami, Omkar. n.d. 'Rural is Much More than only Agriculture'. New Delhi: CERG Advisory Private Limited.

Government of India (GoI). 2002. 'Reports on Marketable Surplus and Post-Harvest Losses of Paddy, Jowar and Ragi in India'. Delhi: Ministry of Agriculture, Government of India.

Gupta, Dipankar. 2010. *The Caged Phoenix: Can India Fly?* Stanford: Stanford University Press.

Harriss-White, Barbara. 2008. *Rural Commercial Capital: Agricultural Markets in West Bengal*. Delhi: Oxford University Press.

Hindu, The. 2013. 'Farmers' suicide rates soar above the rest'. *The Hindu*. 18 May, http://www.thehindu.com/opinion/columns/sainath/farmers-suicide-rates-soar-above-the-rest/article4725101.ece, accessed on 10 July 2013.

IIPS (International Institute for Population Sciences) and Macro International. 2007. 'National Family Health Survey (NFHS-3), 2005–06: India: Volume I'. Mumbai: IIPS.

Jodhka, S. 2012. Agrarian Changes in the Times of (Neo-Liberal) Crises: Revisiting Attached Labour in Haryana'. *Economic and Political Weekly* 47 (26–27).

John, Mary E. and Satish Deshpande. 2008. 'Theorising the Present: Problems and Possibilities'. *Economic and Political Weekly* 43 (46): 83–86.

Kundu, Amitabh and Lopamudra Ray Saraswati. 2012. 'Migration and Exclusionary Urbanization in India'. *Economic and Political Weekly* 47 (26–27): 212–27.

Lee, Roland D. and Andrew Mason. 2011. *Population Aging and Generational Economy: A Global Perspective*. Cheltenham: Edward Elgar.

Lee, Derek Byer, Xianshen Dias and Chris Jackson. 2005. *Agrarian Rural Development and Pro-Poor Growth*. Washington D.C.: World Bank.

Lindberg, Staffan. 1994. 'New Farmers' Movements in India as Structural Response and Collective Identity Formation: The Cases of the Shetkari Sanghatana and the BKU'. *The Journal of Peasant Studies* 21 (3–4): 95–125.

IAMR (Institute of Applied Manpower Research). 2005, 2008, 2009. *India Yearbook Manpower Profile*. Delhi: IAMR.

Ministry of Agriculture (MoA). 2002a. Marketable Surplus and Post-harvest Losses of Paddy in India. Nagpur: Directorate of Marketing and Inspection, Ministry of Agriculture, Government of India, Nagpur, http://agmarknet.nic.in/.

———. 2002b. Marketable Surplus and Post-harvest Losses of Ragi in India, 2002. Nagpur: Directorate of Marketing and Inspection, Ministry of Agriculture, Government of India, http://agmarknet.nic.in/.

———. 2002c. Marketable Surplus and Post-harvest Losses of Jowar in India, 2002. Nagpur: Directorate of Marketing and Inspection, Ministry of Agriculture, Government of India, http://agmarknet.nic.in/.

———. 2012. 'All-India Report on Number and Area of Operational Holdings'. Delhi: Agriculture Census Division, Department of Agriculture & Cooperation, Government of India.

Ministry of Environment and Forests (MoEF). 2009. 'State of Environment Report 2009'. Delhi: Ministry of Environment and Forests, Government of India.

Ministry of Labour and Employment (MoLE). 2011. 'Rural Labour Enquiry Report on General Characteristics of Rural Labour Households'. NSS 61st round, 2004–05, Delhi: Labour Bureau, Ministry of Labour and Employment, Government of India.

Ministry of Statistics and Programme Implementation (MoSPI). 2008. 'Economic Census 2005, All-India Report'. Delhi: CSO.

Naik, Gopal, K. P. Basavaraj, V. R. Hegde, Vijay Paidi and Arjunan Subramanian. 2012. 'Reliability of Agricultural Statistics in Developing Countries: Reflections from a Comprehensive Village Survey on Crop Areas Statistics in India'. Working Paper No. 381, Bangalore: Indian Institute of Management.

National Council of Educational Research and Training (NCERT). 1998. 'Sixth All India Educational Survey, The Main Report'. Delhi: NCERT.

Neff, Daniel, Kunal Sen and Veronika Kling. 2012. 'The Puzzling Decline in Rural Women's Labor Force Participation in India: A Re-examination'. Working Paper No. 196. German Institute of Global and Area Studies (GIGA) Research Unit, Institute of Asian Studies.

National Crime Records Bureau (NCRB). n.d. 'Accidental Death and Suicides in India'. Reports of various years. Delhi: Ministry of Home Affairs, http://ncrb.gov.in/adsi/main.htm, accessed on 13 July 2013.

National Sample Survey Organization (NSSO). 2005. 'Situation Assessment Survey of Farmers: Indebtedness of Farmer Households'. Report No. 498, NSS 59th Round, January-December 2003. Delhi: Ministry of Statistics and Programme Implementation, Government of India.

———. 2009. 'Employment and Unemployment Situation in India', NSS 62nd Round. Delhi: Ministry of Statistics and Programme Implementation, Government of India.

———. 2011. *Employment and Unemployment Situation in*

India, 2009–10. NSS 66th Round, Report No. 537. Delhi: Ministry of Statistics and Programme Implementation, Government of India.

———. 2012. 'Level and Pattern of Consumer Expenditure, 2009–10'. Report No. 538, July 2009–June 2010. Delhi: Ministry of Statistics and Programme Implementation, Government of India.

Omvedt, Gail. 1994. '"We Want the Return for our Sweat": The New Peasant Movement in India and the Formation of a National Agricultural Policy'. *The Journal of Peasant Studies* 21 (3–4): 126–64.

Parthasarathy, G., Shameen and B. Sambi Reddy. 1998. 'Determinants of Rural Non-Agricultural Employment: The Indian Case' *Indian Journal of Agricultural Economics* 53: 139–54.

Planning Commission. 2008. *'Development Challenges in Extremist Affected Areas'*. Report of an Expert Group to Planning Commission. Delhi: Government of India.

———. 2011. *High Level Expert Group Report on Universal Health Coverage for India*. Delhi: Government of India.

———. 2012. 'Report of the Steering Committee on Agriculture and Allied Activities for the 12th Five Year Plan'. Delhi: Government of India.

———. 2013. 'Twelfth Five Year Plan 2012–17'. Delhi: Government of India.

Rodgers, Gerry and Janine Rodgers. 2011. 'Inclusive Development? Migration, Governance and Social Change in Rural Bihar'. *Economic and Political Weekly* 46 (23): 43–50.

Report on the Expert Group on Agricultural Indebtedness 2007. Banking Division, Department of Economic Affairs, Ministry of Finance, Government of India.

Rodell, Matthew, Isabella Velicogna and James S. Famiglietti. 2009. 'Satellite-based Estimates of Groundwater Depletion in India'. *Nature* 460/20, August.

Sathyamala, C., N. J. Kurian, Anuradha De, K. B. Saxena, Ritu Priya, Rama Basu, Ravi Srivastava, Onkar, Mittal, Jacob Puliyel, Claire Noronba and Meera Samson. 2012. 'Public Report on Health: Some Key Findings and Policy Recommendations'. *Economic and Political Weekly* 47 (21): 43–54.

Shah, Mihir. 2008. 'Structures of Power in Indian Society: A Response.' *Economic and Political Weekly* 43 (46): 78–83.

Shah, Mihir, Rangu Rao and P. S. Vijay Shankar. 2009. 'Rural Credit in 20th Century India: Overview of History and Perspectives'. *Economic and Political Weekly* 42 (15): 1351–64.

Shah, Tushaar. 2009. *Taming the Anarchy: Groundwater Governance in South Asia*. Washington D.C.: Resources for the Future, and Colombo: International Water Management Institute.

Singh, S. 2003. *Taming the Waters: Political Economy of Large Dams in India*. Delhi: Oxford University Press.

Vijayshankar P. S., Himanshu Kulkarni and Sunderrajan Krishnan. 2011. 'India's Groundwater Challenge and the Way Forward'. *Economic and Political Weekly* 46 (2).

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CHAPTER 2

Livelihoods

Summary

The structural transformation of the Indian economy from agriculture has been slow. Although agriculture as a share of Gross Domestic Product (GDP) has dramatically declined to under 15 per cent, half of the country still works in agriculture. While the rural labour force has grown, urban absorption of labour, particularly in the manufacturing sector, has not grown much. At the same time, the rural economy itself has changed in several fundamental ways and has grown to encompass both farm and, increasingly, non-farm sources of livelihood.

With the inter-generational transfer and sub-division of lands, 85 per cent of all farmers are small and marginal cultivating 44 per cent of the land in the face of immense challenges. Many cannot obtain formal credit and must rely on moneylenders. They have difficulties leasing in land due to restrictive tenancy regulations in many states. This has encouraged short-term unrecorded tenancies on insecure terms. At the same time, the growing demand for competing, non-agricultural land use, and government land acquisition for 'public purposes' has alienated farmers from their land.

Many small and marginal farmers are diversifying to commercial cropping. Due to their low holding power and poor access to modern supply chains, they are often compelled to sell soon after harvest, to local traders at low prices. While this has benefited many, it increases risk due to price volatility and lack of storage facilities. Cultivation costs also have risen sharply and, coupled with no new breakthrough in crop yields, are eroding the viability of farming on smaller parcels of land.

These conditions are accentuated for farmers in dryland and rainfed areas which constitute 55–65 per cent of the cultivated land. Agrarian policies, however, have not adequately addressed their concerns. For instance, the green revolution which saw the country transition from subsistence to water-intensive commercial farming bypassed many, particularly farmers in dryland areas. Yet no new agricultural models have been developed to suit their more specific needs.

But there have been certain encouraging responses to these challenges. Smaller farmers have formed collectives to farm on a larger scale and jointly access markets and finance. A small but growing number of farmers are moving to non-chemical farming, building on traditional knowledge, while reducing costs of cultivation and improving sustainability. This has resulted in increased

incomes, better soil health and improved yields. These initiatives point to the steps that must be taken going forward—addressing the scale issues of small farmers, investing in technology breakthroughs and promoting crop models suitable to dryland, rainfed conditions.

Over the past two decades, rural livelihoods have become increasingly non-farm based. The prolonged period of agrarian distress from the mid-1990s through the mid-2000s led farmers to diversify into livestock and shift towards non-farm employment to enhance their incomes. Many farmers combine work on their own land, with livestock rearing; they also work as labour on another's farm and migrate for non-farm work in the off-season. Increasingly, male members of the household commute to nearby towns or migrate seasonally as unskilled labour. With 43 per cent of rural households relying on non-farm income as their major source of income, the non-farm sector has substantially contributed to reducing rural poverty.

While much of the diversification into non-farm employment was due to a 'push' from agricultural distress, recently there are also signs of a 'pull', particularly from opportunities stemming from urban growth. Rural manufacturing was the largest non-farm employer but recent growth in non-farm employment is largely driven by trade, construction and transportation sectors.

These shifts have positive mobility implications for the socially disadvantaged. As much as two-thirds of the increase in non-farm employment now is in the form of casual wage labour. These are often the landless or Scheduled Castes (SC) who worked as agricultural labour but now get better wages as casual labour. The opportunity to exit from traditional village social and economic hierarchies has been a boon for them. But casual labour provides no job security or benefits and more secure formal employment has barely grown.

And too many impediments to improving rural livelihoods persist. The most significant appear to be a lack of capital, difficulty in accessing markets for produce and a lack of skills, particularly vocational skills. Previous government skill programmes lacked market links that could provide trainees placement possibilities. To address this critical gap, the government launched 'Aajeevika' to help the poor develop sustainable farm and non-farm livelihoods, through mobilising and supporting self-help groups (SHGs) with technical and marketing knowledge and finance; engaging with the private sector for placement linked skill training; and nurturing entrepreneurs for micro enterprises. The results of Aajeevika remain to be seen.

2.1 Rural Income and Employment: Paradoxes, Challenges and Prospects

India's GDP grew at its fastest rate ever in the first decade of the twenty-first century. This drew world attention and India became known as one of the world's BRICS emerging economies (with Brazil, Russia, China and South Africa). But it also brought paradoxes. While the economy grew, employment growth declined. Even with declining employment growth, poverty rates declined. And rural income and employment grew fastest in the first half of the decade even during widespread agrarian distress.

This chapter explores these paradoxes and looks for plausible explanations as rural India undergoes a transformation. The development path of many countries reflects the declining role of agriculture in employing people and sustaining livelihoods as manufacturing and services assume greater importance. This is also usually associated with increasing urbanisation. In India, this structural transformation has been slow. While agriculture as a share of GDP dramatically reduced to under 15 per cent in 2009–10, half the country's workforce still worked in agriculture in that period (NSSO 2011). The rural labour force grew but was not absorbed into the urban economy and especially the manufacturing sector. How have rural people coped with these circumstances?

This chapter looks at the changing agrarian economy and its implications for livelihoods. It then attempts to explain the role of the non-farm economy in rural livelihoods. A holistic approach must address not only activities but also the assets (physical and social), capabilities and access available to rural households. The chapter thus touches on these aspects, particularly in the context of barriers to non-farm employment because they largely determine the types of activities that households can undertake in the first place. Finally, the chapter discusses the National Rural Livelihoods Mission (NRLM)—Aajeevika, the recent government initiative that adopts a holistic approach to livelihoods by focusing on building capabilities and institutional frameworks that enable more productive activities.

Rural Income and Employment

To what extent do rural incomes reflect the growth in GDP? Net domestic product (NDP) in rural areas has generally grown slower than in urban areas, and

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But rural income growth accelerated in the 2000s (see Table 2.1). Rural income as a share of total income (NDP) thus declined over three decades from 62 per cent in 1970–71 to 48 per cent in 1999–2000. In the period 1999–2000 to 2004–05, rural income growth accelerated even while urban income growth decelerated, so both growth rates were similar, and the rural share of NDP stayed level at 48 per cent in 2004–05.

Paradoxically, the period from 1999–2000 to 2004–05 when rural income and employment grew the fastest, was also a period of prolonged agrarian distress. How did rural income grow if agricultural productivity did not grow much? The answer is non-agricultural or non-farm income and employment.

While it has grown since the 1970s, non-farm income grew the fastest in the first half of the last decade. By 2004–05 (the last year for which data are available), it accounted for 61 per cent of rural NDP. However, growth in non-farm employment, has been slower. In 2004–05, non-farm employment was 27 per cent of total rural employment and by 2009–10 the non-farm sector employed 32 per cent of the rural workforce.

Overall, employment in India has grown very slowly (see Table 2.2). The post-liberalisation fast growth period, 1993–94 to 1999–2000, has been characterised as having a jobless growth. The most recent quinquennium recorded an even lower growth in employment. How can income growth be so high and employment growth so low? The nature of growth in the last two decades has been such that the share of profit in value added has increased sharply and so has inequality (Himanshu 2011; see also Section 2.5.3 and Chapter 3).

Rural employment increased the fastest in the first half of the last decade, leading to hopes that it marked the beginning of sustained growth in rural income and employment. But in the second half of the decade, 2004–05 to 2009–10, there was an absolute decline in employment, particularly of women in agriculture.

Many now believe that rural employment grew in the first half of the decade due to temporary distress rather than as a response to sustained productive opportunities

TABLE 2.1 Growth of NDP in Rural and Urban Areas (Per Cent Per Annum at 2004–05 Prices)

Periods	Rural	Urban	All India
1970–71 to 1980–81	2.4	3.8	2.9
1980–81 to 1993–94	4.7	6.1	5.3
1993–94 to 1999–00	4.2	8.3	6.2
1999–00 to 2004–05	5.7	5.8	5.7

Note: Assessing annual rural income growth, other than agricultural growth, is difficult because the National Accounts Statistics (NAS) does not report the rural–urban composition of NDP on an annual basis. It generally reports the rural component only when there is a series change in GDP estimation.
Source: *National Accounts Statistics 2007 and 2010 (http://mospi.nic.in/MospiNew/Admin/publication.aspx, accessed on 31 August 2012).

TABLE 2.2 Annual Rate of Growth of Employment (Per Cent)

	1983 to 1993–94	1993–94 to 1999–2000	1999–2000 to 2009–10	1999–2000 to 2004–05	2004–05 to 2009–10
Rural	1.72	0.47	1.11	2.67	–0.43
Male	1.91	0.78	1.63	2.17	1.10
Female	1.39	–0.11	0.05	3.58	–3.37
Urban	3.10	2.70	2.88	3.57	2.19
Male	3.04	2.98	2.98	3.25	2.69
Female	3.36	1.65	1.91	4.82	–0.89
Total	2.01	0.98	1.56	2.89	0.25
Male	2.19	1.37	2.02	2.48	1.57
Female	1.64	0.15	0.45	3.78	–2.76

Note: Includes principal plus subsidiary workers. †Computed after adjusting for the population in corresponding population censuses.
Source: Adapted from Unni and Raveendran (2007); NSS Unit level data for 66th Round on Employment and Unemployment in India, 2009–10, Natural Sample Survey Office.

(see for instance Abraham 2009; Himanshu 2008). Due to the widespread crisis in the agriculture sector between 1997–98 and 2003–04 and stagnation in wages and farm earnings, households were forced to look for other sources to supplement their income. As men turned to non-farm activities, women, previously engaged solely in domestic work, and older family members, began working on family farms. This surge in workforce participation—particularly older people, especially older women—then reverted back to earlier levels in the second half of the decade when economic conditions recovered (Abraham 2009; Himanshu 2011). It is a common feature of distress employment that there is an increase in female labour force participation (LFPR) as well as unemployment rates since not all women who seek jobs at times of distress get employment (Himanshu 2011).

Non-farm employment is emerging as an irreversible trend. One simply cannot eke out a living from the small farms upon which over 80 per cent of rural households depend. From 1993–94 to 2009–10, the share of rural households dependent on agriculture as their main source of income thus declined from 68 per cent to less than 58 per cent (NSSO 2011). This decline can be attributed largely to those self-employed in agriculture—almost 6 percentage points. This transformation appears to be an important contributor to declining rural poverty both directly through employment generation, and indirectly through its impact on agricultural wages (Himanshu et al. 2011). Because non-farm wages tend to be higher than farm wages, studies show that they exert upward pressure on agricultural wage rates (see for instance Lanjouw and Murgai 2008).

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In light of these changing dynamics, the rest of this chapter focuses on the key drivers of growth in the farm and non-farm sectors. Who benefitted and who did not? To understand rural livelihoods we begin with their agrarian roots.

2.2 Features of the Agrarian Economy

Agriculture lies at the heart of rural livelihoods. Despite its declining share in the total GDP, agriculture continues to engage around half the country's total workforce and over two-thirds of the rural workforce. Most of India's poor also depend on agriculture, making the agricultural sector a vital focus area in attempts at alleviating poverty.

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2.2.1 Phases of Agricultural Growth and Policy Interventions

While the share of agriculture in GDP declined steadily from 55 per cent in 1950–51 to around 15 per cent in recent years, the sector has seen phases of both growth and decline. After a period of deceleration in the 1960s, the green revolution that began in the late 1960s sparked two decades of dynamic agricultural growth. New seed technology, sustained public sector investment and expanded access to water and other farm inputs significantly drove up yields and bettered terms of trade. By the end of the 1980s though, as public investment decreased, yields began to stagnate and over-exploitation of soil and water resources began to take their toll. The agriculture sector thus entered a prolonged period of distress until around 2004–05, but, at the same time, the livestock sector experienced robust growth; by 2010–11 it accounted for 27 per cent of the value of agricultural output, up from 20 per cent in the 1970s.

Since 2004–05, the agriculture sector has been recovering, driven by favourable terms of trade, higher public and private investment, increased use of certified seeds, fertiliser and pesticides and credit expansion (Chand and Parappurathu 2012). This recovery was associated with renewed dynamism in rainfed areas, with Jharkhand, Chhattisgarh, Rajasthan, Gujarat, Maharashtra, Karnataka and Andhra Pradesh being the best performing states at 5 per cent plus average annual growth between 2005–06 and 2011–12. Rainfed area crops, mainly coarse cereals (bajra, jowar, maize and ragi), oilseeds and cotton had higher yield growth. This yield growth came mainly from better seed quality, higher seed replacement and better practices rather than new crop technology or more irrigation (Planning Commission 2012a).

Agricultural extension, primarily driven by civil society organisations (CSOs), farmer producer organisations (FPOs) and agri-business companies, helped disseminate better practices. These organisations, composed of local community members often acting as agents of agricultural extension, became important

especially as public sector support weakened. Specific public initiatives like the 2007 Agricultural Technology Management Agency (ATMA) programme of setting up farm schools, training, demonstration and exposure visits in most districts also helped. ATMA works at the block level and in 2010 introduced a 'farmer friend' system for every two villages. Critically, ATMA provides rain-fed areas funds for extension services proportionate to a district's actual rainfed area. Small and marginal farmers must also have 50 per cent representation at farm schools. This marks a change from the top-down agricultural extension system of the 1970s that was geared toward promoting green revolution technologies, of little relevance to poor farmers in rainfed areas (Ferroni and Zhou 2012; Anderson et al. 2006).

Various phases of government interventions in land policies also played a role. In the first two decades after Independence, land reforms were at the forefront—both tenancy reform (confirm tenants' rights and regulating rents of leased land) and land redistribution to landless households. But both had limited impact. Land redistribution was concentrated in a few states, particularly West Bengal, and the land often was uncultivable without substantial investments. During the second phase (1972–85), roughly the same time as the green revolution, attention shifted to bringing uncultivated land under cultivation. Where surface water irrigation systems had limited reach, farmers, encouraged by government subsidies for tube wells and electricity to operate them, turned to groundwater. Between 1985 and 1995, water and soil conservation gained importance. But to what extent these land development programmes improved the productivity of land and the well-being of the people living off the land remains debatable. Since 1995, land-policy debate has focused on how best to draft land legislation, improve land revenue administration and, in particular, bring greater clarity to land records (Deshpande 2003; Reddy 2006).

Two farm-sector trends of the past decades that had a defining impact on rural livelihoods are: growing fragmentation of farm holdings and a transition from subsistence to commercial farming.

2.2.2 Growing Fragmentation of Landholdings

Landholdings have become increasingly fragmented over the years, mainly due to rising population pressure, sub-division within families, and a slow occupational shift from agriculture to non-agriculture. While the total area under cultivation of around 160 million hectares has remained stable, the number of holdings almost doubled from 70 million in 1970–71 to 130 million in 2005–06. Concurrently, average landholding size—already low at 2 hectares in 1970–71—fell to 1.2 hectares by 2005–06 (see Table 2.3).

The slow pace of diversification out of agriculture means that more people are supported on smaller and smaller land plots. Marginal and small farms predominate—85 per cent of all operational holdings are marginal or small, with between under 1 hectare

TABLE 2.3 Changing Distribution of Operational Holdings in India

Year	Total		Avg size ha	Distribution of holdings (%)					Distribution of operated area (%)				
	Holdings no. ('000')	Area ('000') ha		Marginal	Small	Semi-medium	Medium	Large	Marginal	Small	Semi-medium	Medium	Large
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1970–71	71011	162178	2.3	51.0	18.9	15.0	11.2	3.9	9.0	11.9	18.5	29.7	30.9
1980–81	88883	163797	1.8	56.4	18.1	14.0	9.1	2.4	12.0	14.1	21.2	29.6	23.0
1990–91	106638	165507	1.6	59.4	18.8	13.1	7.1	1.6	15.0	17.4	23.2	27.0	17.3
2000–01	119931	159435	1.3	62.9	18.9	11.7	5.5	1.0	18.7	20.2	24.0	24.0	13.2
2005–06	129222	158323	1.2	64.8	18.5	10.9	4.9	0.8	20.2	20.9	23.9	23.1	11.8
2010–11	137757	159181	1.2	67.0	17.9	10.0	4.3	0.7	22.2	22.1	23.6	21.2	10.9

Note: Marginal (<1 ha); Small (1–2 ha); Semi-medium (2–4 ha); Medium (4–10 ha); Large (10 and above ha): ha—hectare; Operational holding—All land which is used wholly or partly for agricultural production and is operated as one technical unit by one person alone or with others without regard to the title, legal form, size or location; Operated area—This includes both cultivated and uncultivated area, provided part of it is put to agricultural production during the reference period. Figures may not add up exactly to 100 due to rounding off.
Source: 'All India Report on Number and Area of Operational Holdings, Agriculture Census, 2010–11', Ministry of Agriculture, 2012, website (http://agricoop.nic.in/imagedefault/whatsnew/Agriculture%20Census.pdf).

Over two-thirds of landholdings are now less than 0.4 hectare or 1 acre.

and 1 and 2 hectares respectively (see Table 2.3). What is more, this 85 per cent cultivates just 44 per cent of operated area. In fact, most of the landholdings are extremely small, as much as 67 per cent are marginal holdings, most with less than 0.4 ha (1 acre). The major trends and policy interventions in the sector thus need to be examined through the lens of their impact on small and marginal farmers.

2.2.3 Shift Towards Commercial Farming and Livestock

The shift from subsistence farming to commercial farming is another key trend that has had a critical impact on rural livelihoods. Farmers have been changing the composition of the agricultural output to meet shifting consumer demands. Allied agricultural activities, particularly livestock, have gained prominence with growing demand for eggs, milk and meat. These not only supplement crop-production income but also help mediate annual income fluctuations.

The transition from subsistence to commercial farming is manifest in high marketed surplus and high value crops.

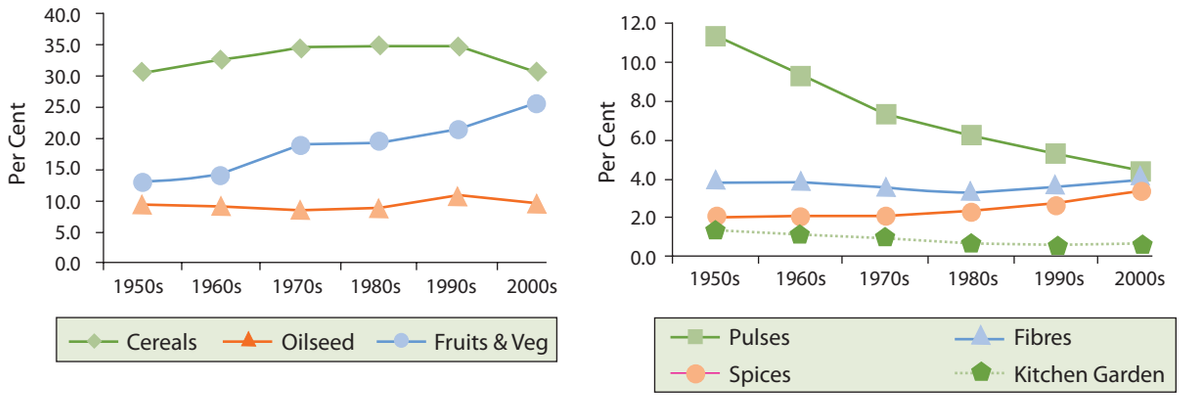
The shift from subsistence farming to commercial farming is visible in two ways: increasing marketed surplus and a shift towards cultivating higher value crops. Even small holdings now increasingly generate marketable surplus of foodgrains. By the late 1990s, for instance, more than half the total production of paddy, the most staple food crop, was available for sale (marketable surplus) (see Appendix Table 2.1). Forty-four per cent of paddy produced even by small farmers was marketed (MoA 2002).

As cropping patterns shift to commercial, high value crops and horticulture, the area under foodgrains is declining and the area under non-foodgrain crops growing. Although the area under wheat and rice has steadily grown, the area under coarse cereals and pulses has continuously declined, except for an increase in pulses since 2010–11. In fact, coarse cereals declined dramatically after the green revolution, from an average of 44 million hectares in the early 1970s to 28 million hectares in the late 2000s (MoA 2012b). At the same time, the area under oilseeds, fruits and vegetables and other horticulture crops increased. The area under horticulture crops has, in fact, increased to more than one-tenth of the country's total cropped area. These changes mostly reflect demand-side factors such as consumer food basket diversification and inelastic demand for foodgrains as incomes rise.

The area under coarse cereals declined dramatically after the green revolution.

Relative values of crop output show a similar trend. The share of cereals in total value of crop output increased until the 1990s but then declined (see Figure 2.1), while the share of pulses declined steeply throughout. At the same time, the share of fruits, vegetables and fibres rose and the share of oilseeds remained steady. Most worrisome, though, the declining share of pulses

FIGURE 2.1 Percentage Share of Crops in Gross Value of Agricultural (Crop Sector) Output



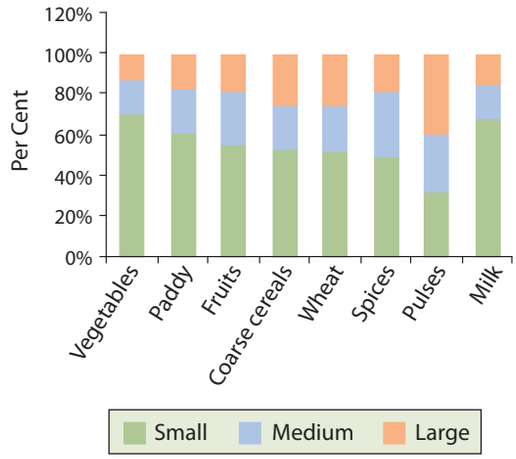
Note: 1. Value of agricultural output excluding livestock sector.
2. Decadal averages.

Source: *National Account Statistics Back Series 1950–51 to 1998–99*, http://mospi.nic.in/mospi_wo_rept=pubs.htm, accessed on 15 December 2012.

has led to a steep rise in its relative price which needs urgent policy attention because the Indian staple diet has traditionally been a mix of cereals and pulses.

This shift to commercial crops appears widespread, but the question remains—to what extent have small farmers benefitted? Studies find that marginal and small farmers enjoy an efficiency advantage over large farmers in growing certain high-value crops such as vegetables (Birthal et al. 2013). This is because growing vegetables is more labour-than capital-intensive and small farms tend to have access to more family labour. Vegetables also give faster and more regular returns than other high-value crops such as fruits and spices, which require more start-up capital and yield slower returns. Marginal and small farmers thus grow 70 per cent of the nation's vegetables on just 41 per cent of the total cultivated area (ibid.). But because they lack adequate market access and storage facilities for perishable items, marginal and small farmers still allocate a large portion of land to safe crops such as rice and wheat (ibid.; see Figure 2.2 and Table 2.4).

FIGURE 2.2 Share of Small Farmers' Production of Selected Commodities in 2003



Source: Birthal et al. (2013).

TABLE 2.4 Cropping Patterns by Farm Size (2003)

Type of Crop	Small (<2 ha)	Medium (4–10 ha)	Large (10 + ha)	All (ha)
Paddy	35.0	24.7	13.4	25.8
Wheat	19.0	15.6	12.8	16.3
Coarse cereals	16.5	19.4	18.3	17.7
Pulses	8.0	11.0	14.6	10.8
Oilseeds	7.2	12.0	14.0	10.4
Fruits	1.2	1.4	0.9	1.2
Vegetables	3.5	2.0	1.0	2.4
Condiments and spices	1.0	1.2	1.0	1.1
Sugarcane	2.6	3.5	2.5	2.8
Cotton	2.1	4.8	15.4	6.9
Other crops	3.9	4.4	6.0	4.7
Total	100	100	100	100

Note: Figures may not add up exactly to 100 due to rounding off.
Source: Birthal et al. (2013).

2.2.4 Continued Prevalence of Dryland and Rainfed Farming

The green revolution, which made India self-sufficient in food, was largely concentrated in irrigated areas. Traditional commercial crop models promoted during the green revolution were water-intensive and thus ill-suited to rainfed areas that lack irrigation infrastructure. But rainfed areas constitute 55–65 per cent of the country's total net sown area and are home to two-thirds of the country's livestock and 40 per cent of its people (NRAA 2012). The green revolution thus bypassed a significant portion of the country.

The green revolution, which made India self-sufficient in foodgrain, was ill-suited.

The application of commercial crop models to rainfed and dryland conditions is a risky practice that has led to expensive failures and severe farmer distress, given the high costs of commercial crop inputs. In Bidar district in Karnataka, for instance, the state government introduced and promoted hybrid varieties of cotton and pulses in the 1960s and 1970s. But over the years drought or monsoon delays led to sizeable losses. That farmers lacked knowledge and experience in dealing with the failure of commercial crops and state governments did not adequately disseminate relevant information, particularly to smaller farmers, compounded the problem.

Much of the increase in green revolution wheat and rice crops, as well as commercial crop area has come from areas in which traditional rainfed crops were grown. But raising traditional rainfed crops, coarse cereals in particular, has fallen sharply due to changing food preferences, stigma of being considered a 'poor man's crop', and emphasis on rice and wheat in the public distribution system (PDS). Yet, if grown under traditional methods, rainfed crops are hardy and can even grow in poor and degraded soil, they require less water, and are not dependent on

Traditional rain-fed crops can even grow in degraded soil, require less water, and are not dependent on chemical fertilisers and pesticides.

chemical fertiliser and pesticides. There is thus an urgent need to actively develop and promote production of dryland crops such as millet to ensure food and water security, community self-reliance and bio-diverse and ecologically sound farming.

2.3 Key Issues in Sustaining Farm Livelihoods

As farm-based livelihoods continue to support a significant share of the rural population, this section explores some key farming issues. Also, given the preponderance of small and dryland farmers, whose needs and constraints have not been addressed by the green revolution, this section pays particular attention to their challenges.

2.3.1 Land

Land, arguably, is the most important rural asset. People living off the land must be able to lease, buy, sell, and leverage land. In this section, we discuss leasing and acquiring land, both of which strongly impact the livelihoods of small and marginal farmers.

Land tenure: A logical response to predominantly small farms and the insufficient income they generate would be to lease-in land to create operationally larger farms. But this is difficult. Land records and ownership rights over land are often unclear and the land leasing laws of most states restrict the leasing-in of land to increase cultivable area.[1]

Such regulatory restrictions have encouraged unrecorded tenancies. This mostly affects marginal and small farmers who depend on leasing-in small plots on insecure terms for short periods, sometimes for only one season (Planning Commission 2011a). While official figures show a decline in tenancy as a percentage of the total number of operated holdings—from roughly 25 per cent in 1970–71 to 10 per cent in 2002–03—unofficial estimates are at about 30 per cent. The most prevalent forms of tenancy are fixed rent (cash or kind, i.e. produce) in irrigated areas, and share-cropping in dryland areas. In the absence of an insurance mechanism, fixed-rent tenants are more vulnerable to crop failures due to drought or floods, or to pest attacks than share-cropping tenants. Tenancy reform in the early post-Independence era emphasised occupancy and possession rights for tenant farmers, but did not actually work, with a few notable exceptions (see Box 2.1).

Regulatory restrictions have encouraged unrecorded tenancies mostly affecting marginal and small farmers who depend on leasing-in small plots on insecure terms for short periods.

Unrecorded tenancies, in particular, leave tenant farmers exposed to eviction and without institutional support such as credit or subsidies. A regulatory mechanism for fixing rents and providing institutional support for tenant farmers, thus, may prove more beneficial than possession rights. Andhra Pradesh, for instance, has a scheme that entitles identified tenant farmers to directly access credit and avail benefits related to farm production, especially agricultural subsidies, circumventing their landlords.[2] Notwithstanding the practical problems in identifying tenant farmers, other states could tailor such a policy to their needs and circumstances. To reduce the transaction cost of maintaining tenancy records, the instrument of leasing-in land should be simplified and the possibility of registration at the panchayat level explored. Overall, a better land administration system including transparent and fair tenancy laws could enhance agricultural growth.

Land acquisition: Rising industrialisation, infrastructure development and urbanisation have also increased demands on land. To date, the process of land acquisition based on the 1894 Land Acquisition Act, has been fraught with difficulties, with many households losing access to lands and livelihoods as a result of poor compensation and inadequate resettlement. In 2011, the Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Bill (LARR), was introduced to replace this Act and, after several amendments, was passed by the Lok Sabha in August 2013 and the Rajya Sabha in early September

[1]Most states restrict land leasing; only Odisha, Rajasthan, Haryana, Punjab (tenant may purchase land after 6 years of continuous occupation) and Andhra Pradesh (the Andhra area, not Telangana, has restrictions) do not. Others restrict who may lease or permit leasing but not the right to purchase land. Kerala, Jammu & Kashmir, and Manipur completely prohibit leasing (Planning Commission 2011a).

[2]The Jayati Ghosh Commission in the advent of agrarian distress witnessed in the state recommended such a policy and finally it was implemented on the recommendation of the Koneru Rangarao Committee.

BOX 2.1 Tenancy Reform Under *Operation Barga*

Operation Barga, a project initiated by the West Bengal government in the late 1970s to protect the rights of share-cropping tenants, i.e. the Bargadars, is deemed successful. Share-cropping tenants were registered, assured protection against eviction, given inheritable quasi property rights, and guaranteed their due crop share. By giving them priority rights if owners sold their land, it also facilitated the conversion of tenants to land owners. By 1990, around 1.5 million tenants were registered under Operation Barga; various estimates put it at between 48 to 65 per cent of the state's total tenant farmers. This initiative changed the conditions of tenants, brought economic stability among farmers and contributed to the state's agricultural growth. As in the rest of India, supportive measures such as access to institutional credit for these resource-poor tenant farmers, however, were not ensured.

Source: Author.

2013. As the first national law to integrate land acquisition with rehabilitation and resettlement (R&R), the Act aims to facilitate the process of acquiring land in a transparent and fair manner. The Act defines public purpose, i.e. when the government can acquire land without consent,[3] and mandates that in cases where public purpose does not apply, 80 per cent of the project-affected households have to provide their consent through a formal process, while public-private partnerships (PPPs) require 70 per cent consent.

Moreover, it requires compensation be provided of up to four times the market value of land in rural areas and double in urban areas. In addition, R&R is to be provided in the form of housing, livelihood provision, and other means such as developed land or stock in company. The land acquisition and R&R processes have several transparency safeguards to ensure accountability. These include a social impact assessment by the central or state government in consultation with the village panchayat (or municipality in urban areas) which is to be examined by an independent expert group, public hearings in those gram sabhas (and municipalities) where more than 25 per cent of the land is being acquired, the creation of various bodies to ensure accountability at the central, state and local levels, and making all land acquisition and R&R documents publicly available.

The LARR Act is first national law to integrating land acquisition with R&R, and in a fair, transparent way.

If this landmark Bill is effectively implemented, it should ensure sustainable livelihoods for those dependent on acquired land. Some, however, have criticised the lengthy process, the broad definition of public good, and ambiguity in the employment for livelihood losers. There is also some concern that the various levels of oversight lack defined powers and responsibilities, making accountability difficult to enforce. Land records and rights need to be clarified to enable better governance and facilitate land transactions from acquisition to leasing, including: guarantee of ownership/security of tenure, property taxation, security for credit, development of land markets, protection of state lands, reduction of land disputes and facilitation of land reform.

2.3.2 Access to Credit

Farmers' access to credit for investments and operations that raise farm productivity remains a significant constraint. Many farmers still rely on informal sources of credit, including extortionary moneylenders. Following the government's efforts to expand the reach of institutional credit, formal credit grew sharply in the 1970s (see Figure 2.3) after banks were nationalised and a mandatory priority sector bank lending target to agriculture was introduced. Regional rural banks were also started in 1975 to promote the rural economy and serve small and marginal farmers, agricultural labourers and rural artisans. In 1982, the National Bank for Agriculture and Rural Development (NABARD) was created, essentially to refinance agricultural and rural development agencies and banks. Institutional credit thus doubled from 32 per cent of total credit to farmers in 1971 to 63 per cent in 1981 (see Figure 2.3a). In the 1990s, the share of institutional credit declined, mainly because of a contraction in commercial banks' rural branch network due to viability concerns. During this period, the share of long-term credit also

[3]Strategic security, public infrastructure, projects for project-affected people, planned development, educational and research institutions and residential projects for calamity-affected people.

fell as investment in agriculture slowed down. Several policy measures were introduced to step up credit to farmers. Whether these measures increased the share of institutional credit would only be known when the next All-India Debt and Investment Survey is out. But there are indications that this may be so, as the early 2000s saw a quantum jump in the intensity of institutional credit to agriculture (see Figure 2.3b).

Yet, the increasing credit intensity in agriculture does not necessarily mean that farmers have greater credit access. First, because banks could not meet the agricultural credit target of 18 per cent of total lending, the Reserve Bank of India (RBI) allowed indirect credit to agriculture (e.g. for agro-processing, agricultural inputs and storage) to be counted towards the target. This led to a huge increase in indirect lending essentially to agri-related enterprises, not to farmers. Direct credit to farmers fell from 85 per cent of total agricultural credit in the 1970s to 55 per cent in the 2000s. Second, even including indirect credit, by end March 2012, 15 of 26 public-sector banks and 11 of 22 private sector banks failed to meet targets. Rather than taking on the high risk of lending to farmers, they preferred paying shortfall penalties in the form of deposits to the Rural Infrastructure Development Fund (RIDF), which the RIDF administrator then invests in rural development.

Many farmers still rely on informal sources of credit, including extortionary moneylenders.

Access to formal credit correlates directly with farm size. Smaller farmers, who tend to have less investible surplus are most affected and continue to be excluded from formal credit and rely on moneylenders and traders, while large farmers have disproportionate access to formal credit. Only 40 per cent of marginal farmers have institutional credit, whereas over two-thirds of medium and large farmers do (see Table 2.5). The Expert Group on Agricultural Indebtedness emphasised this inadequacy in meeting the requirements of an increasingly modern and commercial agriculture (MoF 2007). In 2003, the last year for which data are available, about 49 per cent of farmer households had access to credit and 58 per cent of them availed formal credit, implying that just 30 per cent of all farm households had access to formal credit for agriculture (see Table 2.5).

TABLE 2.5 Access to Credit amongst Farmer Class and Source of Credit, 2003 (Per Cent)

Type of farmer	Access to credit (%)	Source		
		Government, Co-operative banks	Moneylender, trader	Relatives and others
Marginal	45.0	39.6	41.1	19.3
Small	51.0	57.6	30.1	12.2
Semi-medium	58.2	65.1	28.1	6.9
Medium	65.1	68.8	22.8	8.3
Large	66.4	67.6	27.8	4.6
All sizes	48.6	57.7	30.9	11.5

Note: Figures may not add up exactly to 100 due to rounding off.
Source: NSSO (2005).

FIGURE 2.3A Distribution of Outstanding Loan of Cultivator Households by Source (Per Cent)

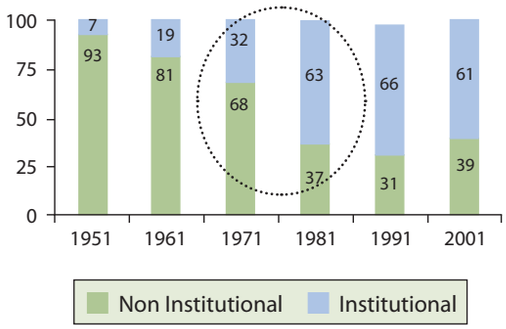
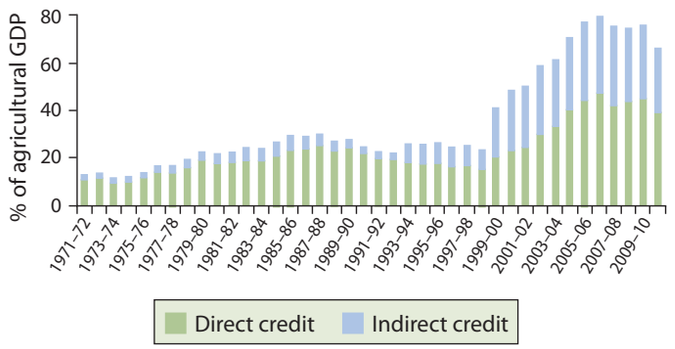


FIGURE 2.3B Growing Credit Intensity in Agriculture Credit to Agricultural GDP (Per Cent)



Note for Figure 2.3B: Data on credit from cooperatives available only up to 2007–08, hence 2008–09 to 2010–11 figures are based on simple three years moving average.
Source (2.3A): All India Debt and Investment Survey, RBI, NSSO (1998; 2005b) and adapted from Mohan (2006).
Source (2.3B): RBI (2011–12).

Several factors impede extension of credit to farmers ranging from credit risk and collateral requirements to cumbersome loan appraisal and documentation procedures. Many of the impediments raise the transaction costs to both farmers and banks, some of them prohibitively. One innovation to mitigate transactions costs and smoothen credit delivery is the Kisan Credit Card (KCC), a revolving credit with appraisal required only the first time it is issued. All farmers, including tenant farmers, oral lessees, SHGs, and Joint Liability Groups are eligible to apply. Launched in 1999, it has progressively expanded to reach over 20 million farm households. Recent enhancements, based on technology, provide greater flexibility to the farmers in using it for operations through ATMs, business correspondents, and mobile-based transfer transactions.

2.3.3 Lack of Productivity Breakthrough

Since land available for cultivation is limited, improvement in farming techniques and land productivity is critical. Green revolution technology and its associated inputs, along with better irrigation infrastructure—entirely supported by the public sector—brought a remarkable improvement in yields, especially for high yield variety (HYV) crops such as wheat and rice. But since then there has been little improvement in yields of cereals and non-cereals or non-food crops except cotton. There is said to be a technological stalemate in agricultural research and development. The emerging genetically modified variety of seed technology in the form of Bt. technology is mainly driven by the private corporate sector and the Bt. seeds market, especially of cotton, is flourishing in India. But the long-term consequences on health and bio-diversity of Bt. technology and on the development of a monopoly in the seed market have been seriously debated. The concern is that, while the Bt. gene helps control destruction by a specific set of actors e.g. pests, it provides no additional benefit to the soil by way of nutrition, which traditional agriculture does (Vasavi and Swaminathan 2010). As a consequence of these debates, a moratorium has presently been placed on Bt. Brinjal.

Two problems have now emerged with respect to irrigation, a key factor in green revolution, both of which limit cropping intensity and yields. First, there are limitations to tap surface water through large dams and the neglect of minor irrigation systems (see Chapter 5). Second, groundwater has been overexploited with deleterious consequences. Water management and productivity is also very poor. Use of micro-irrigation, such as drip and sprinkler systems is limited and expensive, and Indian agriculture is significantly less water-efficient even than other developing country counterparts.

2.3.4 Increasing Cost of Cultivation

The cost of cultivation—for both labour and non-labour inputs—has been rising steadily over the years. There are many contributing factors. Dependence on hired labour and mechanised cultivation is increasing with commercial farming which, in turn, is raising the cultivation costs. Besides, unregulated seed, fertiliser and other inputs in the 'black market' increase costs, as do groundwater irrigation systems. That the cost of irrigation, both fixed investment and operating costs, is a factor that led to the agrarian crisis that resulted in farmer suicides in various parts of India is well documented. The high cost of deep submersible pumps to extract groundwater and the debt undertaken to finance them, for instance, led to tragic suicides (Vaidyanathan 2006), particularly in dryland areas of Andhra Pradesh, Maharashtra and Karnataka, where low rainfall drives increased dependence on groundwater (Mitra and Shroff 2007).

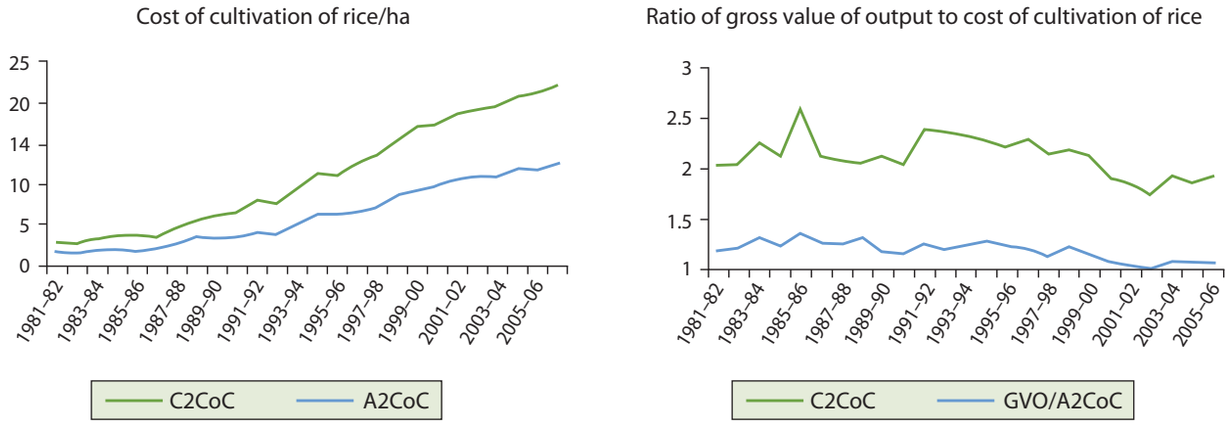
Whereas in the 1970s and 1980s, increased cultivation costs were surpassed by increases in yields, in the 1990s yields have not kept up with increases in costs of labour, inputs, water and so on. Part of the reason is inadequate investment; productivity generally increases with investment, but when profitability is low, farmers will not invest, which leads to a vicious circle of stagnating yields.

Whereas in the 1970s and 1980s, increases in cultivation costs were surpassed by increases in yields, in the 1990s yields have not kept up with increases in costs of labour, inputs and water.

Until recently, minimum support prices (MSPs) for crops failed to rise fast enough to compensate farmers for increased cultivation costs, particularly for rice (Dev and Rao 2010). Farmers, thus, were increasingly exposed to market price volatility, a major factor in eroding farming viability. Rice cultivation costs, for instance, rose since the 1990s (see Figure 2.4a), while the ratio of gross output value to cultivation cost, an indicator of profitability, declined (see Figure 2.4b). Several other crops show a similar pattern. When higher costs erode the profit margin, farmers are not motivated to step up investments.

Since cultivation costs vary across regions, a nationwide MSP benefits some regions but hurts others where it may not even cover the cost of production. The recent 'crop holiday' declared by rice farmers in Andhra Pradesh

FIGURE 2.4A and B **Cost of Cultivation for Rice**



Note: C2CoC: Cost of cultivation including imputed value of family labour; GVO: Gross value of output; A2CoC: Cost of cultivation excluding imputed value of family labour.
Source: Adapted from Dev and Rao (2010).

BOX 2.2 **Andhra Pradesh Farmers Declare a Crop Holiday**

The recent crop holiday declared by farmers in Andhra Pradesh is an unusual phenomenon in agrarian history, but is symptomatic of a larger agricultural crisis. Farmers in the East Godavari district covering 85,050 acres declared a 'crop holiday', refusing to cultivate their land during the 2011 kharif season. This had a spiralling effect in the state and country. Around 3 lakh acres of land went uncultivated. A Committee constituted by the Government of Andhra Pradesh (GoAP), in the wake of this declaration, found that neither the market price nor the MSP covered the higher cultivation costs. The Committee found that an ineffective procurement system, inadequate storage capacity, crop failures on account of frequent cyclones, improper maintenance of the drainage system, late release of canal waters, non-availability and high cost of labour and lack of suitable farm machinery are among the major reasons for high cost of cultivation and subsequent declaring of a 'crop holiday'.

Source: GoAP (2011).

reflects the gap between their production cost and their sale price or the MSP (see Box 2.2; GoAP 2011). Moreover, MSP-based procurements are concentrated in particular states and regions, and do not necessarily cover all the major producing states and regions.

2.3.5 Viability of Small-holder Farming

The relationship between farm size and productivity has been widely debated. Some researchers (Chand et al. 2011) argue that productivity inversely correlates with farm size because small farms tend to be more resource-efficient and productive due to extensive cropping (Birthal et al. 2013). Others (Ghose 1979; Deolalikar 1981) argue that this inverse relationship holds only at lower levels of technology; as with more advanced technology large farms are more efficient. In contrast, Rao (1975) and Subbarao (1982) found a positive relationship between farm size and productivity due to the higher use of fertilisers and other cash-intensive inputs on larger farms. More recent evidence from NSSO has shown that smaller farm holdings do indeed have higher productivity than larger farms. Birthal et al. (2013) cite evidence from Collins (1995) and others which suggests that while small farmers may have lost their competitive advantage in the production of wheat, sugarcane, cotton and other crops that benefit from mechanisation, they have a clear advantage in production of high value crops such as vegetables that require constant monitoring, careful weeding and other care.

What is clear is that even if small farms may have higher *total* productivity, their *per capita* productivity tends to be low. Poverty is more common amongst small farmers (Chand et al. 2011), the vast majority of whom cannot generate enough income to sustain

Even if small farms may have higher total productivity, their per capita productivity tends to be low.

their households. A Situation Assessment Survey of Farmer Households conducted by NSSO in 2003 showed that 94 per cent of farming households that own less than 4 ha of land, earn less from all sources than their monthly consumption expenditure, making it difficult for them to continue in agriculture (NSSO 2005a). It also revealed that 40 per cent of the farmers reported they would quit farming if given an option. But the lack of alternative opportunities compels them to continue in farming activity.

2.3.6 Agricultural Marketing

Farmers—particularly small and marginal farmers—often face immense difficulties in marketing their produce. They tend to have small quantities of marketable surplus and low holding power due to extreme poverty. As a result, they sell off most of their produce in local markets at very low prices, immediately after the harvest (distress sales). Because rural markets often also are dominated by interlinked transactions, farmers are obliged to sell to moneylenders and traders from whom they have taken credit for inputs and consumption. Ensuring remunerative prices for produce, thus, would go a long way in helping small farmers survive.

Small and marginal farmers face immense difficulties in marketing their produce.

Over the decades, the government has intervened to assure farmers fair prices, both as regulator and buyer, but with limited success. Since the mid-1950s, through Agricultural Produce Marketing Committees (APMCs), state governments set up regulated markets to sell certain notified agricultural products by a transparent open auction in the presence of a market committee official. At a time when private trade was underdeveloped and exploitative, this helped eliminate several malpractices in agricultural markets, created transparent marketing conditions and ensured fairer deals to farmers (Acharya 2004). But because they were not sufficiently spread out, farmers could not reach the regulated markets or would need to travel long distances to reach them. Over time, facilities became inadequate as the markets failed to modernise. As corruption, inefficiency and bureaucratic control took hold, auctions no longer remained transparent or fair. By preventing private investment in agricultural markets, these regulated markets or *mandi*s stifled competition and guarded the interests of middlemen. Informal private markets persisted. Farmers' continued dependence on *arhtiya*s, or middlemen and traders for their credit needs continues to force them to market their produce where these moneylenders are, at unattractive prices.

Over the decades, the government has intervened, both as regulator and buyer, to assure farmers of fair prices, but with limited success.

In the last decade, the government has moved to remove the state's marketing monopoly power and to allow private sector participation. The new Model State Agricultural Produce Marketing (Development and Regulation) Act 2003 permits direct purchase of produce from farmers, setting up of private wholesale markets and making contract farming legal while specifying mandatory and optional provisions of contracts. Most states and union territories have either fully or partly adopted the Model Act. But apart from contract farming, progress has been slow mainly due to lack of enthusiasm on part of the states for the Model Act and reluctance to change the existing mandi systems. A number of large private national and multi-national corporations[4] have entered into contract farming arrangements with farmers. But except for Karnataka, Tamil Nadu and Andhra Pradesh, where private firms work with small farmers for crops that require careful cultivation, most private firms work with large and medium farmers (Planning Commission 2011a; Singh 2012). Most projects also are in agriculturally developed states and not in eastern and north-eastern states that have large numbers of small and marginal farms. Contract farming often occurs without enforceable agreements. Buyers routinely procure only a limited portion of the growers' crop, without a firm commitment and without sharing the risk (Singh 2012). Farmers, thus, receive no benefits of contract farming, such as assured markets and prices and access to support services.

The central and state governments are also substantial buyers (mainly wheat and rice) for the PDS and

[4]MNCs like Cadbury in cocoa; PepsiCo in potato, chilly and groundnut; Unilever in tomato, chicory, tea and milk; ITC in tobacco, wood trees and oilseeds; and Cargill in seeds. Domestic corporates like Ballarpur Industries, JK Papers and Wimco in eucalyptus and poplar trees; Green Agro Pack, VST Natural Products, Global Green, Intergarden India, Kempscity Agro Exports and Sterling Agro in gherkins; United Breweries in barley; Nijjer Agro in tomato; Tarai Foods in vegetables; M Todd in mint; and Namdhari Seeds in seeds.

strategic food security buffers. The Food Corporation of India (FCI) is the largest buyer and has traditionally concentrated in states like Punjab, Haryana and western Uttar Pradesh for wheat and Andhra Pradesh for rice while bypassing poorer, often rainfed states. In 1997–98 the central government encouraged decentralised procurement by state governments in order to extend the MSP to 'non-traditional' states and increase efficiency in procurement. A decade later, Madhya Pradesh, a significant wheat producer with historically low central procurement and insufficient allocation from the central PDS, undertook successful decentralised wheat procurement (Krishnamurthy 2012). State agencies now successfully purchase, store and distribute Madhya Pradesh wheat, known for its high quality. This has benefitted farmers as well as consumers. Chhattisgarh has also taken up decentralised procurement for paddy and both states have emerged as major regional players in the public procurement of their respective crops.

Adequate and affordable decentralised storage facilities and other post-harvest infrastructure also play a crucial role in providing small and marginal farmers holding power and linking to organised markets and FPOs could play a significant role. Since smallholder producers typically have small quantities of marketed surplus, an FPO would aggregate produce from a large number of producers to reach substantial volumes and store it until it is sold. In the interim, warehouses could issue warehouse receipts against the value of the stored produce to satisfy farmers' credit needs. Many NGOs use warehouse receipts to finance aggregation and marketing operations. To promote small farmers' linkage with markets, bank interest rates for financing against warehouse receipts should be at levels the FPO can afford. Also, traditional local food storage methods, such as 'Golas' or 'Kodambbaes',[5] that have long been effective and proven to be ecologically sensitive can be explored.

Decentralised storage facilities and other post-harvest infrastructure would provide small and marginal farmers holding power. Farmer producer organisations could play a significant role in linking small farmers to organised markets.

In 2013 the government decided to provide FPOs matching equity from support organisations like the Small Farmers' Agri-Business Consortium (SFAC) up to a limit of Rs 10 lakh. Although the rules and norms for new organisational forms like FPOs are still evolving, they hold tremendous potential for ensuring small and marginal farmers access to organised markets.

2.4 Responding to a Changing Agrarian Economy

Small and marginal farmers have responded to these challenges in various ways, sometimes supported by CSOs and state governments:

- Some adopted improved cultivation practices as an alternative to green revolution-driven techniques. These should be more widely disseminated both in traditional green revolution areas and even more so in rainfed areas.
- Marginal and small farmers formed collectives or farmer producer organisations to pool small plots of land and purchase inputs, share labour and machinery, and market output as a group. Even the landless can participate in such collectives by leasing land.

A large number of farmers diversified into livestock, which also serves as a natural insurance to some extent, but is no substitute for the formal insurance that should be extended to small and marginal farmers.

The changing agrarian economy has thrown up new challenges, particularly small and marginal farmers who have been forced to adapt and innovate. In some cases, they have received support from CSOs and state governments, yet in others they have tackled the problems on their own. This section explores some of the key responses of small and marginal farmers, to the changed milieu.

2.4.1 Sustainable Agriculture

A few initiatives have been introduced in different parts of the country that aim to move away from ecologically harmful green revolution cultivation methods towards more sustainable practices, while preserving or increasing yields, and reducing costs. These include moving away from the heavy use of chemical fertilisers and pesticides in agriculture that not only degrades land (discussed in Chapter 5) and hurts yields, but also poses serious health risks. Chemical inputs are also expensive, particularly for small and marginal farmers, accounting for around 30 per cent of cultivation costs (NSS 2005). While certified organic farming is still

[5] 'Golas' or 'Kodambbaes' are traditional storage structures made of wood or mud together with natural plant based pest-repellents like neem.

currently limited to only 0.5 per cent of cultivated land, these nationwide initiatives are based on sustainable, even organic, farming practices.

One such initiative is the Community Managed Sustainable Agriculture (CMSA) introduced in Andhra Pradesh in 2004 to address low profitability resulting from the high cost of fertiliser and pesticides, with subsequent indebtedness, even leading to suicides in desperation. CMSA encourages a shift to non-pesticide management, based on understanding the crop ecosystem, adopting suitable cropping practices, including multi-cropping, understanding insect biology and behaviour and adopting suitable preventive measures. CMSA, which is largely driven by farmers' self-help groups (SHGs), also engages the local community in building and sharing knowledge and skills. A farmer who has successfully adopted CMSA becomes a community resource person who then promotes and advises on these methods and provides extension services in neighbouring villages.

CMSA has shown impressive results. It has substantially reduced cultivation costs without significantly reducing productivity, resulting in a net increase in farmers' income as well as health and ecological benefits (UNEP 2012); see also Kumar et al. 2009). Since men tend to migrate for work and women undertake farming responsibilities, these health benefits have a gendered significance. By 2012–13, nearly 2 million farmers adopted CMSA on over 1.5 million hectares or over 10 per cent of Andhra Pradesh's net cropped area (SERP 2013).

While many other sustainable farming initiatives exist, few promote certified organic farming. In five districts of drought-prone Vidarbha, Maharashtra, for instance, certified organic farming yielded positive results, even turning farmers back from the brink of distress. More than 50,000 farmers in over 600 villages switched to natural and sustainable methods of farming, and are being supported by an NGO to obtain organic certification. Not only do they now enjoy improved income, health and yields, but they no longer depend on expensive seeds and pesticides from outside dealers.

Another important sustainable agricultural practice is the cultivation of millet, which is not just a monocrop farming system, but considered a holistic farming method. Millets are traditionally inter-cropped with other varieties of millets and pulses, oilseeds and vegetables. The mix of crops allows harvesting at different times and reduces the risk of complete crop failure as at least one variety of millet grows even when rainfall fails. Millets grow on harsh uplands and hilly terrains that are predominantly inhabited by tribals making it an important component of their diet.

Millet cultivation has multiple benefits—high nutritional value, use as fodder, ability to grow in harsh conditions, and requiring few external inputs—and is inter-cropped with other crops, reducing the risk of complete crop failure.

The System of Rice Intensification (SRI), another sustainable method of cultivation, also benefits small and marginal farmers. With SRI, younger seedlings are planted at a wider spacing, while maintaining aerobic soil conditions and avoiding complete soil flooding. SRI uses 40 to 50 per cent less water and significantly less seed and chemical fertilisers, but generates significantly increased yields. In Nalanda, Bihar, for instance, paddy yields increased from 30 quintal/ha to 70 quintal/ha (Krishnagopal 2010). Organic farmers in Bihar set the 2013 world record, producing 224 quintals/ha. SRIs have now spread to other states including Tamil Nadu, Karnataka, Odisha, Madhya Pradesh and Andhra Pradesh.

2.4.2 Collective Farming

Through collective farming, small and marginal farmers and the landless can overcome many problems. Small farmers can make large joint investments in agricultural machinery or land (buying or leasing) by pooling their financial resources and gaining better access to credit. Group farming especially supports women farmers who often lack land rights and are discriminated against in market dealings (Agarwal 2010). Group cultivation also can help spread risk by greater crop diversification.

By pooling financial resources and gaining better access to credit, small farmers can make large joint investments in agricultural machinery or land (buying or leasing).

While collective farming is not new, recent successful approaches are distinct because of the domination of women farmers. An early example is a collective started in the 1980s by poor, low-caste women in Andhra Pradesh's Medak district, supported by the Deccan Development Society (DDS). The underlying aim is to ensure food security without harming the environment. Women members lease land, pay 25 per cent and take the rest on concessional credit from the DDS and the state. The group shares all cultivation tasks except ploughing for which they hire tractor services. Today

BOX 2.3 Collective Farming Under Kudumbashree in Kerala

Over 250,000 landless and small and marginal women farmers have formed collectives across 14 Kerala districts since 2006–07, cultivating 24,000 hectares. Each group of 4 to 10 members leases land for 1 to 3 years and/or pools small parcels of their own land. The groups generally gets subsidised credit from NABARD and other banks primarily to lease land, about 30 per cent of which had been fallow (9 per cent of Kerala's fallow land). The state government helped with subsidised seeds, fertilisers and manure, pesticides and access to machinery, training and support for marketing. In some districts the groups cultivate paddy for subsistence; in others they grow pineapple, bananas and vegetables mostly for sale. All members contribute agricultural labour and divide the produce and profits amongst themselves.

Collective farming under Kudumbashree has several benefits. The group can raise productivity by 10–20 per cent because it can mobilise labour when needed. Employment boosts the women's self-worth and societal status, while improving food security and nutrition levels. But challenges of finding land to lease, short tenures, insecurity of leases and ad-hoc rents remain.

Source: Planning Commission (2011a).

this initiative supports about 2,600 families. A similar initiative by Andhra Pradesh Mahila Samakhya started in 2001 supports about 4,300 small and marginal women farmers and landless who farm food crops on leased land as a group. The largest collective farming initiative is by Kudumbashree, the SHGs promoted by the government of Kerala in 1998 (see Box 2.3).

Another form of collective is a producer company incorporated under the Companies Act. Farmers take stakes in such a company and can undertake production, processing and direct marketing. Currently, India has about 130 such companies (Planning Commission 2011a). While there are some successes, producer companies have not really taken off for several reasons such as inadequate capital and capacity issues in operations as a company.

2.4.3 Diversification: Growth of Livestock

Technology and diversification have contributed the most to agricultural growth over the past three decades. While technological change—particularly during the green revolution—was the main driver of growth, diversification into horticulture and livestock has also been important. Excluding the northern states, in the 2000s, diversification contributed around 40 per cent to agricultural growth (Birthal et al. 2013).

Although marginal and small farmers have embraced diversification and enjoy comparative efficiency in producing vegetables, their lack of access to markets and credit, and higher transport and transaction costs, have meant that they still rely heavily on traditional foodgrains for food security. While some could benefit from modern supply chains, such as through cooperatives (particularly dairy) and contract farming, on the whole they remain constrained in taking advantage of higher value commodities.

Marginal and small farmers have also diversified into animal husbandry to augment their incomes. More than two-thirds of all Indian farm households now practise livestock husbandry, especially small farmers (ibid.). Marginal and small farmers own more than half the country's cattle and buffalo and between 62 and 64 per cent of small ruminants (sheep and goat) and poultry. Their share of livestock increased by 15 to 25 percentage points between 1981–82 and 2002–03 as compared to a total increase of 7 percentage points in rural households (Birthal and Negi 2012). But landless households have reduced their livestock holdings due to increasing difficulties in accessing common grazing lands.

More than two-thirds of all farm households now practise livestock husbandry, especially small farmers.

Because it tends to be more predictable than crop income, livestock income plays a crucial role in helping reduce year-to-year income fluctuations. If drought or floods affect crop yields, livestock can stabilise income as long as some crop residue or by-product is available as fodder, although consecutive crop failures that severely affect feed availability do also affect livestock.

Livestock husbandry has other benefits as well. Livestock can be sold in times of need (e.g. wedding, education) or distress and is natural capital that can be multiplied to generate wealth. In other words, 'livestock assumes the role of a financial institution—a living bank with offspring as interest—and is an insurance against income shocks' (Birthal and Negi 2012).

The rapid growth of livestock over the past two

decades—faster than crops—thus is not surprising. Livestock now generates higher output than foodgrains. It contributed 31 per cent to agricultural growth in the 1990s and 36 per cent in the 2000s, with a contribution of as high as 70 per cent in some states such as Bihar and Uttar Pradesh, and 57 per cent in Tamil Nadu (ibid.).

Despite its importance in the value of agricultural output, the livestock sector receives only about 12 per cent of total public expenditure on agriculture and allied sectors and about 4 to 5 per cent of total institutional credit to agriculture and allied sectors (Planning Commission 2011f). Similarly, small ruminants, which support livelihoods of landless and weaker sections and hold scope for commercialisation, have received less attention from government, banks and co-operatives. Livestock owners often find it difficult to obtain feed, fodder and drinking water. With two-thirds of livestock in rainfed areas, these issues came to the fore during the 2009 drought and consequent high inflation in feed and fodder (Planning Commission 2013).

2.4.4 Insurance

Agricultural insurance offers income-stabilising support to farmers, particularly those who undertake risky rainfed cultivation. In fact, banks often make agricultural insurance a precondition to institutional credit.

Agricultural insurance offers income-stabilising support to farmers, particularly those who undertake risky rainfed cultivation.

For farmers, currently, the main risk-management instrument is the National Agricultural Insurance Scheme (NAIS) introduced in 1999. It operates on an area yield index basis with claim payments based on the average crop yield across the insurance unit, typically a block. Premium rates depend on the season and crop and small and marginal farmers receive a premium subsidy. By 2008–09 the Agricultural Insurance Company, the only organisation authorised to sell NAIS products, covered about 19 million Indian farmers (Clarke et al. 2012), merely 17 per cent of the total. And about two-thirds of those insured were borrowing farmers who were required to purchase NAIS insurance; only 6 per cent of non-borrowing farmers purchased insurance (ibid).

One reason for this low penetration is the financial viability of NAIS. Due to welfare concerns, farmers' premium rates are capped and central and state governments pay for claims that exceed the cap. Between 2000 and 2008, the claims were three-and-a-half times the premium paid (ibid.). This not only put stress on the government but also delayed claim payments due to inadequate ex-ante budgeting. Delays and inconsistencies in reports of crop cutting experiments to estimate yield also increased farmers' basis risk. Resulting delays of up to 9 to 12 months caused farmers already under the stress of poor harvests cash-flow problems and made them ineligible for formal credit. It is such a vicious circle that has contributed to the low uptake of crop insurance.

Recognising NAIS's shortcomings, the government launched two pilot schemes to allow private provider participation based on actuarially determined premium rates. Premium rates paid by farmers remain capped and central and state governments paid the difference upfront. The Weather Based Crop Insurance Scheme (WBCIS), first introduced in Karnataka in 2007, now has about a third of NAIS coverage nationwide (Planning Commission 2012a). Under WBCIS, farmers receive claim payments if weather parameters exceed a pre-determined level. This has lower moral hazard as claims are payable irrespective of yield, and the insured are incentivised to save crops. It has also allowed extension of insurance to crops without historical yield data (Nair 2010a). Financially, WBCIS is more likely to receive reinsurance from international markets and costs less because it has eliminated field visits (Nair 2010b). But it does not protect against localised weather events and may not capture aggregate events like disease outbreak. Additionally, the poor density of weather stations in India increases basis risk. The other scheme, Modified National Agricultural Insurance Scheme (MNAIS), was introduced in 2010–11. It aims to reduce insurance units from block to gram panchayat (GP) and provide higher indemnity. Importantly, it provides early 'on account' payment of up to 25 per cent of likely claims based on weather indices. These pilot programmes are to be reviewed in the Twelfth Plan for future revisions to a National Agricultural Insurance Programme.

2.5 Significance of the Rural Non-farm Sector

Since agriculture cannot absorb all the growth in the rural workforce, the crucial role of non-farm activities in rural livelihoods was recognised in the 1980s. In the last two decades growth in non-farm work accelerated and now almost a third of rural workers and 42.5 per cent of rural households do

Now almost 43 per cent of rural households are engaged in non-farm work.

non-farm work (NSSO 2011). This change has taken place in varying forms and degrees across the country.

This present section attempts to explain the drivers of this growth, the process through which it has happened and its implications for village social structures. It also addresses broad issues such as the nature of rural non-farm jobs, the sections of the rural population that benefit from them and the barriers they face.

2.5.1 Non-farm Sector is the Source of Most New Rural Jobs

Between 1993–94 and 2009–10, rural employment grew by over 44 million and reached a total of 337 million adult workers (aged 15 years and above). Over this period, all net new jobs were in the non-farm sector (see Table 2.6), an acceleration of non-farm activity as compared with the 1980s, when 6 out of 10 new jobs were in agriculture (World Bank 2011a). Almost two-thirds of the increase in non-farm employment was in casual wage labour, whereas roughly one-fifth between 1993–94 and 2009–10 was in self-employment.

Where is this job growth being created? Do poorer states have more non-farm activity because of distress or do richer states have greater non-farm employment because of growth? There is no clear relationship between state incomes and rural non-farm sector employment. Kerala, at 64 per cent, has one of the highest shares of non-farm employment, whereas other high income states such as Gujarat, Maharashtra and Karnataka have small non-farm sectors. There is similar diversity amongst low income states. Chhattisgarh and Madhya Pradesh have the least, with between 15 to 18 per cent of the rural workforce employed in non-farm activities, while non-farm employment has rapidly *increased* in Bihar and Jharkhand (see Appendix 2.2).

There is no clear relationship between state incomes and rural non-farm sector employment.

2.5.2 What is Driving Non-farm Growth?

The Debate

Many have debated the issue of what has driven non-farm job growth over the past three decades. The literature in the 1970s and 1980s debated the role of agriculture in rural non-farm sector growth. A variety of factors were identified as explaining concentration of rural non-farm activity in particular regions of the country, such as the inter-linkages between agriculture and non-agricultural activity. This hypothesis emphasised the forward and backward linkages of the rural non-farm sector with the agriculture sector, whereby growth in agriculture increases demand for non-farm inputs and vice versa. Researchers observed that the performance of the rural industrial sector in certain states broadly related to agricultural productivity (Raj 1976; Papola 1987) and in some cases higher consumption and input intensity accounted for higher income in agriculturally productive states (Hazell and Haggblade 1991). Micro studies found that in the long term, crop diversification and resulting higher rural incomes prompted growth in non-farm occupations, often due to a growing demand for retail trade and services (Chand 1996). But the hypothesis that production and consumption linkages with the agriculture sector have driven non-farm job growth in the past two decades is supported by little empirical evidence (Lanjouw and Murgai 2008). Studies show that the non-farm sector (particularly self-employment) actually acts as a safety net especially in regions of declining agricultural productivity (Lanjouw and Murgai 2010).

An alternative view is that non-farm activity acts as a residual sector so that rural workers who are not fully absorbed in agriculture spill over into non-farm activities

TABLE 2.6 Rural Workers Employed in Farm and Non-farm Sector (Millions)

	Male				Female				Person			
	1993–94	1999–2000	2004–05	2009–10	1993–94	1999–2000	2004–05	2009–10	1993–94	1999–2000	2004–05	2009–10
Agriculture	139	142	146	146	90	90	103	83	229	232	249	229
	(74)	(71)	(67)	(63)	(86)	(85)	(83)	(79)	(78)	(76)	(73)	(68)
Non-agriculture	49	57	73	86	14	15	21	22	63	72	94	108
	(26)	(29)	(33)	(37)	(13)	(14)	(17)	(21)	(22)	(24)	(27)	(32)
Total employed	188	199	219	232	105	106	124	105	293	304	343	337

Note: Figures in parentheses are percentages of total employed.
Source: NSSO (1997, 2001, 2006b, 2011); Himanshu (2011).

(Vaidyanathan 1986). A variation of this view is that agrarian distress 'pushes' rural households to diversify into non-farm activities to mitigate risk from agriculture or increase household income when it goes below the reservation level. This view dominated the debate during much of the 1990s and 2000s, especially since it was observed that crises brought out several household members, women, and the elderly to work who were otherwise not participating in the labour market, and who subsequently withdrew when conditions began to improve (Himanshu 2008; Abraham 2009). Some recent empirical evidence suggests that non-farm work is to supplement family income rather than to mitigate risk (Coffey et al. 2012).

Since the 1990s, 'pull' factors, in particular urbanisation, have been identified as stimulating non-farm growth (including Papola 1992; Bhalla 1997; Himanshu et al. 2011), citing empirical evidence that non-farm employment grew faster where urban incomes also grew (Lanjouw and Murgai 2008). Proximity to growing urban areas, therefore, could have a significant positive impact on the rural non-farm sector (Lanjouw and Murgai 2010). Small towns that are more closely connected to surrounding rural areas and have stronger spill-over effects naturally have a stronger impact on rural non-farm growth.

Recent evidence suggests non-farm employment grew faster in villages close to growing small towns.

2.5.3 Types of Non-farm Jobs and Key Trends

Rural non-farm jobs fall into three major categories spread across a variety of industries—regular formal jobs, casual labour and self-employment. Over the past decade, the trade, construction and transportation sectors have driven non-farm job growth (see Table 2.7). Across both industries and types of jobs, some clear trends are emerging.

Decline in 'Salaried' Jobs

Employment in the formal, organised sector has declined—from 25 per cent of total non-farm employment in 1993–94 to 21 per cent in 2009–10 (see Figure 2.5). This is a cause for concern because formal sector jobs (particularly government jobs) bring greater job security, assurance of minimum wage, and benefits like health, insurance and pension.

Growth in government jobs has been limited. Any expansion—such as teachers or staff for the implementation of programmes such as the Mahatma Gandhi

TABLE 2.7 Sectoral Share in Rural NDP and Employment

Economic activity	Sectoral share in rural NDP (%)			Sectoral share in rural employment (%)			
	1993–94	1999–2000	2004–05	1993–94	1999–2000	2004–05	2009–10
Farm: Agriculture, forestry and fishing	57.0	51.4	38.9	78.4	76.3	72.7	67.9
Non-farm	43.0	48.6	61.1	21.6	23.7	27.3	32.1
Mining and quarrying	2.6	1.8	3.7	0.6	0.5	0.5	0.6
Manufacturing	8.1	11.2	11.5	7.0	7.4	8.1	7.2
Registered	5.2	6.7	6.7	n.a.	1.3	1.0	1.0
Unregistered	2.9	4.5	4.8	n.a.	6.1	7.1	6.2
Electricity, gas and water supply	0.9	1.4	0.9	0.2	0.2	0.2	0.2
Construction	4.6	5.6	7.8	2.4	3.3	4.9	9.4
Trade, hotels and restaurant	7.8	8.7	14.9	4.3	5.1	6.1	6.4
Transport, storage and communication	3.4	4.0	5.7	1.4	2.1	2.5	2.9
Other services	15.6	15.9	16.6	5.7	5.2	5.0	5.4
All	100	100	100	100	100	100	100

Note: n.a. refers to 'Not available'; 'Other services' include financing, insurance, real estate and business services and community, social and personal services. Data for the unregistered manufacturing sector employment in 1993 is not available because NSS had no survey in 1993–94 on the informal sector. 'Registered units' are units employing 10 or more workers and using power or 20 or more workers but not using power; 'Unregistered units' refer to all residual units.
Source: CSO (2007); NSSO (1997, 2001, 2006b, 2007, 2011, 2012); Himanshu (2011).

FIGURE 2.5 Non-farm Employment by Type (Per Cent of Total Non-farm Employment)

Source: NSSO (1997, 2001, 2006b, 2011); Himanshu (2011).

National Rural Employment Guarantee Scheme (MGNREGS), Integrated Child Development Services (ICDS) scheme, and NRLM-Aajeevika—has often been based on contracts rather than on permanent staff.

The formal private sector saw no job growth between 1999–2000 and 2009–10. Manufacturing, the largest source of non-farm income and employment in rural areas through the 1990s, did not create jobs during the post-liberalisation period of high growth. Even though growth in manufacturing output was consistently higher in rural areas than in urban centres, resulting in over 51 per cent of all organised manufacturing value-added being produced in rural areas in 2007–08, up from 36 per cent in 1998–99, it generated minimal increase in employment (CSO 2011a). This is because the growth of organised manufacturing in rural areas has largely been in natural resource-based industries, which are capital-intensive and do not employ much labour. The growth industries have been basic metals, non-metallic mineral products, and coke and petroleum products, which accounted for as much as 45 per cent of the total net value-added in 2007–08, up from 20 per cent in 1998–99. The machinery and chemicals sub-sectors, which accounted for 10 per cent and 15 per cent of rural manufacturing value-added in 2007–08 also have grown rapidly but are not labour-intensive. On the other hand, the contributions of agro-based and labour-intensive industries such as food products, textiles and leather have declined from 27 per cent of the total value-added in 1998–99 to 14 per cent in 2007–08.

Even the limited number of jobs created in the formal private sector is mostly on a contract basis. Private corporations with the potential to create regular salaried jobs circumvent government laws to keep down the cost of labour and retain flexibility (see Box 2.4).

With registered manufacturing units in rural areas employing less than 15 per cent of workers, the rest work in the unorganised manufacturing sector often as self-employed persons (see Table 2.7).

Until Recently, Self-employment has been Predominant

Until recently, the largest category of rural non-farm workers was the self-employed, predominantly in unorganised manufacturing, trade and services. Between 1983 and 2004–05, the number of self-employed in rural areas doubled from 23 to 47 million, or 50 per cent of total rural non-farm employment (see Figure 2.3). From 2004–05 to 2009–10, however, the number declined sharply to 41 million or 38 per cent of total rural non-farm employment.

Self-employment in Unorganised Manufacturing is Declining ...

A significant segment of self-owned enterprises operates in unorganised manufacturing, relying on family labour. In 2005–06, only 16 per cent of the total unorganised manufacturing workforce were hired workers, mainly in industries such as food processing, non-metallic mineral products (such as glass, ceramics, tiles, clay and finished stone), textiles, furniture, and apparel (NSSO 2007). Unorganised manufacturing also includes traditional artisans who have typically passed down their skills over the generations.

Self-employment in unorganised manufacturing is declining but growing in trade and services.

BOX 2.4 Domination of Informal Labour

When 93 per cent of the workforce is unorganised and informal, businesses would be foolish not to tap into this gold mine. But facts are concealed, less than proper wages are paid, not to mention the slurring over of provident fund, medical benefits and bonuses. If this means bribing the labour inspector, it is a minor expense. Not surprisingly, the unorganised workers have grown over time in India. When labour is ready to be hired for a song, it is tempting for business houses to rely on the informal sector.

This has unexpected consequences. If you think your swanky car is a product of the organised sector, think again. Reports suggest that as much as 85 per cent of the workforce of some of the largest auto manufacturers is made up of contract labour. Similarly, garment manufacturing units are outsourcing their work to smaller unorganised units who mainly employ informal labour under poor working conditions. Relying on cheap, informal labour has become such a habit that it is hardly surprising that the number of units employing less than 10 workers, which get classified as informal has increased significantly over the last 25 years or so. Although many are household industries, they often produce for large corporate enterprises. As household industries employ low paid labourers, there is little demand for skilled workers and they help private corporations make huge profits. Not only does this make our corporate sector corruption-prone trying to circumvent government laws, but also inhibits it from being world class. This is why the vocationally trained labour force is stagnant at 5 per cent in India, but a staggering 95 per cent in South Korea.

But why should any of that be worrisome? After all, on the back of informal labour, our textile exports went up by roughly 100 per cent between the years 1995 to 2003. Even if one were to entertain good intentions, it is hard to argue against such practice. Corporate spokespeople may, however, explain this situation somewhat differently. In fairness, they are not always unconvincing. They would argue that the reason for their over-reliance on the informal sector is because government laws are so unreasonable. In their rendition, the Industrial Disputes Act makes it impossible to fire recalcitrant and non-performing workers and unit closures once the unit employs more than 100 people. But the laws and regulations on worker job security, minimum wages are not unique to our country. Nothing stops the employer of a unit with less than 100 employees from providing wage guarantee and social security benefits.

If the corporate sector routinely lapses into corrupt practices, blame it on the easy pickings strewn in its path. Once you go down the road on informal labour, other practices soon follow as natural accompaniments. Records are concealed, payments docked for no good reason, and a little bribe on the side helps grease the wheel. As our low-wage products make us internationally competitive, there is little reason to change the rules. The law enforcers and entrepreneurs are not just on the same page, but often on the same balance sheet too. When it comes to the corporate sector, small may not always be beautiful, but it need not be informal either.

Source: Dipankar Gupta.

Labour productivity of the self-employed or own-account enterprises (OAEs) tends to be low and their value-addition and number of people they employ have marginally declined over time. In addition, inconsistent product quality, design issues and inadequate marketing channels limit their access beyond local markets. In other instances, OAEs have been unable to scale up either for lack of seed capital or lack of knowledge to innovate production processes. Due to these limitations and increased competition from urban products, many in the unorganised sector have discontinued production and have resorted to wage labour (see Section 2.5.4). Even skilled artisans who cannot make a living off their trade are forced to migrate or work as casual labour.

The government has tried to revive such enterprises by providing technology upgrades, credit support and market connections. This sometimes takes a 'cluster' approach, encouraging industries to benefit from proximity to one another by providing them access to infrastructure, markets and technology. But while a handful of clusters have succeeded, by and large this intervention has not worked. Success stories include the cashew and fruit processing cluster in Sindhudurg district in Maharashtra, where micro enterprises and SHGs have mechanised the processing and packaging of cashew and fruits to meet international standards and are marketing directly to Mumbai and international markets (UNIDO 2003).

... but is Growing in Trade and Services

In recent years, as self-employment in unorganised manufacturing has declined, the trade segment has grown, both in numbers employed and in rural NDP

(see Table 2.7), and is now the main source of growth in self-employment. Two possible reasons for this are: (i) the rural production economy is growing and related trade is expanding, or (ii) the rural market for urban products is emerging. It appears that rapidly rising rural consumption is driving growth in retail trade. Several market surveys and studies show the large and growing size of the rural market and the rapid increase in penetration of consumer durables, consumer products and farm equipment such as tractors, combine harvesters, and power sprayers. As much as 50 to 75 per cent of the sales of fast moving consumer goods and consumer durables are in rural markets.

2.5.4 The Marked Casualisation of the Labour Force

A striking feature of non-farm employment is the casualisation of labour. Today, two out of three new rural non-farm jobs are casual labour, i.e. unskilled daily wage jobs. Unlike regular salaried jobs, casual labour typically requires little or no education and none of the financial capital that self-employment requires. Casual labour offers no job security or benefits, but because it is both perceived and compensated much better than agricultural labour, offers the chance of social mobility. For this reason, the move to casual labour is often not a distress move away from agriculture labour, but rather an intentioned one.

A striking feature of non-farm employment is the casualisation of labour. Today, two out of three new rural non-farm jobs are casual labour, i.e. unskilled daily wage jobs.

Over time, this move from agriculture to casual work has also contributed to a narrowing of the gap between casual non-farm and farm wages, as agricultural labour is becoming scarce. The wage gap between regular employment and casual labour has also narrowed. One possible explanation is that the growth in regular jobs has largely been in lower paying contract-based jobs (World Bank 2011a).

The one-time trend of young men moving to non-farm employment while women and older men stayed to do farm work is now changing. In recent years, the gap between male and female wages, particularly in casual non-farm work, has narrowed and female participation in the casual labour force has grown (see Figure 2.5).

The main demand for casual labour has come from the construction industry, which has now overtaken manufacturing as the highest provider of non-farm employment. A majority of the construction workforce is characterised by unskilled workers, who secure work on a day-to-day basis through a spot or 'naka' market. The construction sector boom has led to growing demand for masons, marble polishers, brick kiln workers and skilled workers such as carpenters, plumbers, electricians, welders and crane operators. But the demand for skilled workers remains largely unmet, while the share of unskilled workers in the construction sector has risen from 73 per cent in 1995 to 83 per cent in 2005 (Planning Commission 2007). Training of construction workers is generally passed on by master craftsmen who often lack the knowledge of new construction technology. Even unskilled workers need a minimum amount of training on the use of machinery, safety procedures, workplace discipline and ability to execute instructions.

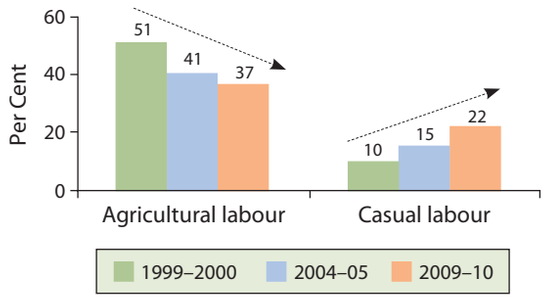
2.5.5 The Evolving Social Dynamics of the Village

Historically, the most privileged rural segment could get regular salaried jobs, which typically required better education, social connections or payment of bribes. These were the early migrants who over time became permanent migrants. For decades, the more disadvantaged, particularly the Scheduled Castes and Tribes (SCs/STs) or those with lower landholdings, could not move away from agriculture. Debts often tied them to large landowners. But with the decline in farm size and consequent preponderance of family farms, along with new opportunities outside agriculture, many moved to non-agricultural jobs. The SCs in particular benefitted from such jobs—with a 12 percentage point shift from agricultural labour to casual labour (see Figure 2.6). In making it possible for them to break out of traditional caste hierarchies, the growing availability of casual labour jobs has given the socially disadvantaged upward mobility (see Chapter 1).

Growing availability of casual labour jobs has given the socially disadvantaged mobility.

As more people move to casual non-farm work, social hierarchies and traditional production systems in villages are disintegrating. One of these is the traditional *jajmani* system, whereby the landless service classes or *'kameens'*, with occupations such as weavers, cobblers, barbers, palanquin bearers or iron-smiths, provided services to the landed higher castes. The higher caste patron or *'jajman'* provided inputs to the kameen class, who then would render services or supply finished goods in exchange for grain and other payments in

FIGURE 2.6 Shift of SC Agricultural Labour Households to Casual Labour as Main Source of Income (Per Cent of Total SC Rural Households)



Note: 'Other labour' includes manual labour working in non-agricultural occupations.
Source: NSSO (2001, 2006b, 2011).

TABLE 2.8 Distribution of Rural Households with Non-farm as Major Source of Income by Each Size Class of Land Owned (Per Cent)

Size class (ha)	2004–05	2009–10
0	71.9	76.3
0.001–0.004	50.3	52.4
0.005–0.40	49.3	54.4
0.41–1.0	24.7	26.0
1.01–2.0	15.1	17.5
2.01–4.0	12.1	11.9
4.01+	10.8	13.2
All	38.3	42.5

Source: NSSO (2011).

kind. Jajmani caste groups were hereditary, so that the relationship between jajman and kameen passed down through generations. Kameens also worked as agricultural labour. Most belong to the SCs and other backward classes (OBCs). But as households diversify and move out of inherited occupations, this web of production and exchange is coming apart countrywide. Those that are turning to non-farm occupations are concentrated amongst the less privileged with lower landholdings (see Table 2.8).

But not all are switching occupations. Many households, both more and less well-to-do, are not leaving farming, but rather are combining farm and non-farm work. These are the overlapping livelihoods referred to in Chapter 1. Most non-farm work is in nearby towns or in farther cities. Short-term migration or commuting allows farming households to take on non-farm work and villagers increasingly commute to towns, mainly for construction work (Himanshu et al. 2011; Jeyaranjan 2012; Mukhopadhyay 2011).

Even as opportunities expand, the dearth of human, financial and physical assets prevent the poor from participating as entrepreneurs in growing non-farm sectors and confines them to employment in low-productivity, low-growth segments (Haggblade et al. 2010). Not surprisingly, socially disadvantaged groups face the most severe handicaps. SCs thus only own 8 per cent and STs 3 per cent of the unregistered sector microenterprise, and 11 and 5 per cent respectively of the registered sector (MSME 2007). But instances of successful Dalit entrepreneurship are emerging (see Box 2.5).

2.6 Barriers to Rural Non-farm Livelihoods

Creating sustainable and secure livelihoods requires an environment that enables and empowers individuals to avail of opportunities. There are various aspects to this, including capabilities, equal access and assets. Capabilities include education and skills, and the health and nutritional security needed to be a productive worker.

BOX 2.5 Dalit Entrepreneurship

Although one may not imagine Dalits as entrepreneurs, they do engage in certain traditional non-farm occupations. Rural Dalits continue to face the disadvantages of discrimination, fewer social networks and lack of access to finance, markets and inputs compared to urban Dalits (Jodhka and Gautam 2008; World Bank 2011d). But micro-level data shows that migration has helped Dalits move into entrepreneurial activities. A survey in urban centres in Haryana and Uttar Pradesh found that 20 per cent of Dalit entrepreneurs were migrants from nearby villages and had started ventures—largely funded by personal savings—such as shopkeeping, dealerships or agencies, and providing skill-based services (Jodhka 2010). While most first generation entrepreneurs had illiterate parents, they were better educated. Despite caste issues that bar them from renting shops and expose them to hostile competition, Dalit entrepreneurship, thus, is emerging.

Equal access—from financial inclusion to proximity—creates a level playing field to compete for opportunities. And **assets**—social, financial or physical—determine an individual's ability to avail of opportunities. This section looks at some critical barriers that constrain opportunities to developing productive rural livelihoods, and discusses efforts made to address them.

2.6.1 Financial Exclusion

A key barrier for vulnerable groups is financial exclusion. In 2003, nearly 80 per cent of non-farming households had no access to credit from any source and thus could not invest in productivity-enhancing assets (NSSO 2005b). They also had no affordable access to other financial services such as savings, insurance, and payment and remittance facilities at an affordable cost. Though efforts have been taken to extend financial services to unbanked rural areas, this remains a concern.

In 2003, nearly 80 per cent of non-farm households did not access credit and could not invest in productivity-enhancing assets.

Extension of Formal Banking Institutions

Banks play an important role in extending financial services. Although the expansion of banking services to rural areas slowed down after the 1991 reforms, renewed emphasis on financial inclusion increased bank penetration after 2005. After 2006 this was driven by the Reserve Bank of India (RBI) innovations in the form of no-frills accounts (NFAs) with zero or very low minimum balance, relaxed 'know your customer' norms and electronic benefit transfer.[6] Such initiatives resulted in an almost four-fold increase in bank coverage from March 2010 to March 2012 (Sarr et al. 2012).

By the end of March 2012, around 105 million NFAs had been opened. But banks often could not service customers that were not within commuting distance. This led to dormant NFAs, with barely just over 10 per cent reported as active (Kochhar 2009). Although financial literacy education has increased usage (Sarr et al. 2012), the high number of inactive accounts and the small amounts transacted are not financially viable for banks.

Banks have attempted to overcome this problem through the business correspondent (BC) model since 2006, allowing them to expand (see Table 2.9).

TABLE 2.9 Progress in Financial Inclusion Through the Banking System

Particulars	March 2010	March 2011	March 2012
Total number of banking outlets in villages	54,258	1,00,183	1,47,534
Through branches	21,475	22,662	24,701
Through BCs	32,684	77,138	1,20,355
Through other modes	99	383	2478
Number of no-frills accounts (million)	50.3	75.4	105.5
Amount in savings (Rs crore)	4260	5700	9330

Source: RBI (2011b).

BCs are authorised to carry out transactions as bank agents. Banks can thus extend services to distant clients and provide services at customers' doorsteps. About 1.5 lakh villages now have access to banking facilities, either through a branch or a BC. Led by the State Bank of India, 15 to 20 banks have piloted the BC model reaching to about 1.2 lakh villages.

Yet, while access has increased, several problems persist. Villages covered by bank branches enjoy a wider range of services compared to those covered by BCs. BCs often focus only on opening NFAs and linking them to government payments such as under MGNREGS or pensions; in some cases they extend credit either in partnership with a microfinance institution (MFI) or through the SHG federation, but BCs do not usually promote saving habits or credit facilities, and other aspects such as remittances and insurance are unavailable. Banks also face challenges because BCs' handling of cash has attendant risks (ACCESS 2009) and the low commissions paid to BCs does not lead to stability or commercial viability (ibid.; Sa-Dhan 2012a).

Micro and small enterprises are eligible for credit at reduced rates under priority sector lending activities for non-farm activities, along with agriculture. The RBI also introduced a General Credit Card scheme in 2006 to provide access to credit to non-agricultural clients in rural and semi-urban areas along the lines of the Kisan Credit Card scheme. In 2008, the Rangarajan Committee stressed that all households must be covered by 2015 and suggested the creation of two funds—the Financial Inclusion Promotion and Development Fund

[6]Electronic benefit transfers allow disbursement of government payments at the location of business correspondents (BCs) of banks through hand-held devices using biometric smart cards.

and Financial Inclusion Technology Fund—by the government, the RBI and NABARD.

Microfinance

Microfinance, an important tool in providing people without bank accounts access to mainstream finance, has made inroads in lending to the poor (see Table 2.10). India has two models: the SHG-Bank Linkage programme and the MFIs.

The SHG-Bank Linkage programme, developed by NABARD, links SHGs to banks and provides them savings and credit facilities. SHGs pool the savings of their members and use them and bank loans to extend small loans to them. Sixty-eight per cent of microfinance customers, or more than half the rural households, are members (NABARD 2012). An average loan to an SHG is around Rs 1.44 lakh and an average loan to a member is around Rs 14,000 (ibid.). Often inadequate, these are supplemented with other loans (Johnson and Meka 2010). NABARD has now introduced SHG2 to progress from community banking to individual banking by allowing SHG members to save by opening or reviving their bank accounts and qualifying enterprising members for larger loans.

MFIs, while narrower in reach, provided loans through joint liability groups to almost 32 million customers by end-March 2011, although credit later declined after the microfinance crisis in Andhra Pradesh (see Table 2.10). A number of factors caused the crisis, including credit given too easily without proper creditworthiness assessments, high interest rates and coercive loan recovery practices. Often, if the periodic repayment schedule did not coincide with the cash flows of customers, they resorted to multiple borrowing to repay previous debts, creating a debt trap (Planning Commission 2011c). The Malegam Committee Report (RBI 2011a) highlighted the need to regulate MFI activities because borrowers belonged to vulnerable social groups. Consequently the Microfinance Institutions (Development and Regulation) Bill, 2012 was introduced putting RBI in control of the sector.

A critical issue for income generation and enhancing the non-farm sector is that microfinance credit has been fungible and catered to varied financial needs of poor households. Though the RBI, in 2011, stipulated that 75 per cent of loans should be for the purposes of generating income, this is difficult to monitor. A study in Andhra Pradesh found that only around 17 per cent of loans were used for investment (Ananth 2011).

2.6.2 Marketing of Non-farm Products

Lack of marketing facilities is another major constraint especially for the self-employed segment of the non-farm sector, a heterogeneous collection of micro and small enterprises that generally produce and market their products under uncertain conditions. The products range from traditional handloom and handicraft goods to non-traditional products such as garments, iron and steel works, flour milling and food products. Growth in non-traditional goods recently has outpaced that in traditional goods (Mehta 2002). Due to poor education, lack of market orientation and poor market access, small producers often know so little about markets, consumer tastes and quality criteria that their goods do not match market demand and result in low returns (Annapurna 2006; Pastakia and Oza 2011).

Small producers often know so little about markets, consumer tastes and quality criteria that their goods do not match market demand and yield low returns.

Despite increased demand for rural products, small producers cannot easily access urban and export markets due to supply chain inefficiencies. They lack organised systems to aggregate goods, conduct quality checks, and supply them to retailers. Because they also lack the financial capacity to hold produce, they are forced

TABLE 2.10 Client Outreach and Credit Portfolio of Microfinance

	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12
Number of customers (million)	48.0	61.2	76.6	86.3	94.3	83.4
o.w. Banks-SHG	38.0	47.1	54.0	59.6	62.5	56.6
MFI	10.0	14.1	22.6	26.7	31.8	26.8
Loans outstanding (Rs billion)	158.2	229.5	344.1	456.1	521.8	572.5
o.w. MFI	34.6	59.5	117.3	183.4	215.6	209.1

Note: o.w.: of which.
Source: Adapted from Sa-Dhan (2012b); NABARD (2012).

to sell in the nearest local market, often to middlemen who, while enabling market linkages, pay them a fraction of the fair price. With the breakdown of the jajmani system, producers who were once provided raw materials by rich landlords and traders are now forced to buy materials at high prices due to their limited scale of operation, and no longer have the assured markets they once had. As a result, a large number of artisans and other rural producers are discontinuing production and, as they lack other skills, looking for unskilled casual employment.

New Trends and Initiatives for Supporting Rural Marketing

The government attempted to support rural producers by setting up the All-India Handicrafts Board as early as 1952. But as the focus shifted to industrialisation, policies for artisans increasingly targeted welfare rather than growth. Since 2000, this approach has changed and the government has tried to create marketing infrastructure. Certain initiatives of the past decade merit discussion.

Improving marketing infrastructure and access to markets. A market-oriented approach is critical for livelihood projects to succeed and be scalable. In recent years, the government has intervened by creating a marketing infrastructure, linking small producers with modern markets and giving them the opportunity to learn consumers' tastes. Since 1999, the Ministry of Rural Development (MoRD) has organised *SARAS mela*s for the sale of rural products produced by SHGs. In 2009, 22 fairs were held with over 7,500 participants. It has also created rural *haat*s since 2009 to provide permanent marketing centres at the village, district and state levels. In addition, rural *bazaar*s similar to ITC's e-choupal are being started for ICT-based marketing, with operational portals for Goa, Tamil Nadu and Tripura. But these interventions are inadequate. Most production remains disorganised and production-oriented rather than demand-driven, leaving artisans struggling for sustenance.

Demand-driven production. Another intervention involves addressing market information asymmetries to enable demand-driven production. The *Rangasutra* initiative, for example, provides producers design and marketing inputs, coordinates production and quality control, and brings together poor handloom craftsmen, fashion-conscious consumers, the organised retail sector and other supply chain partners. Design houses and retail outlets such as FabIndia, Anokhi and Contemporary Arts and Crafts have marketed these products and have attempted to reposition and contemporise them in accordance with market tastes.

Value chain interventions. Value chain interventions are seen as a special type of market-based intervention that attempts to generate livelihoods at different nodes of the chain. Certain successful initiatives have revived a sick value chain or created new ones. PRADAN's sericulture initiative in Jharkhand and Bihar, for instance, added new nodes to the tussar silk value chain to improve quality and productivity, and focused on marketing through Eco-Tussar which sells these products through large urban stores and exports (Pastakia and Oza 2011).But the rate of proliferation of such practices is limited and should be hastened to link small producers to modern markets and promote their livelihoods.

2.6.3 Skills

Failure to adequately develop the skills of rural dwellers has hurt their livelihood prospects. Over 30 per cent of India's rural population remains illiterate (Census of India 2011) due to the poor quality of education and the almost 50 per cent drop-out rate (MHRD 2011). Many jobs require vocational skills not taught in schools. With the growing demand for technical skills to fill roles previously filled by college graduates, vocational training is increasingly seen as a way to improve rural employment prospects (Unni and Sarkar 2012).

Failure to adequately develop the skills of rural dwellers has hurt their livelihood prospects.

Huge skill gaps in professions ranging from plumbers and electricians to nurses and teachers persist. India's vocationally skilled workforce is limited to only about 10 per cent, trained formally (2 per cent) or informally (8 per cent) (Planning Commission 2011h). While various ministries have training programmes for artisans, textile and handicraft workers and small enterprise workers, most informal labourers generally learn from other low skilled people either on the job or through informal apprenticeships.

Training capacity remains grossly inadequate. Taken together, the government-run, and now increasingly, public-private partnership (PPP)-modelled, Industrial Technical Institutes (ITIs), privately-run Industrial Training Centres (ITCs) and various polytechnic institutions can only train about 3.1 million people per year while 12.8 million people enter the workforce per year (Planning Commission 2011h). The total

training capacity would have to increase to 40 to 50 million per year over the next decade to achieve the government's goal of training 500 million people by 2022 (Chenoy 2013).

But formal vocational training programmes are not in high demand for various reasons:

- The quality and relevance of training provided in formal institutions is poor and have not improved employability. The National Council for Vocational Training sets the curricula of ITIs and ITCs, but it does not take adequate account of industry and employer needs. Private employers must be continuously consulted in designing curricula and keeping them updated for training to remain relevant.
- Entrance requirements cannot be met. Even though only 12 per cent of the rural population has secondary education (NSSO 2013), it is often a pre-requisite (Hajela 2012).
- The high cost of financing vocational education, without sufficient banking support, also deters potential participants. Even if employment prospects following training may be good, pay rates are too low to incentivise investment in the programme. On the other hand, firms do not want to pay a placement fee for skilled workers for fear that they will get inadequately skilled workers and the risk of attrition.

To address these concerns, the government launched the National Skill Development Policy in 2009, which caters to emerging employment market needs by involving social/ private partners. The National Skill Development Corporation (NSDC), an innovative PPP was established to catalyse the creation of private, for-profit vocational institutions. Rather than providing training themselves, NSDC subsidises companies or organisations that provide skill development through loans, equity or tax breaks. Individuals learn industry-relevant skills through such corporate involvement. The NSDC is also involved in forming Sector Skill Councils to establish quality and skill competency standards, standardise the affiliation and accreditation process, and assist in planning and implementing training programmes by identifying skill development needs and cataloguing skill types. But even the ambitious NSDC faces the challenge of scaling up financial assistance programmes with effective standardised monitoring tools (Sabharwal and Sharma 2013).

2.7 National Rural Livelihoods Mission (NRLM): Aajeevika

Launched in June 2011, Aajeevika[7] is envisioned as the centrepiece in the fight against rural poverty. It is based on the core belief that the poor have innate capacities that can be developed through a group approach (collectives such as SHGs, farmer cooperatives and artisan groups) and supported with skills training, marketing knowledge and finance to build sustainable farm and non-farm livelihoods. Aajeevika has a three pillared approach:

- Improving the poor's existing livelihood options;
- Building marketable skills; and
- Nurturing the self-employed and entrepreneurs (for micro enterprises).

Aajeevika has a three-pillared approach:
- Improving existing livelihood options
- Building marketable skills
- Nurturing the self-employed

First pillar: improving the poor's existing livelihood options

Aajeevika's first pillar aims are:

- to bring at least one member of each poor rural household, preferably a woman, into the SHG system, an effort rolled out in phases beginning with 150 districts, including 82 Integrated Action Plan (IAP) districts;
- to promote and scale up innovative livelihood activities in farming and livestock;[8]
- to improve SHGs' access to credit and improve members' financial literacy—i.e., make them more informed and responsible borrowers; and

[7]Aajeevika replaces the Swarnajayanti Gram Swarozgar Yojana (SGSY), the primary programme aimed at assisting the rural poor in developing alternate income sources since 1999. Central to SGSY were SHGs, which marketed their farm and non-farm produce, received skill training as 'units', formed savings collectives, and acted as channels for livelihood finance. This group approach marked a critical shift from SGSY's predecessor, the Integrated Rural Development Programme which focused on providing household-level access to finance for small enterprises. But SGSY had limited success. While nearly 31 lakh SHGs were formed between 1999–2000 and 2008–09, barely 22 per cent of them undertook economic activity. Much of the economic activities was in the primary sector with little diversification in their livelihood base (MoRD 2009). This was mainly due to insufficient capacity building, lack of technical training and credit and market constraints. Reviews (Planning Commission 2012a) also found that states with more robust and pro-poor institutions had better success in implementing SGSY and in mobilising the poor, particularly the most vulnerable groups—SC/STs, women and the disabled.

[8]A key programme, Mahila Kisan Sashaktikaran Pariyojana (MKSP) is intended to create sustainable agricultural livelihoods for women, improve their skills and managerial capacities and ensure food security at the household and community level. MKSP has aided in extending

- to use SHGs as conduits to broader financial inclusion by having them serve as business correspondents and community facilitators for credit, remittances and insurance.

The second and third pillars: placement-linked skill training and self-employment

To move beyond the low productivity businesses that characterised previous programmes and create formal and self-employment opportunities, Aajeevika emphasises *professionally-managed and relevant capacity building* through:

(a) Aajeevika's skill development programme; and
(b) rural self-employment training institutes (RSETI).

Aajeevika's skill development programme—which aims to cover about 50 lakh rural youth over the 12th Plan period, is largely run by the private sector, financed 75 per cent by the government and 25 per cent by the private sector implementing agency. The programme focuses on the rural poor (all beneficiaries are Below Poverty Line or BPL) and youth from IAP districts, Jammu and Kashmir, north-eastern states, districts/ blocks with high SC population and minority-concentrated districts, and girls. What distinguishes this from other government programmes is its links to post-training job placement, guaranteeing salaried employment for 75 per cent of the trainees. But the programme faces various challenges, a key one being job retention. The Himayat programme in Jammu and Kashmir[9] has tried to address the issue of retention with some success (see Box 2.6). The Ministry is now considering a migration support centre and an alumni programme to counsel the youth who have migrated from rural areas and need to adapt to the demands of the formal sector.

Aajeevikas skill-development programme is largely run by the private sector, financed 75 per cent by the government and 25 per cent by the private sector implementing agency.

In addition to skills training for formal employment, Aajeevika provides training in technical skills, marketing, and best practices to encourage the rural youth to set up micro enterprises. This is through the RSETIs created in each district in partnership with public sector banks. RSETIs are intended to provide apprenticeship opportunities and banks are to provide credit for starting micro enterprises. In addition, following a Kerala model, Micro Enterprise Consultants—men and women who can provide entrepreneurs support in identifying business opportunities, building market and supplier linkages, etc.—are locally placed on a chargeable basis.

Aajeevika also trains SHG members as health professionals, nutrition and education experts who can act as community resources, and government representatives for social development programmes.

BOX 2.6 Himayat Programme in Jammu and Kashmir

Himayat is a placement-linked skill development programme seeking to train and place one lakh school dropouts and economically disadvantaged youth in Jammu and Kashmir over five years. Project implementing agencies provide three to nine months of training for emerging sectors such as retail, information technology, communication and hospitality. About 70 per cent of the training is centred on domain skills and 30 per cent on personality development, such as communication and English language skills and computer literacy. The youth are trained in batches of 10 to 15 candidates from a Gram Panchayat and parents are involved to allay fears of their children working outside their villages improving job retention. The youth are mainly placed in urban centres of Jammu and Kashmir—Srinagar and Jammu—and outside Jammu and Kashmir in Chandigarh, Delhi and Punjab. Leading companies such as Cafe Coffee Day, KFC, V-Mart, Competent Synergies and Bharati Walmart have recruited trainees. Himayat provides financial assistance of Rs 2000 per month for six months. Approximately 8,000 youth were trained and 5600 placed in the first two years. Job retention was a concern in the initial batches as the youth found it difficult to adapt to the discipline of formal work and urban life. These issues are being addressed by helping youth take informed job decisions, alumni programme for developing social network in cities and by providing trainees support for the first month, to, for instance, help them settle in the city.

Source: Based on discussions with MoRD officials.

sustainable agricultural practices such as community managed sustainable agriculture in Andhra Pradesh and SRI cultivation in Bihar (see section titled 'Sustainable Agriculture'). MKSP has also assisted in establishing market linkages and connecting women farmers with community-based organisations that provide access to credit, inputs, procurement and marketing.

[9]Aajeevika recently launched a skill development initiative like Himayat called 'Roshni' for the rural youth from the 24 most critical LWE affected districts covering women and vulnerable tribal groups on a priority basis.

Strategic Shifts: NRLM versus Its Predecessor, the Swarnajayanti Gram Swarozgar Yojana (SGSY)

NRLM has two strategic shifts aimed at overcoming the shortcomings of its predecessor programme, the SGSY:

- It is demand-driven. States prepare livelihoods-based 7-year business plans and annual action plans for which they request funds from the centre.
- It has introduced a professional and autonomous *institutional delivery structure* by the State Rural Livelihood Mission (SRLM), an autonomous society that has flexibility in hiring and autonomy in developing private-sector partnerships. SRLMs have multidisciplinary teams of trained professionals at the district and block levels responsible for social mobilisation and technical support for SHGs and Aajeevika beneficiaries. While most states have set up SRLMs as societies, Gujarat has experimented by setting up a for-profit company, the Gujarat Livelihood Promotion Company. Recently, the Cabinet authorised the creation of an autonomous and professionally managed National Rural Livelihoods Promotion Society focused on providing the states technical support.

To overcome exclusion and inclusion errors, Aajeevika will use *a system of participatory identification of the poor* (PIP) rather than the BPL list. This will benefit SHGs due to greater affinity amongst members, which is more difficult if members are brought together arbitrarily using a BPL list. PIP has a set of automatic inclusion and exclusion criteria and a set of deprivation indicators broader than income alone. The Gram Sabha (GS) and Gram Panchayat (GP) then vet and modify the list of candidates that fit these criteria.

Aajeevika is intended to cover all districts over the next 5 to 7 years. Certain states such as Andhra Pradesh and Kerala are already implementing NRLM on a state-wide basis and other states will gradually transit from SGSY to NRLM. While the programme holds promise for energising rural livelihoods and making them more productive, how well it will actually perform remains to be seen.

2.8 Conclusion

The agrarian economy remains central to rural livelihoods. But rising costs, shrinking farm sizes and stagnating productivity put it at risk, particularly for small and marginal farmers for whom access to land, credit and markets remains challenging. Dryland farmers, in particular, have been sidelined in the development of commercial crop models, even though their farms constitute well over half of the country's total cultivated land.

Farm-based livelihoods must urgently be revitalised and secured by addressing these issues. To address the current leasing-in of land on insecure terms, without credit, subsidies and other institutional support, collective or cooperative farming should be encouraged. Farmers then can jointly buy inputs and sell products and thus compete with larger farmers on a more equal footing.

Technological research and development to improve yields merit investment, but traditional agricultural knowledge and practices must inform this research. Special attention must be paid to improving productivity of small and dryland farmers. Crops like millet, for instance, that are not only better suited in dryland areas, but also ensure food security due to their high nutritional value, should be promoted.

Other interventions include improving access to credit, developing products suited to agrarian livelihoods, and increasing financial literacy. Crop and livestock insurance should be expanded to protect rural incomes from shocks. As farmers increasingly depend on livestock for income, rising fodder and feed costs and the marketing of livestock products need to be addressed. Livelihoods based on small ruminant husbandry should also be promoted, particularly for the marginal and landless.

Non-farm sources of income have grown in importance over the last two decades. But non-farm jobs overwhelmingly are in the form of casual labour or daily wage work. Although such jobs do provide the unskilled certain opportunities, they offer no job security, advancement opportunities or other benefits of formal employment. Of the persistent barriers to more productive jobs for rural dwellers, poor access to capital, marketing opportunities and marketable skills remain the most pressing.

The government launched Aajeevika to address these constraints. However, the scale of the constraints far surpasses the actions taken to address them. While private sector involvement in skill-development programmes has improved the relevance of skills training and thereby the potential for job placement, these projects are too small in size and number to satisfy to total need.

Appendices

TABLE A2.1 Marketable/Marketed Surplus of Paddy Out of Farm Production by Size Category of Farmers in India, Triennium Ending 1998–99

S. No.	Details	Quantity ('000 tonnes)				Per Cent			
		Small	Medium	Large	Total	Small	Medium	Large	Total
1.	Total production	52,029	36,672	33,570	1,22,271	100	100	100	100
2.	Total farm family requirement including losses	28,620	15,269	10,577	54,466	55	42	32	45
3.	Marketable surplus	23,409	21,404	22,992	67,805	45	58	68	55
4.	Quantity sold—Marketed surplus	22,779	19,620	21,144	63,543	44	54	63	52

Note: 1. Average of 1996–97, 1997–98 and 1998–99.
2. Size category of farmers based on the area under paddy cultivation. Difference between marketable and marketed due to post-harvest losses.
Source: MoA (2002).

TABLE A2.2 State-wise Share of Non-agriculture in Total Rural Employment (Per Cent)

State	1993–94	1999–2000	2004–05	2009–10
Andhra Pradesh	21	21	28	31
Arunachal Pradesh	14	17	18	24
Assam	21	32	26	30
Bihar	16	19	22	33
Chhattisgarh	–	–	14	15
Delhi	90	93	93	100
Goa	55	71	65	76
Gujarat	21	20	23	22
Haryana	28	32	36	40
Himachal Pradesh	20	26	30	37
Jammu & Kashmir	24	24	36	40
Jharkhand	–	–	30	45
Karnataka	19	18	19	24
Kerala	44	52	58	64
Madhya Pradesh	10	13	18	18
Maharashtra	17	17	20	21
Manipur	36	25	31	47
Meghalaya	14	14	18	29
Mizoram	11	15	13	19
Nagaland	25	20	21	26
Odisha	19	22	31	32
Punjab	25	27	33	38
Rajasthan	20	22	27	37
Sikkim	41	39	40	46
Tamil Nadu	30	32	35	36
Tripura	52	54	57	69
Uttar Pradesh	20	24	27	33
Uttarakhand	–	–	22	31
West Bengal	37	36	37	44
All-India	22	24	27	32

Note: All data pertain to usually working persons in the principal status (PS) and subsidiary status (SS) taken together.
Source: *NSS*: *Employment and Unemployment Situation in India, Report Nos* 409 (50th Round, 458 (55th Round), 515 (61st Round) and 537 (66th Round) (1997, 2001, 2006 and 2011).

TABLE A2.3 Key Features of SGSY and NRLM-Aajeevika

SN	Key Feature	SGSY	NRLM-Aajeevika
1.	Fund allocation	District wise allocation based on BPL list/rural poverty estimate	Overall state allocation based on estimated poverty population-sub state poverty level based on State Perspective Plan
2.	Fund flow	To the districts	To the state
3.	Delivery mechanism and programme management	Through District Rural Development Agencies (DRDAs)	Through state mission structure, a special purpose organisation established for NRLM
4.	Programme priority	Capital subsidy	Mobilisation of poor into groups
5.	Capital subsidy flow	Through banks as subsidy for economic activities	Direct to groups as demand based seed capital
6.	Role of banks	As disbursers of capital subsidy	As providers of credit

Source: NRLM-Programme Implementation Plan, MoRD, GoI (http://www.aajeevika.gov.in/nrlm/PIP-NRLM.pdf, accessed on 15 February 2013).

The State-wise status of the implementation of NRLM-Aajeevika (and transition from SGSY) is presented below:

- Twenty-six states have taken approval for rolling out of NRLM-Aajeevika.
- Sixteen states have appointed full time state mission directors.
- A core team is in place in 13 states.
- Twenty-three states have submitted their Annual action plan under NRLM-Aajeevika.
- Annual action plans for 10 states have been approved; remaining 13 states are under discussion.
- State perspective and implementation plan have been received from 5 states, out of which 3 approved.
- Most missions have undergone immersion-cum-exposure visits.

Bibliography

Abraham, Vinoj. 2009. 'Employment Growth in Rural India: Distress Driven?' *Economic and Political Weekly* 44 (16): 97–104.

ACCESS. 2009. 'Business Correspondents and Facilitators: Pathway to Financial Inclusion?' Report of policy retreat organised by College of Agricultural Banking (CAB), Reserve Bank of India and ACCESS, 15 May, http://www.microfinanceindia.org/download_reports/bc_retreat_report.pdf, accessed on 11 April 2013.

Acharya, S. S. 2004. 'Agricultural Marketing in India'. *Millennium Study of Indian Farmers*, Vol. 17. New Delhi: Academic Foundation, Government of India.

Agarwal, Bina. 2010. 'Rethinking Agricultural Production Collectivities'. *Economic and Political Weekly* 45 (9): 64–78.

———. 2011. 'Agrarian Distress and Rural Non-Farm Sector Employment in India'. MPRA Paper No. 35275, http://mpra.ub.uni-muenchen.de/35275/, accessed on 20 March 2013.

Ananth, S. 2011. 'An In-Depth Study of Issues and Challenges in Microfinance Sector in Andhra Pradesh'. Hyderabad: Society for Elimination of Rural Poverty.

Ananth, S. and T. Sabri Oncu. 2013. 'Challenges to Financial Inclusion in India: The Case of Andhra Pradesh'. *Economic and Political Weekly* 43 (7): 77–83.

Anderson, Jock. R., Gershon Feder and Sushma Ganguly. 2006. 'The Rise and Fall of Training and Visit Extension: An Asian Mini-drama with an African Epilogue'. Policy Research Working Paper WPS3928, Agriculture and Rural Development Department, World Bank, May, https://openknowledge.worldbank.org/bitstream/handle/10986/8447/wps3928.pdf?sequence=1, accessed on 18 July 2013.

Annapurna, M. 2006. 'Transitioning Markets: Transcending Consumption'. *Economic and Political Weekly* 41 (31): 3388–93.

Bardhan, Pranab and Dilip Mookherjee. 2011. 'Subsidized Farm Input Programs and Agricultural Performance: A Farm-level analysis of West Bengal's Green Revolution, 1982–1995'. *American Economic Journal: Applied Economics* 3: 186–214.

Basu, D. N. and S. P. Kashyap. 1992. 'Rural Non-Agricultural Employment in India: Role of Development Process and Rural-Urban'. *Economic and Political Weekly* 27 (51&52): 178–89.

Bhalla, Sheila. 1997. 'The Rise and Fall of Workforce Diversification Process in Rural India'. In *Growth, Employment and poverty: Change and continuity in Rural India, Indian Society of Labour Economics*, ed. G. K. Chadha and Alakh N. Sharma. pp. 145–83. New Delhi: Vikas Publishing House Pvt. Ltd.

Bharathi, Mudunuri. 2012. 'Tribal Women's Perspective on the Land Acquisition Bill'. *Economic and Political Weekly* 47 (20): 73–77.

Binswanger-Mkhize, Hans P. 2012. 'India 1960–2010: Structural Change, the Rural Non-Farm Sector, and the Prospects for Agriculture'. Berkeley: Department of Agricultural and Resource Economics, University of California, http://are.berkeley.edu/documents/seminar/Binswanger.pdf, accessed on 19 March 2013.

Birthal, P. S., P. K. Joshi and A. V. Narayanan. 2013. 'Agricultural Diversification in India: Trends, Contribution to Growth and Small Farmer Participation'. In *Transforming Indian Agriculture-India 2040*, ed. Marco Ferroni. UK: Sage Publications.

Birthal, Pratap S. and Digvijay S. Negi. 2012. 'Livestock for Higher, Sustainable and Inclusive Agricultural Growth'. *Economic and Political Weekly* 47 (26&27): 89–99.

Census of India. 2011. Ministry of Home Affairs, Delhi: Government of India.

Chand, Ramesh. 1996. 'Agricultural Diversification and Farm and Non-Farm Employment in Himachal Pradesh'. *The Indian Journal of Labour Economics* 39 (4): 841–50.

———. 2012. 'Development Policies and Agricultural Markets'. *Economic and Political Weekly* 47 (52): 53–63.

Chand, Ramesh and Shinoj Parappurathu. 2012. 'Temporal and Spatial Variations in Agricultural Growth and its Determinants'. *Economic and Political Weekly* 47 (26&27): 55–63.

Chand, Ramesh, P. A. Lakshmi Prasanna and Aruna Singh. 2011. 'Farm size and Productivity: Understanding the Strengths of Smallholders, and Improving their Livelihoods'. *Economic and Political Weekly* 46 (26&27): 5–11.

Chand, Ramesh, S. S. Raju and L. M. Pandey. 2007. 'Growth Crisis in Agriculture, Severity and Options at National and State Levels'. *Economic and Political Weekly* 42 (26): 2527–33.

Chen, M., J. Sebstad and L. O'Connell. 1999. 'Counting the Invisible Workforce: The Case of Homebased Workers'. *World Development* 27 (3): 603–10.

Chenoy, Dilip. 2013. 'Skill Development in India: A Transformation in the Making'. In *India Infrastructure Report 2012: Private Sector in Education*, ed. IDFC Foundation. pp. 199–207. Delhi: Routledge.

Chowdhury, Anis. 2011. 'Food Price Hikes: How much is due to Excessive Speculation?' *Economic and Political Weekly* 46 (28): 12–15.

Clarke, Daniel J., Olivier Mahul, Kolli N. Rao, and Niraj Verma. 2012. 'Weather Based Crop Insurance in India'. Policy Research Working Paper no. 5985, The World Bank. http://www-wds.worldbank.org/servlet/WDSContentServer/WDSP/IB/2012/03/05/000158349_20120305105832/Rendered/PDF/WPS5985.pdf, accessed on 11 April 2013.

Coffey, Diane, John Papp and Dean Spears. 2012. 'Dual Economics or Dual Livelihoods? Short-Term Migration from Rural India and Non-Agricultural Employment', http://riceinstitute.org/wordpress/wp-content/uploads/downloads/2012/12/nimns_paper.pdf, accessed on 26 April 2013.

Collett, Kathleen and Chris Gale. 2009. 'Training for Rural Development: Agricultural and Enterprise Skills for Women Smallholders'. London: City & Guilds Centre for Skills Development.

Collins, J. 1995. 'Farm size and Non-traditional Exports: Determinants of Participation in World Markets'. *World Development* 23 (7): 1103–14.

Credit Rating Information Services of India Limited (CRISIL). 2012. 'Sustaining the rural consumption boom'. *CRISIL Research Insight*, August.

CSO (Central Statistics Organisation). 2007. 'National Account Statistics'. New Delhi: CSO, Ministry of Statistics and Programme Implementation, Government of India.

———. 2011a. 'Time–Series Data on Annual Survey of Industries (1998–99 to 2007–08)'. Kolkata: CSO, Ministry of Statistics and Programme Implementation, Government of India.

———. 2011b. 'Situation Analysis of the Elderly in India'. New Delhi: Ministry of Statistics & Programme Implementation, Government of India.

Dasara and Godrej Group. 2012. 'Leveraging the Dividend: Enhancing Employability in India'. http://www.dasra.org/pdf/Dasra-Enhancing-Employability-LTD.pdf, accessed on 15 April 2013.

Deolalikar, Anil B. 1981. 'The Inverse Relationship between Productivity and Farm Size: A Test Using Regional Data from India'. *American Journal of Agricultural Economics* 63 (2): 275–79.

Desai, Bhupat M., Errol D' Souza, John W. Mellor, Vijay Paul Sharma and Prabhakar Tamboli. 2011. 'Agricultural Policy Strategy, Instruments and Implementation: A Review and the Road Ahead'. *Economic and Political Weekly* 46 (53): 42–50.

Deshingkar, Priya and Shaheen Akter. 2009. 'Migration and Human Development in India'. *Human Development Reports*, Research Paper 2009/13, United Nations Development Programme.

Deshpande, R. S. 2003. 'Current Land Policy Issues in India'. *In land reform—land settlement and cooperatives—Special Edition*, FAO and the World Bank, vol. 3. http://www.fao.org/docrep/006/y5026e/y5026e00.htm.

Dev, S. Mahendra. 1990. 'Non-Agricultural Employment in Rural India: Evidence at a Disaggregate Level'. *Economic and Political Weekly* 25 (28): 1526–36.

———. 1998. 'Government Intervention and Social Security for Rural Labour. In *Empowering Rural Labour in India: Market, State and Mobilization*, ed. R. Radhakrishna and A. N. Sharma. pp. 173–204. New Delhi: Institute for Human Development.

———. 2012. 'Small Farmers in India: Challenges and Opportunities'. Working Paper WP-2012–014. Mumbai: Indira Gandhi Institute of Development Research.

Dev, S. Mahendra and N. Chandrasekhar Rao. 2010. 'Agricultural Price Policy, Farm Profitability and Food Security'. *Economic and Political Weekly* 45 (26&27): 174–82.

Dhan Foundation and Wassan. 2012. 'Supporting Millets in India: Policy Review & Suggestions for Action'—Part of Revalorising Small Millets in Rainfed Regions of South Asia (RESMISA), supported by International Development Research Centre (IDRC) and Canadian International Food Security Research Fund (CIFSRF).

Djurfeldt, Göran, Venkatesh Athreya, N. Jayakumar, Staffan Lindberg, A. Rajagopal, and R. Vidyasagar. 2008. 'Agrarian Change and Social Mobility in Tamil Nadu'. *Economic and Political Weekly* 43 (45): 50–61.

Drèze, Jean and Reetika Khera. 2012. 'Regional Patterns of Human and Child Deprivation in India'. *Economic and Political Weekly* 47 (39): 42–49.

Dutta, Puja, Stephen Howes and Rinku Murgai, 2010. 'Small but Effective: India's Targeted Unconditional Cash Transfers'. *Economic and Political Weekly* 45 (52): 63–70.

Economist, The. 2012. 'Welfare in India, Money Where the Mouth Is: A Debate is Growing About How to Get Welfare to the Needy'. 10 November.

Faetanini, Marina and Ramya Subrahmanian. 2012. 'Internal Migration in India Initiative: For a Better Inclusion of Internal Migrants in India'. *Policy Briefs*, October. Delhi: UNESCO and UNICEF.

FAO (Food and Agricultural Organization). 2008. 'The State of Food Insecurity in the World'. Rome.

Ferroni, Marco and Yuan Zhou. 2012. 'Achievements and Challenges in Agricultural Extension in India'. *Global Journal of Emerging Market Economies* 4 (3): 319–34. Emerging Markets Forum, Los Angeles, London, New Delhi, Singapore: Sage. http://www.syngentafoundation.com/db/1/1172.pdf, accessed on 18 July 2013.

FICCI (Federation of Indian Chambers of Commerce and Industry). 2012. 'Knowledge paper on Skill Development in India—Learner First'. Kolkata: Ernst & Young.

GoAP (Government of Andhra Pradesh). 2011. 'Report of the State Level Committee to Study the Problems of Farmers in Crop Holiday Affected Mandals of East Godavari District of Andhra Pradesh'. Hyderabad: Government of Andhra Pradesh.

Ghose, A. K. 1979. 'Farm Size and Land Productivity in Indian Agriculture: A Reappraisal'. *Journal of Development Studies* 16 (1): 27–49.

Ghuman, Ranjit Singh. 2005. 'Rural Non-Farm Employment Scenario: Reflections from Recent Data in Punjab'. *Economic and Political Weekly* 40 (41): 4473–80.

Gujral, Jyoti and Piyush Joshi. n.d. 'Regulatory Impediments to Market Based Policy Reforms in Agriculture: The Case of NWRs',http://www.ncaer.org/popuppages/eventdetails/e16feb2011/jyoti-gujral.pdf, accessed on 2 April 2013.

Haan, Arjan de. 1999. 'Livelihoods and Poverty: The Role of Migration: A Critical Review of the Migration Literature'. *The Journal of Development Studies* 36 (2):1–47.

Haggblade, Steven, Peter B. R. Hazell and Thomas Reardon. 2010. 'The Rural Non-Farm Economy: Prospects for Growth and Poverty Reduction'. *World Development* 38 (10): 1429–41.

Hajela, Ruchi. 2012. 'Shortage of Skilled Workers: A Paradox of the Indian Economy'. *SKOPE* Research Paper no. 111, November.

Hazell, Peter B. R. and Steven Haggblade. 1991. 'Rural-Urban Growth Linkages in India'. *Indian Journal of Agricultural Economics* 46 (4): 515–29, October-December.

Himanshu. 2008. 'Growth, Employment and Poverty Reduction: Post-Reform Indian Experience'. Working Paper 23. London: Asia Research Centre (ARC), London School of Economic and Political Science, http://eprints.lse.ac.uk/38342/1/ARCWP23-Himanshu.pdf, accessed on 19 March 2013.

———. 2011. 'Employment Trends in India: A Re-examination'. *Economic and Political Weekly* 46 (37): 43–59.

Himanshu, Peter Lanjouw, Abhiroop Mukhopadhyay and Rinku Murgai. 2011. 'Non-Farm Diversification and Rural Poverty Decline: A Perspective from Indian Sample Survey and Village Study Data'. Working Paper 44. London: Asia Research Centre (ARC), London School of Economics & Political Science, http://eprints.lse.ac.uk/38371/1/ARCWP44-HimanshuLanjouwMukhopadhyayMurgai.pdf, accessed on 19 March 2013.

Holmström, Mark. 1993. 'Flexible Specialisation in India'. *Economic and Political Weekly* 28 (35): M82–86.

ILO (International Labour Organization). 2011. 'Towards National Social Protection Floors'. A Policy Note for the G20 Meeting of Labour and Employment Ministers. Paris, 26–27 September.

Jensen, Robert. 2012. 'Do Labor Market Opportunities Affect Young Women's Work and Family Decisions? Experimental Evidence from India'. *Quarterly Journal of Economics* 127 (2): 753–92.

Jeyaranjan, J. 2012. 'A Study on the Rural Non-Farm Employment in Tamil Nadu'. Chennai: Institute of Development Alternatives.

Jha, Brajesh. 2006. 'Rural Non-Farm Employment in India: Macro-Trends, Micro-Evidences and Policy Options'. Working Paper 267, Agricultural Economics Unit, Institute of Economic Growth, http://iegindia.org/workpap/wp267.pdf, accessed on 19 March 2013.

Jodhka, Surinder S. 2010. 'Dalits in Business: Self-Employed Schedules Castes in North-West India.' *Economic and Political Weekly* 45 (11): 41–48.

———. 2012. 'Agrarian Changes in the Times of (Neo-liberal) "Crises"'. *Economic and Political Weekly* 47 (26&27): 5–13.

Jodhka, Surinder S. and S. Gautam. 2008. 'In Search of a Dalit Entrepreneur: Barriers and Supports in the Life of Self-Employed Scheduled Castes'. Paper prepared for

the study, 'Poverty and Social Exclusion in India'. Delhi: Indian Institute of Dalit Studies.

Johnson, Doug and Sushmita Meka. 2010. 'Access to Finance in Andhra Pradesh'. Chennai: Centre for Micro Finance, IFMR and Centre of Microfinance Research.

Kadiyala Suneetha, P. K. Joshi, S. Mahendra Dev, T. Nanda Kumar and Vijay Vyas, 2012. 'A Nutrition Secure India: Role of Agriculture'. *Economic and Political Weekly* 47 (8): 21–25.

Kalavadonda, and Smriti Lakhey. 2009. 'Ecologically Sound, Economically Viable Community Managed Sustainable Agriculture in Andhra Pradesh, India'. Washington, D.C.: The World Bank, http://www.csa-india.org/sites/csa-india.org/files/Ecologically_Sound_Economically_Viable_Community_Managed_Sustainable_Agriculture_in_Andhra_Pradesh_India_1.pdf, accessed on 22 July 2013.

Keshri, Kunal and R. B. Bhagat. 2012. 'Temporary and Seasonal Migration: Regional Pattern, Characteristics and Associated Factors'. *Economic and Political Weekly* 47 (4): 81–87.

Khera, R. 2011. 'Revival of Public Distribution System: Evidence and Explanations'. *Economic and Political Weekly* 46 (44–45): 36–50.

Kochhar, Sameer. 2009. *Speeding Financial Inclusion*. Gurgaon, Haryana: Skoch Development Foundation.

Krishnagopal, G. V. 2010. 'Assessment of System Of Rice Intensification (SRI) Programme in Bihar': Final Report. Submitted to Bihar Rural Livelihoods Promotion Society, Bihar. Hyderabad.

Krishnamurthy, Mekhala. 2012. 'States of Wheat: The Changing Dynamics of Public Procurement in Madhya Pradesh'. *Economic and Political Weekly* 47 (52): 72–83.

Kumar, A. 2001. 'India Agriculture: Issues and Prospects'. Google ebook. New Delhi: Sarup and Sons.

Kumar, T. Vijay, D. V. Raidu, Jayaram Killi, Madhavi Pillai, Parmesh Shah, Vijaysekar

Kundu, Amitabh and Lopamudra Ray Saraswati. 2012. 'Migration and Exclusionary Urbanisation in India'. *Economic and Political Weekly* 47 (26&27): 219–27.

Kundu, Anirban and Saumya Chakrabarti. 2009. 'Rural Non-Farm Economy: A Note on the Impact of Crop Diversification and Land Conversion in India'. *Economic and Political Weekly* 44 (12): 69–75.

Lanjouw, Peter and Rinku Murgai. 2008. 'Poverty Decline, Agricultural Wages, and Non-Farm Employment in Rural India'. Policy Research Working Paper WPS 4858, Poverty Team, The World Bank.

———. 2010. 'Size Matters: Urban Growth and Poverty in India 1983–2005'. Mimeo. Development Economics Research Group, The World Bank.

Mahajan, Vijay and Rajeev Kumar Gupta. 2011. 'Non-Farm Opportunities for Smallholder Agriculture'. Presented at the Conference on New Directions for Smallholder Agriculture, 24–25 January, Rome.

Mahul, Olivier, Niraj Verma and Daniel J. Clarke. 2012. 'Improving Farmers'. Access to Agricultural Insurance in India'. Policy Research Working Paper No. 5987. The World Bank.

Mazumdar, Indrani, N. Neetha and Indu Agnihotri. 2013. 'Migration and Gender in India'. *Economic and Political Weekly* 48 (10): 54–64.

Mehta, G. S. 2002. 'Non-Farm Economy and Rural Development'. Lucknow: Giri Institute of Development Studies.

Mellor, John W. 1976. *The New Economics of Growth: A Strategy for India and the Developing World*. Ithaca, NY: Cornell University Press.

MHRD (Ministry of Human Resources Development). 2011. 'Educational Statistics: At a Glance, 2011'. Delhi: MHRD, Government of India.

———. 2012. 'Educational Statistics—At a Glance, 2011'. Delhi: MHRD, Government of India.

Millet Network of India, Deccan Development Society, FoodFirst Information and Action Network (FIAN, India). n.d. 'Millets Future of Food & Farming'.

Mitra, Siddhartha and Sangeeta Shroff. 2007. '"Farmers" Suicides in Maharashtra'. *Economic and Political Weekly* 42 (49): 73–77.

MoA (Ministry of Agriculture). 2002. 'Marketable Surplus and Post Harvest Losses of Paddy in India 2002'. Nagpur: Department of Agriculture and Cooperation, Ministry of Agriculture, Government of India.

———. 2007. 'National Policy for Farmers 2007'. Delhi: Department of Agriculture and Cooperation, Ministry of Agriculture, Government of India.

———. 2012a. 'All-India Report on Number and Area of Operational Holdings'. Delhi: Agriculture Census Division, Department of Agriculture & Cooperation, Government of India.

———. 2012b. *Agricultural Statistics at a Glance 2012*. Delhi: Department of Agriculture and Cooperation, MoA, Government of India.

———. Various years. 'Serving Farmers and Saving Farming'. Reports by National Commission on Farmers submitted in December 2004, August 2005, December 2005, April 2006 and October 2006'. Delhi: Ministry of Agriculture, Government of India.

Mohan, Rakesh. 2006. 'Agricultural Credit in India: Status, Issues and Future Agenda'. *Economic & Political Weekly* 41 (11): 1013–21.

MoF (Ministry of Finance). 2007. 'Report of the Expert Group on Agricultural Indebtedness'. Delhi: Ministry of Finance, Government of India.

MoLE (Ministry of Labour and Employment). n.d. 'All India and Centre-wise Linking factors between New Series of Consumer Price Index Numbers for Industrial Workers on base 2001 = 100 and the previous series on base 1982=100 (General Index)'. Labour Bureau, MoLE, Government of India Chapter 2.rtfhttp://

labourbureau.nic.in/indtab.html#LB1, accessed on 9 April 2013.

MoRD (Ministry of Rural Development). 2009. 'Report of the Committee on Credit Related Issues under SGSY'. Delhi: Ministry of Rural Development, Government of India.

———. 2011a. 'The Land Acquisition, Rehabilitation and Resettlement Bill, 2011'. Bill No. 77 introduced in Lok Sabha. Delhi: Ministry of Rural Development, Government of India.

———. 2011b. 'The Draft Land Acquisition and Rehabilitation and Resettlement Bill (LARR), 2011– An Overview'. Presentation on LARR Bill Cabinet Version. Delhi: Ministry of Rural Development, Government of India.

———. 2012. *Annual Report 2011–12*. Ministry of Rural Development, Government of India.

MSME (Ministry of Micro, Small and Medium Enterprises). 2007. 'Final Report of Fourth All-India Census of Micro, Small & Medium Enterprises 2006–07. Delhi: Ministry of Micro, Small and Medium Enterprises, Government of India.

Mukhopadhyay, Abhiroop. 2011. 'Stepping out of Palanpur: Employment Outside Palanpur'. Asia Research Centre Working Paper no. 46. London: Asia Research Centre (ARC), London School of Economics and Political Science.

NABARD (National Bank for Agriculture and Rural Development). 2012. 'Status of Microfinance in India, 2011–12'. Mumbai: Micro Credit Innovations Department, National Bank for Agriculture and Rural Development. http://www.microfinancegateway.org/gm/documents1.1.16975/MF%20book%20–%20full.pdf, accessed on 10 Otober 2012.

Naik, Gopal, K. P. Basavaraj, V. R. Hegde, Vijay Paidi and Arjunan Subramanian. 2012. 'Reliability of Agricultural Statistics in Developing Countries: Reflections from a Comprehensive Village Survey on Crop Area Statistics in India'. Working Paper No. 381, Bangalore: Indian Institute of Management.

Nair, Reshmy. 2010a. 'Crop Insurance in India: Changes and Challenges'. *Economic and Political Weekly* 45 (6): 19–22.

———. 2010b. 'Weather-based Crop Insurance in India: Towards a Sustainable Crop Insurance Regime?' *Economic and Political Weekly* 45 (34): 73–81.

NCEUS (National Commission for Enterprises in the Unorganised Sector). 2008. 'A Special Programme for Marginal and Small Farmers'. Delhi: NCEUS, Government of India.

Nijman, Jan. 2012. 'India's Urban Challenge'. *Eurasian Geography and Economics* 53 (1): 7–20.

NRAA (National Rainfed Area Authority). 2012. 'Prioritization of Rainfed Areas in India'. Study Report 4. Delhi: NRAA, Planning Commission, Government of India.

NSSO (National Sample Survey Organisation). 1997. 'Employment and Unemployment in India, 1993–94'. Report No. 409, NSS 50th Round. Delhi: Ministry of Statistics and Programme Implementation, Government of India.

———. 1998. 'Indebtedness of Rural Households as on 30.6.1991, Debt and Investment Survey'. Report No. 420, NSS 48th Round. Delhi: Ministry of Statistics and Programme Implementation, Government of India.

———. 2001. 'Employment and Unemployment Situation in India, 1999–2000'. Report No. 458, NSS 55th Round. Delhi: Ministry of Statistics and Programme Implementation, Government of India.

———. 2005a. 'Situation Assessment Survey of Farmers: Indebtedness of Farmer Households'. Report No. 498, NSS 59th Round, January-December 2003. Delhi: Ministry of Statistics and Programme Implementation, Government of India.

———. 2005b. 'Household Indebtedness in India as on 30.06.2002, All India Debt and Investment Survey'. Report No. 501, NSS 59th Round. Delhi: Ministry of Statistics and Programme Implementation, Government of India.

———. 2006a. 'Some Aspects of Operational Land Holdings in India, 2002–03'. Report No. 492, NSS 59th Round, January–December 2003. Delhi: Ministry of Statistics and Programme Implementation, Government of India.

———. 2006b. 'Employment and Unemployment Situation in India, 2004–05'. Report No. 515, NSS 61st Round. Delhi: Ministry of Statistics and Programme Implementation, Government of India.

———. 2007. 'Informal Sector and Conditions of Employment in India, 2004–05'. Report No. 519, NSS 61st Round. Delhi: Ministry of Statistics and Programme Implementation, Government of India.

———. 2008. 'Unorganised Manufacturing sector in India, 2005–06: Employment, Assets and Borrowing's, Report No. 525, NSS 62nd Round. Delhi: Ministry of Statistics and Programme Implementation, Government of India.

———. 2011. 'Employment and Unemployment Situation in India, 2009–10'. Report No. 537, NSS 66th Round. Delhi: Ministry of Statistics and Programme Implementation, Government of India.

———. 2012. 'Informal Sector and Conditions of Employment in India, 2009–10'. Report No. 539, NSS 66th Round. Delhi: Ministry of Statistics and Programme Implementation, Government of India.

———. 2013. 'Status of Education and Vocational Training in India, 2009–10'. NSS Report No. 551: NSS 66th Round. Delhi: Ministry of Statistics and Programme Implementation, Government of India.

Oxfam India. 2012. 'The Proposed Land Acquisition Bill: Putting Livelihoods first'. *Oxfam India Policy Brief* no.2, October.

Panicker, Aishwarya. 2012. 'Land Woes: LARR Act and the Missing Link'. Delhi: Accountability Initiative, Centre for Policy Research, http://www.accountabilityindia.in/accountabilityblog/2579-land-woes-larr-act-and-missing-link, accessed on 9 April 2013.

Papola, T. S. 1987. 'Rural Industrialisation and Agricultural Growth: A Case Study on India'. In *Rural Industrialisation and Employment in Asia*, ed. R. Islam. pp. 59–106. International Labour Organization, Asian Development Programme, New Delhi.

———. 1992. 'Rural Non-Farm Employment: An Assessment of Recent Trends'. *Indian Journal of Labour Economics* 35 (3): 238–45.

Papola T. S. and Partha Pratim Sahu. 2012. 'Growth and Structure of Employment in India-long-term and Post-Reform Performance and the Emerging Challenge'. Delhi: Institute for Studies in Industrial Development.

Parthasarathy, G., Shameem and B. Sambi Reddy. 1998. 'Determinants of Rural Non-Agricultural Employment: The Indian Case'. *Indian Journal of Agriculture Economics* 53 (2): 139–54.

Pastakia, Astad and Sachin Oza. 2011. 'Livelihood Augmentation in Rainfed Areas: A Strategy Handbook for the Practitioner, Volume II-Entrepreneurial Strategies for Augmenting Rural Livelihoods'. Ahmedabad: Development Support Centre.

Pillai, S. Ramachandran. 2007. 'Agrarian Crisis and the Way Out?' *The Marxist* 23 (3), July–September.

Planning Commission. 2007. 'Report of the Working Group on Construction for the Eleventh Five Year Plan (2007–2012)'. Delhi: Planning Commission, Government of India.

———. 2008: Eleventh Five Year Plan 2007–12 (Vol. 2). Delhi: Planning Commission, Government of India.

———. 2010. 'Addressing India's Nutrition Challenges: Report of the Multi-stakeholder Retreat, 7–8 August'. Delhi: Planning Commission, Government of India.

———. 2011a. 'Report of the Twelfth Plan Working Group on Disadvantaged Farmers, Including Women'. Delhi: Planning Commission, Government of India.

———. 2011b. 'Report of the Working Group on Agricultural Marketing Infrastructure, Secondary Agriculture and Policy Required for Internal and External Trade for the Twelfth Five Year Plan 2012–17'. Delhi: Agriculture Division, Planning Commission, Government of India.

———. 2011c. 'Report of the Working Group on Outreach of Institutional Finance, Cooperatives and Risk Management for the Twelfth Five Year Plan (2012–17)'. Delhi: Planning Commission, Government of India.

———. 2011d. 'Report of Working Group on National Rural Livelihoods Mission (NRLM) for the Twelfth Five Year Plan (2012–17)'. Delhi: Planning Commission, Government of India.

———. 2011e. 'Report of the Working Group on Nutrition for the Twelfth Five Year Plan (2012–2017)'. Government of India, New Delhi.

———. 2011f. 'Report of the Working Group on Animal Husbandry and Dairying for the Twelfth Five Year Plan (2012–17)'. Delhi: Planning Commission, Government of India.

———. 2011g. 'Report of the Working Group on Employment, Planning and Policy for the Twelfth Five Year Plan (2012–2017)'. Delhi: Planning Commission, Government of India.

———. 2011h. 'Working Group Report on Secondary and Vocational Education for Twelfth Five Year Plan'. Delhi: Planning Commission, Government of India.

———. 2011i. 'India Human Development Report 2011: Towards Social Inclusion'. Delhi: Oxford University Press.

———. 2012a. 'Draft Twelfth Five Year Plan 2012–17', http://planningcommission.gov.in/plans/planrel/12thplan/welcome.html, accessed on 19 March 2013.

———. 2012b. 'Report of the Working Group on Skill Development and Training for Twelfth Five Year Plan (2012–2017'. Delhi: Planning Commission, Government of India.

———. 2012c. 'Report of the Steering Committee Report on Rural Livelihoods and Rural Governance-12th Plan'. Delhi: Planning Commission, Government of India.

———. 2013. 'Twelfth Five Year Plan 2012–17'. Delhi: Government of India.

Pradhan, Kanhu Charan. 2012. 'Unacknowledged Urbanisation: The New Census Towns of India'. Working Paper 2, Centre for Policy Research (CPR), http://f.hypotheses.org/wp-content/blogs.dir/489/files/2012/08/Unacknowledged-Urbanisation_CPR-Working-Paper_KCPradhan.pdf, accessed on 19 March 2013.

Raghavan, M. 2008. 'Changing Pattern of Input Use and Cost of Cultivation'. *Economic and Political Weekly* 43 (26&27): 123–29.

Raj, K. K. 1976. 'Growth and Stagnation in Indian Industrial Development'. *Economic and Political Weekly* 11 (5, 6, 7): 223–36, Annual Number.

Rao, Hanumantha C. H. 1975. Technological Change and Distribution of Gains in Indian Agriculture. New Delhi: The Macmillan Company of India Limited.

Ramesh, Jairam and Varad Pande. 2012. 'No Need for Hype but Certainly a Hope'. *The Hindu*, 11 December.

Ranjan, Nitesh. 2005. 'Role of Commodity Exchanges, Futures & Options (A Case Study on Soya Oil)'. Occasional Paper 46. Mumbai: Department of Economic Analysis and Research, NABARD.

Ranjan, Sharad. 2009. 'Growth of Rural Non-Farm Employment in Uttar Pradesh: Reflections from Recent Data', *Economic and Political Weekly* 44 (4): 63–70.

Reddy, D. Narasimha. 2006. 'Economic Reforms, Agrarian Crisis and Rural Distress'. Professor B. Janaradhan Rao

Memorial Lecture, on 27 February 2006, Department of Public Administration, and Human Resource Management, Kakatiya University, Warangal, Andhra Pradesh.

RBI (Reserve Bank of India). 2011a. 'Report of the Sub-Committee of the Central Board of Directors of Reserve Bank of India to Study Issues and Concerns in the MFI Sector'. Mumbai: RBI.

———. 2011b. 'Reserve Bank of India Annual Report 2011–12'. Mumbai: RBI.

———. 2011–12. 'Handbook of Statistics on Indian Economy (2011–12)'. Mumbai: Reserve Bank of India.

———. 2012. 'Report on Trend and Progress Of Banking in India 2011–12'. Mumbai: RBI.

Sabharwal, Manish and Neeti Sharma. 2013. 'Private Sector in Professional and Vocational Education'. *India Infrastructure Report 2012: Private Sector in Education*, ed. IDFC Foundation, 208–16. Delhi: Routledge.

Sa-Dhan. 2012a. 'Financial Inclusion: A Study on the Efficacy of Banking Correspondent Model'. Delhi: Sa-Dhan.

Sa-Dhan. 2012b. The Bharat Microfinance Quick Report 2012: Microfinance-growing Against All Odds. *Sa-Dhan Association*, 96 pages.

Sane, Renuka and Susan Thomas. 2013. 'Regulating Microfinance Institutions'. *Economic and Political Weekly* 48 (5): 59–67.

Sankaranarayan, V. 1980. 'Inter-State Variation in Rural Non-Agricultural Employment-Some Tentative Results'. Working Paper No. 104. Trivandrum: Centre for Development Studies.

Sarr, Leopald, Santadarshan Sadhu and Nathan Fiala. 2012. 'Bringing the Bank to the Doorstep: Does Financial Education Influence Savings Behavior among the Poor? Evidence from a Randomized Financial Literacy Program in India'. Working Paper, August 2012. Chennai: Institute for Financial Management and Research, Centre for Micro Finance.

SERP (Society for Elimination of Rural Poverty). 2013. 'Indira Kranti Patham: Progress Report for the month of April, 2013'. Hyderabad: Society for Elimination of Rural Poverty. http://www.rd.ap.gov.in/IKP/IKP_PROG_APRIL_2013.pdf, accessed on 24 June 2013.

Shariff, Abusaleh and Peter Lanjouw. 2004. 'Rural Non-Farm Employment in India'. *Economic and Political Weekly* 39 (40): 4429–46.

Sharma, A. 2010. 'Food and Nutrition Security in India'. In *Agriculture, Food Security and Rural Development*, ed. Asian Development Bank. pp. 140–83. New Delhi: Oxford University Press.

Singh, Sukhpal. 2012. 'New Markets for Smallholders in India: Exclusion, Policy and Mechanisms'. *Economic and Political Weekly* 47 (52): 95–105.

Sinha, Janmejaya Kumar, James Abraham, and Rohit Vohra. 2008. *India's Demographic Dilemma: Talent Challenges for the Services Sector—[BCG Report]*. New Delhi: CII and Boston Consulting Group.

Srivastava, Nisha and Ravi Srivastava. 2010. 'Women, Work and Employment outcomes in Rural India'. *Economic and Political Weekly* 45 (28): 49–63. 10 July.

Srivastava, Ravi. 2012. 'Changing Employment Condition of the Indian Workforce and Implications for Decent Work.' Global Labour Journal 3 (1): 63–90. http:/digitalcommon.mcmaster.ca/globallabour/vol3/iss1/4, accessed on 12 September 2013.

Srivastava, Ravi and S. K. Sasikumar. 2003. 'An Overview of Migration in India, Its Impacts and Key Issues'. Presented at paper is one of twelve prepared for and presented at the Regional Conference on Migration, Development and Pro-Poor Policy Choices in Asia, Dhaka, 22–24 June.

Subbarao, Duvvuri. 2012. 'Agricultural Credit—Accomplishments and Challenges'. Speech delivered at the thirty years anniversary celebration of NABARD at Mumbai. *RBI Monthly Bulletin*, August.

Subbarao, K. 1982. 'Technology Gap and the Emerging Size-Productivity Relationships Following the Adoption of New Technology: An Analysis of Evidence from North-West and Eastern India'. Unpublished Paper, University of California, Berkeley, Department of Agriculture and Resource Economics.

Suryanarayana, M. H. 2011. 'Food Security: Beyond the Eleventh Plan Fiction'. In *India Development Report*, ed. D. M. Nachane. pp. 40–47. New Delhi: Oxford University Press.

Taylor, J. Edward. 1999. 'The New Economics of Labour Migration and the Role of Remittances in the Migration Process'. *International Migration* 37 (1): 63–88.

Tyagi, Ashish and Himanshu. 2011. 'Tenancy in Palanpur'. Working Paper 47. London: Asia Research Centre (ARC), London School of Economics & Political Science.

UNEP. 2012. Evaluation of non-chemical alternatives to endosulfan, Stockholm Convention of Persistent Organic Pollutants, Technical Work, Eight Meeting of the Persistent Organic Pollutants Review Committee, Geneva. 15–19 October 2012. Available at http://www.csa-india.org/sites/csa-india.org/files/UNEP-POPS.pdf.

UNIDO (United Nations Industrial Development Organisation). 2003. 'Diagnostic Study: Cashew and Fruit Processing Cluster Sindhudurg District, Maharashtra'. Cluster Development Programme, UNIDO.

Unni, Jeemol. 1991. 'Regional Variations in Rural Non-Agricultural Employment: An Exploratory Analysis'. *Economic and Political Weekly* 26 (3): 109–22.

———. 1996. 'Diversification of Economic Activities and Non-Agricultural Employment in Rural Gujarat'. *Economic and Political Weekly* 31 (33): 2243–51.

———. 1998. 'Non-Agricultural Employment and Poverty in Rural India: A Review of Evidence'. *Economic and Political Weekly* 33 (13): A36–A44.

———. 2011. "Skilling' the Workforce in India—Different Models?' *NORRAG News* 46: 73–76, September.

Unni, Jeemol and G. Raveendran. 2007. 'Growth of Employment (1993–94 to 2004–05): Illusion of Inclusiveness?' *Economic and Political Weekly* 42 (3): 196–99.

Unni, Jeemol and Sudipa Sarkar. 2012. 'Changing Occupations, Changing Skills: Graduate Labour Market in India'. *Vikalpa: The Journal of Decision Makers* 37 (3): 111–15.

Vaidyanathan, A. 1986. 'Labour Use in Rural India: A Study of Spatial and Temporal Variations', Review of Agriculture. *Economic and Political Weekly* 21 (52): A130–A146.

Vaidyanathan A. 2006. '"Farmers" Suicides and the Agrarian Crisis'. *Economic and Political Weekly* 41 (38): 4009–13.

Vasavi, A. R. 1999. 'Agrarian Distress in Bidar: Market, State and Suicides'. *Economic and Political Weekly* 34 (32): 2263–68.

Vasavi, A. R., and Padmini Swaminathan. 2010. 'Agrarian and Rural Studies: Trends, Texts, Pedagogies and Collaborations'. Report of the Conference-Cum-Consultation, 19–20 October National Institute of Advanced Studies, Bangalore. http://agrariancrisis.in/wp-content/uplouds/2011/05/Agrarian-and Rural-Studies-Report-Final.pdf, accessed on 15 April 2013.

Vijayshankar, P. S. and Mekhala Krishnamurty. 2012. 'Understanding Agricultural Commodity Markets'. *Economic and Political Weekly* 47 (52): 34–37.

World Bank. 2011a. 'A Casual Transformation: The Growing Rural Non-Farm Sector'. *Perspectives on Poverty in India—Stylized Facts from Survey Data*. Washington D.C.: World Bank.

———. 2011b. 'India—National Rural Livelihoods Project'. Washington D.C.: The World Bank, http://documents.worldbank.org/curated/en/2011/06/14368884/india-national-rural-livelihoods-project, accessed on 11 April 2013.

———. 2011c. 'Overview—More and Better Jobs in South Asia'. Washington: The International Bank for Reconstruction and Development/ The World Bank.

———. 2011d. *Poverty and Social Exclusion in India*. Washington D.C.: World Bank.

World Food Summit. 1996. 'Rome Declaration on World Food Security'. The Report of the World Food Summit, 13–17 November 1996, by the Food and Agriculture Organization of the United Nations (FAO), Rome, Italy.

LANGUISHING WATERSHED TRANSFORMED

Hiware Bazar, Maharashtra

Image credit: Popatrao Pawar, Hiware Bazar

Facing severe water scarcity, the village developed its watershed by:

- undertaking reforestation on hilly forest land
- building trenches to trap and slow rainwater runoff
- levelling cultivation plots and framing them with barriers

It maintained its recharged groundwater table levels by:

- prohibiting tree cutting and open grazing in development areas
- prohibiting bore-well drilling except for drinking water
- prohibiting water-intensive crops like sugarcane and banana
- preparing an annual water budget and planning crops by area, crop type and number of cultivation cycles depending on rainfall in the year

With watershed development that permitted cash crops and dairying, Hiware Bazar turned from a poor village to a prosperous one in the top decile in the country. It also has safe water and sanitation for all and almost universal literacy.

Success hinged on:

- community involvement to collectively decide priorities and regulations
- beneficiaries contributing labour
- addressing everyone's livelihood concerns, including the landless
- treating water as a community resource

Hiware Bazar now has assured drinking water even in droughts.

Source: IDFC. 2012. 'Hiware Bazaar: A Water-led Transformation of a Village'. *IDFC Quarterly Research Note* No. 16.

BIOMASS-BASED POWER SYSTEMS FOR REMOTE HABITATIONS

Bihar

Image credit: www.acumen.org

Image credit: IDFC

Power systems in rural Bihar using locally available rice husk as fuel:

- generate and supply power locally for lighting to clusters of at least 300 households
- using low-cost generation plants built on rented plots with standardised modular structures and running insulated wires along bamboo poles to distribute electricity
- and cater to household demand as long as each household assures minimum demand of two light connections (2 x 15 watt CFL) and monthly payment of Rs 100 for 6 hours of daily supply

Bihar currently has over 80 plants built by Husk Power Systems, enabling village life after dark—businesses and shops can stay open and children are able to study.

Success hinged on:

- lowering power-generation cost through technological innovation and exploiting scale economies
- lowering financial costs through higher equity share relative to debt, supplementing capital subsidies and low interest loans
- effective management of feedstock by running own rice mills and providing husking service to local farmers free or at low prices
- training and involving villagers in managing plant operations

Remote villages in Bihar now have reliable, clean-energy lighting.

Source: IDFC. 2011. 'Biomass-based Decentralized Distributed Generation for Universal Energy Access'. *IDFC Quarterly Research Note* No. 11.

FOREST-PROTECTING COMMUNITY PAVES WAY FOR BAMBOO SALE

Jamguda, Odisha

Image credit: www.downtoearth.org.in

To combat forest degradation, since the 1970s local communities formed over 10,000 self-initiated forest protection groups in Bihar, West Bengal, Odisha, Jharkhand and Andhra Pradesh. In Odisha 4,500 groups protecting 10 per cent of the forest area

- improved biodiversity and forest density but
- their right to sell non-timber forest products (NTFPs), and inclusion of bamboo as an NTFP, was not legally recognised until the Forest Rights Act, 2006 (FRA).

Jamguda in Kalahandi, Odisha:

- has protected the forest since 1990
- got community forest rights under FRA in 2010 but, denied a transit pass, was unable to sell harvested bamboo outside the village
- became the first village in Odisha to get a remunerative price for bamboo by getting permission to sell outside the village in March 2013

Success hinged on:

- the community's eight-month long struggle and political pressure on the forest department to issue a transit pass to sell bamboo

Proper FRA implementation can empower forest dwellers and boost incomes.

Source: Ajit Kumar Banerjee. 2010. 'Multiplicity of Indian Forest Management and Its Relative Contribution to Livelihood'. *RULNR Monograph*. Hyderabad: CESS; Mark Poffenberger and Prodyut Bhattacharya. 1996. *Grassroots Forest Protection: Eastern Indian Experiences*. Berkeley: University of California; Yashmita Ulman and Sudhansu Sekhar Deo. 2013. 'Jamguda—A New Beginning Under FRA'. *Community Forestry* 27, Jan–April. Odisha: Regional Centre for Development Corporation.

NEONATAL MORTALITY RATE REDUCED BY 70 PER CENT

Gadchiroli, Maharashtra

Image credit: www.indiatodayimages.com

To address high neonatal mortality rates, in 1993–98, the Society for Education, Action and Research in Community Health started a field trial of home-based neonatal care through

- health education to mothers
- supported breast-feeding
- monitoring body temperature of new-borns, and
- regular home visits during the neonatal period to monitor for danger signs in mothers and babies.

Home-based care reduced the neonatal mortality rate by 70 per cent and infant mortality by 56 per cent. In 2001, the project was replicated in other Maharashtra sites where mothers had limited access to neonatal care.

Both neonatal and infant mortality rates declined 50 per cent in replication sites.

Source: Abhay Bang, Hanimi Reddy, Mahesh Deshmukh, Sanjay Baitule and Rani Bang. 2005. 'Neonatal and Infant Mortality in the Ten Years (1993 to 2003) of the Gadchiroli Field Trial: Effect of Home-Based Neonatal Care'. *Journal of Perinatology* 25: S92–S107; SEARCH. 2006. *Replicating the Home-Based Newborn Care in India: New Evidences from 12 Sites and Implications for National Policy*. Report of the Convention, New Delhi, 10 August 2006. Available at http://nipccd.nic.in/mch/fr/nbc/erl27.pdf.

CHILDREN ENCOURAGE USE OF TOILETS

Hiware Bazar, Maharashtra

Image credit: Popatrao Pawar, Hiware Bazar

The village of Hiware Bazar, Maharashtra, used children as a medium to encourage toilet-use.

The panchayat built toilets in the anganwadi and school and made sure that:

- the children used them
- the toilets were built with a *jalli* door so children could look out into the open air, as they were used to, and
- the children, including the sarpanch's, cleaned them.

As children became accustomed to toilet-use, its health and other benefits, they spread the message to their parents.

By 2007, all residents had built individual soak pit toilets at their own cost.

Source: IDFC. 2012. 'Hiware Bazaar: A Water-led Transformation of a Village'. *IDFC Quarterly Research Note* No. 16.

FISHERMEN USE MOBILE PHONES TO OPTIMISE SALE OF THEIR CATCH

Kerala

Image credit: www.thehindumages.com

Before mobile phones were available, Kerala fishermen often wasted their catch because they had no way of knowing the daily demand, best markets or prices (on average 5–8 per cent of the catch would remain unsold).

> Robert Jensen: 'On January 14th 1997 … 11 fishermen … ended up throwing away their catches, yet on that day there were 27 buyers at markets within 15 km … who would have bought their fish. There were also wide variations in the price of sardines along the coast.'

After fisherman started using mobile phones to call coastal markets while still at sea:

- they were able to find the best price
- fish were no longer wasted, and
- variation in prices along the coast fell dramatically.

Fishermen's profits rose by an average 8 per cent and consumer prices fell by 4 per cent.

Source: Robert Jensen. 2007. 'The Digital Provide: Information (Technology), Market Performance, and Welfare in the South Indian Fisheries Sector'. *The Quarterly Journal of Economics* 122 (3): 879–924.

THE BIRTH OF THE SOCIAL AUDIT: A FORUM FOR ALL TO PARTICIPATE IN GOVERNANCE

Rajasthan

Image credit: Ministry of Rural Development

Pioneered by the Mazdoor Kisan Shakti Sangathan in the mid-1990s, social audits had two core elements:

- demanding access to government records of local development works, bringing in the notion of the right to information (RTI); and
- *Jansunwai*, a public hearing at which details of official records were read out and local residents invited to give testimonies, and government officials and local politicians to publicly defend their actions.

Rajasthan may be considered the birthplace of social audit.

Source: Mazdoor Kisan Shakti Sangathan (www.mkssindia.org, accessed on 22 July 2013).

STATE-SPONSORED AND SUPPORTED SOCIAL AUDITS

Andhra Pradesh

Image credit: Ministry of Rural Development

Andhra Pradesh is the only state with regular social audits, improving transparency and accountability:

- Youth trained as village social auditors cross-verify official records, examine worksites and gather information through interviews
- Findings are shared with the villagers at gram sabha meetings, then taken up at mandal level with a group of villages, where officials are answerable

Social audits have led to improved scheme implementation, empowered villagers and strengthened their ability to interact with government officials.

Success hinged on:

- top level political and bureaucratic commitment
- local representatives and lower level bureaucrats brought on board so that they did not feel threatened by social audits
- social audit starting quietly, and once it gathered momentum with huge turnouts, it became difficult for political set-up to oppose the process

Andhra Pradesh has a model state-driven social audit system.

Source: Yamini Aiyar and Salimah Samji. 2009. 'Transparency and Accountability in NREGA—A Case Study of Andhra Pradesh'. *Accountability Initiative Working Paper No. 1*, Accountability Initiative, Centre of Policy Research, Delhi; Ritesh Singh and Vinay Vutukuru. n.d. 'Enhancing Accountability in Public Service Delivery through Social Audits: A Case Study of Andhra Pradesh, India'. *Engaging Accountability: Working Paper Series*, Accountability Initiative, Centre of Policy Research, Delhi.

WOMEN'S SELF-HELP GROUP (SHG) REAPS A HARVEST AND GAINS CONFIDENCE

Tripura

Image credit: Ministry of Rural Development

In a backward tribal hamlet, an 11-member women's self-help group (SHG) used members' own savings and a bank loan to transform their livelihoods.

Against a Rs 6,050 deposit, they obtained credit with which they leased a 1-acre plot for Rs 15,000.

Contributing their own labour, they grew and reaped a crop harvest.

In a single cropping season, they were able to both repay the borrowed amount and save for the future.

The formation of the SHG has allowed:

- women to achieve financial independence, and
- the power to make their own decisions

With new confidence, the group now undertakes other economic activities such as weaving traditional tribal garments.

Source: National Bank for Agriculture and Rural Development (NABARD) (www.nabard.org/microfinance/successstories.asp, accessed on 20 June 2013).

COMMUNITY MANAGED SUSTAINABLE AGRICULTURE (CMSA) IMPROVES YIELDS

Andhra Pradesh

Image credit: csa@csa-india.org

Commercial farming increased farmer indebtedness and degradation of productive lands due to heavy use of expensive pesticides and other inputs. Chemical inputs accounted for one-third of the cost of cultivation. CMSA was introduced, which:

- encourages a shift to non-pesticide management (NPM) based on an understanding of the crop ecosystem, adopts suitable cropping patterns that maintain soil health, and uses natural fertilisers
- draws on farmers' traditional knowledge and skills, and on locally available materials
- is implemented using experienced farmers working as community resource persons
- is implemented through farmer field schools and the use of information and communication technologies (ICT) to share information and encourage community participation and learning
- sets up community seed banks to eliminate purchase of commercial seeds, and NPM shops to assist farmers.

With lower costs without lower yields, farmers now have higher net incomes and significant health and ecological benefits. About 2 million farmers have now adopted CMSA on over 1.5 million hectares.

Source: Vijay T. Kumar, D. V. Raidu, Jayaram Killi, Madhavi Pillai, Parmesh Shah, Vijayasekar Kalavakonda and Smriti Lakhey. 2009. 'Ecologically Sound, Economically Viable'. Learning Note. Washington, D.C.: The World Bank. Available at http://www.csa-india.org/sites/csa-india.org/files/Ecologically_Sound_Economically_Viable-_Community_Managed_Sustainable_Agriculture_in_Andhra_Pradesh_India_1.pdf; Society for Elimination of Rural Poverty (SERP). 2013. *Indira Kranti Patham: Progress Report for the Month of April, 2013*. Hyderabad: Society for Elimination of Rural Poverty.

BICYCLES IMPROVE HIGH SCHOOL GIRLS' ENROLMENT

Bihar

Image credit: Abhinav Nayar, Yale University

In 2006 the Government of Bihar provided bicycles to all girls studying in classes IX and X.

- Each student was given Rs 2,000 (now Rs 2,500) and receipts for bicycles were collected.
- The bicycles improved school access by reducing the cost of attendance.
- The programme improved girls' school enrolment and completion in grade IX by 40 per cent.

Most of the improvement was in villages where the nearest secondary school was more than 3 km away.

The programme increased the number of girls appearing for the secondary school certificate (SSC) exam by 10 per cent and bridged the pre-existing gender gap in enrolment by 40 per cent.

Source: Karthik Muralidharan and Nishith Prakash. 2013. 'Cycling to School: Increasing Secondary School Enrollment for Girls in India'. Powerpoint presented at the IGC South Asia Growth Conference, 18–19 July, Delhi.

REFORMATION OF A PUBLIC DISTRIBUTION SYSTEM (PDS)

Chhattisgarh

Image credit: www.thehinduimages.com

Since 2004, the Government of Chhattisgarh plugged leakages, improved delivery and extended coverage of its PDS by

- turning over management of ration shops from private dealers to community organisations
- replacing private transporters and directly delivering food to ration shops by the first week of each month
- introducing wall painting of PDS shops with card holder names, pricelist and toll-free number for complaints
- using technology such as digitisation of ration cards to eliminate bogus cards and global positioning system on trucks to limit diversion of PDS grains

Success hinged on:

- breaking the powerful private dealer lobby
- extending coverage and involving villagers in running the shops gave people a stake in their local ration shops
- commitment of the government to implement the reform and pay for it

Chhattisgarh reformed its PDS into a transparent and efficient one, reducing leakages while reaching 80 per cent of the rural population.

Source: Jean Drèze and Reetika Khera. 2011. 'PDS Leakages: The Plot Thickens'. *The Hindu*, 12 August; Raghav Puri. 2012. 'Reforming the Public Distribution System: Lessons from Chhattisgarh'. *Economic and Political Weekly* 47 (5): 21–23; R. Khera. 2011. 'Revival of Public Distribution System: Evidence and Explanations'. *Economic and Political Weekly* 46 (44–45): 36–50.

Image credit: Sudhir Shivaram/Sanctuary Photo Library

CHAPTER 5

Sustainability

Summary

Natural resources sustain rural life in several ways. Agriculture sustains a majority of rural Indians who depend on land for cultivation and fodder, forest products for fuel, food and medicine, water for drinking, cooking and irrigation, and fisheries for food and sale. But these resources have been over-exploited and are rapidly depleting, exacerbating already severe rural poverty and vulnerability to climate change. This chapter explores the reasons and evaluates initiatives taken to turn things around.

Policymakers have often overlooked the crucial need to strike a proper balance between protecting natural resources and enhancing livelihoods. Often, policies aimed at catalysing growth in rural incomes unintentionally introduced perverse incentives at the expense of the environment. Green revolution policies, for instance, helped India achieve food security. But, aided by subsidies, farmers intensified the use of fertilisers and groundwater irrigation, which has not only degraded land but has also led to the groundwater crisis that now threatens even the basic right to drinking water. Farmers have become caught in a vicious cycle: land degradation reduces crop yields so they increase inputs, which in turn raise costs and further degrade land.

Certain initiatives intended to protect and conserve natural resources, on the other hand, have failed to consider the livelihoods of those critically dependent on those resources. The notification of forests as reserved and protected under government control, for example, was intended to conserve these ecologically diverse and fragile areas, but these measures have in fact disenfranchised the Scheduled Tribes and forest dwellers who traditionally protected forests and depended on them. State control over resources previously managed by local residents led to the disintegration of community stakes in several places. Efforts to cultivate 'wastelands' or acquire local commons for public projects also have alienated communities from common property resources and led to the disintegration of their stake in natural resources.

The preservation of natural resources is essential to securing rural livelihoods. The vicious cycle of degradation and depletion of resources that impacts livelihoods must be reversed, though the zeal to protect resources (such as forests) should not come at the cost of livelihoods.

Conservation and efficient use of natural resources can be achieved through sustainable farming practices such as the use of organic composite fertilisers and reduced water-intensity. This must be encouraged through a mix of financial incentives, technology, regulations and institutional support. Top-down efforts to arrest land degradation and increase agricultural productivity have had limited success. But experience shows that communities, either spontaneously or aided by NGOs, can effectively ensure equitable sharing, conservation and maintenance of natural resources.

The success of initiatives such as community-managed sustainable agriculture and decentralised rainwater harvesting highlight the importance of a more participatory approach. The importance of community management has now been acknowledged in two legislations—the Panchayats (Extension to Scheduled Areas) Act 1996 and Forest Rights Act 2006—that entrust forest dwellers with certain rights over forests. These Acts must be implemented in letter and spirit.

Efforts to address climate change must be integrated into rural development policy. These efforts should address mitigation, such as through organic farming which simultaneously reduces environmental stress and cost of cultivation, and to build the rural population's capacity to adapt and become more resilient to sudden impacts of climate change.

5.1 Balancing Livelihoods and Natural Resource Conservation

Rural India depends heavily on natural resources for sustenance and livelihood. Land is used for cultivation and fodder, wood and other forest products for fuel, food and medicines, crop and animal waste for fuel, water for drinking, cooking and irrigation, and local fisheries for human consumption and export. Products and services derived from natural resources also provide an ever-expanding range of income-generating opportunities, crucial to those who lack adequate employment, particularly during the lean agricultural season.

But population growth, market forces and industrialisation have led to over-exploitation of natural resources—i.e. use rates exceeding natural regeneration rates—and regeneration or conservation efforts have been inadequate. Environmental degradation, thus, is shrinking the rural economy's input base and exacerbating already severe rural poverty (Jodha 2000). Tensions and conflicts over natural resources are increasing. Steps to ensure the sustainability of natural resources and arrest damage to the ecosystem and rural livelihoods are urgently needed before the situation becomes irreversible.

Steps to ensure the sustainability of natural resources and arrest damage to the ecosystem and rural livelihoods are urgently needed before the situation becomes irreversible

Past policies governing natural resource use and management often failed, in part because they failed to recognise the importance of natural resources in sustaining rural livelihoods. Only now have we realised that rural development strategies must aim to conserve natural resources, increase efficiency of resource use, reduce negative environmental impacts, *and* strengthen climate resilience of communities and contribute to climate change mitigation (MoRD 2012a). Policies emphasising inter-temporal and inter-generational equity must be framed so that short-term gains are not achieved at the cost of long-term sustainability. Protecting land, water, forest and fishery resources is necessary to ensure long-term eco-balance, food security and livelihoods.

Because most natural resources are community-owned, local institutions play a critical role in managing them. The capacity of local institutions to plan, implement and manage resource conservation through various government programmes, such as Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS), thus needs to be strengthened (see Chapter 7), as does their role in ensuring that gains from conservation are equitably distributed (see Chapter 6).

This chapter explores issues related to the sustainability of land, water, forest and fishery resources in rural India. It examines how these resources are threatened and evaluates the initiatives taken to overcome challenges. It also discusses the rural sector's vulnerability to climate change and the steps being taken to increase its resilience against its adverse impacts. Various sustainability issues that are intrinsically linked to rural livelihoods are discussed in detail in the chapter on Livelihoods (Chapter 2).

5.2 Land

Land provides habitat and sustenance. But the increased pressure of population growth and competing land uses have caused a serious decline in the availability and quality of land resources with huge impacts on ecological sustainability and rural livelihoods.

5.2.1 Declining Land Availability

India occupies only 2.4 per cent of the world's area, yet supports 17 per cent (as of 2011) of the world's population and about 11 per cent (as of 2007) of the world's livestock. Over the years, land use has significantly intensified due to population and livestock growth, economic forces, weakening of institutions that regulate land use and various natural factors (MoA 2012a).[1]

Over the years, land use has significantly intensified due to population and livestock growth, economic forces, weakening of institutions that regulate land use and various natural factors.

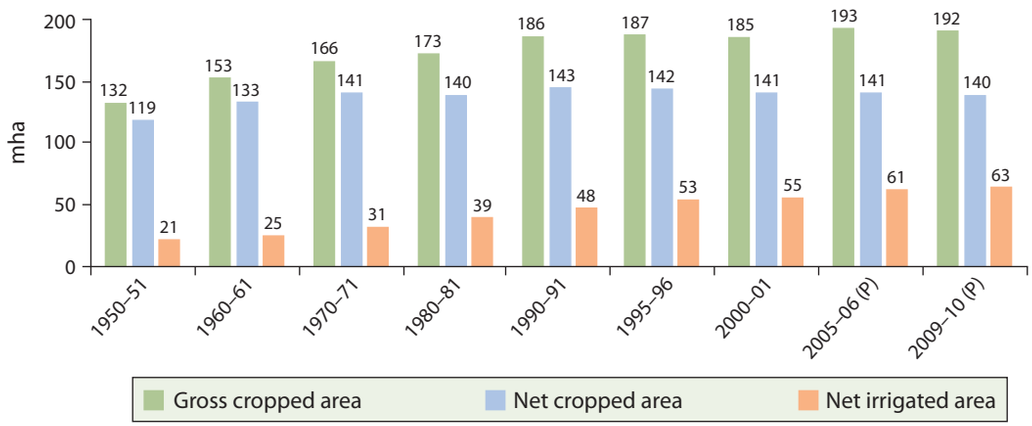
This declining land availability has had a major impact on rural livelihoods. Agriculture, the largest category of land use, sustains a majority of the rural population and is the mainstay of the rural economy. Farmers have tried to increase yield or productivity through increased irrigation and use of other inputs, resulting in higher cropping intensity. So, although the net sown area[2] has remained at 46 per cent of total geographic area since 1970–71 (it increased in the first two decades after independence from 42 per cent in 1950–51 to 46 per cent[3]), the gross cropped area[4] has significantly increased due to higher cropping intensity[5] (see Figure 5.1).

Industrialisation, urbanisation and infrastructure projects have also increased the demand for land. The area under non-agricultural use has increased from 16 million hectares (mha) in 1970–71 to 26 mha in 2009–10 (MoA 2012a), leading to vast displacement and resettlement. And the history of implementing resettlement and compensation packages for people displaced by land acquisition for non-agricultural purposes is not encouraging. But the Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act 2013—which attempts to balance such concerns with the needs of industrialisation and development—offers some relief to those historically dependent on land for their livelihood (see Chapter 2).

5.2.2 Land Degradation

Land degradation is the main cause of reduced land potential, which, in turn, affects the livelihoods of those dependent on land. Many farmers are caught in a vicious cycle: land degradation reduces crop yields, so they increase the use of farm inputs, which in turn raises costs and contributes to further degradation of the land. Since the minimum support price (MSP) is determined at the national level, farmers in regions with higher cultivation costs suffer more than those in

FIGURE 5.1 Gross Cropped Area, Net Cropped Area and Irrigated Area



Note: P—Provisional
Source: MoA (2012a).

[1]Per capita availability of land declined from 0.89 ha in 1951 to 0.27 ha in 2011, and is projected to decline to 0.19 ha by 2050. The average size of operational holdings decreased from 2.3 ha in 1970–71 to 1.2 ha by 2010–11 (MoA 2012c).

[2]Net sown area is the total area sown with crops and orchards with areas sown more than once in the same year counted only once.

[3]Land-use statistics are available for 2009–10 for 306 mha (covering 93 per cent of the total land area).

[4]Gross cropped area is the total area sown with areas cropped multiple times counted as many times as they are sown in a year.

[5]The cropping intensity represents the ratio of the gross cropped area to the net cropped area.

By far the leading cause of land degradation is soil erosion due to water run-off and loss of vegetation cover.

fertile regions. In addition to crop cultivation, land degradation also adversely affects livestock and forest production.

In 2005, the National Bureau of Soil Survey and Land Use Planning (NBSS&LUP), Nagpur, reported that around 147 mha of land suffered from various kinds of degradation. According to a study by the Indian Space Research Organisation (ISRO), as much as 57 per cent of India's total area has been subject to degradation (32 per cent) or desertification (25 per cent), the degradation of dryland areas (Ajai et al. 2009). Various factors caused such degradation:

Soil Erosion. By far the leading cause of land degradation is soil erosion due to water run-off and loss of vegetation cover. In 2008, the NBSS&LUP estimated that soil erosion by water accounted for 70 per cent of total land degradation (see Figure 5.2). In particular, more than half the area of Chhattisgarh, Jharkhand, Madhya Pradesh, Uttar Pradesh, Uttarakhand and the north-eastern hill states has been degraded due to soil erosion, with 11 per cent of the area classified as under very severe soil erosion (NAAS 2012).

Land also has been degraded as an unintended consequence of policies that encouraged inappropriate input use.

Inappropriate Input Use. Land also has been degraded as an unintended consequence of policies that encouraged inappropriate input use. That the green revolution—while it increased output and assisted in attaining self-sufficiency in foodgrain production using irrigation, high-yielding varieties of seeds, chemical fertilisers and pesticides—also resulted in inefficient input use and degradation of natural resources is now widely acknowledged. Poor management of water for irrigation coupled with inadequate watershed management and over-exploitation of groundwater has also led to land degradation and other environmental problems and, in turn, these have affected livelihoods and health (see section 5.4.3).

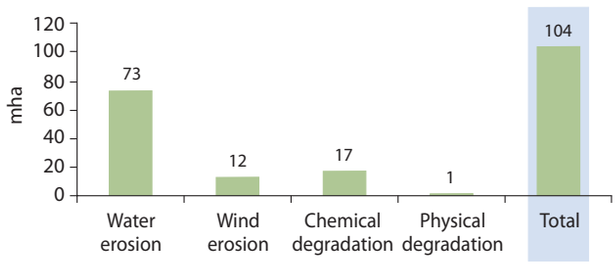
Many farmers are caught in a vicious cycle: land degradation reduces crop yields, so they increase input use, which raises costs and further degrades land.

Fertiliser subsidy has led to a huge increase in fertiliser consumption: from 13 kg/ha in the early part of the green revolution (1970–71) to 145 kg/ha by 2010–11 (NAAS 2012). The disproportionate use of chemical fertilisers, particularly nitrogen (out of nitrogen, phosphorous and potassium, i.e. N, P, K), has reduced soil nutrients and thereby soil fertility. Overuse of urea (discussed in section 5.2.4) has destroyed the natural nitrogen-fixation process and led to salt imbalance in the soil in many parts of the country. About 90 per cent of soils are now low to medium in nitrogen, 80 per cent deficient in phosphorus, and 50 per cent deficient in potassium (MoA 2012a).

Insufficient Fallow Cycles. The recent trend of shorter fallow periods has increased concerns regarding soil fertility, crop yield and food security (Grogan et al. 2012). Though debated, it is widely held that shifting, or *jhum* cultivation, in hilly areas with growing population and pressure on land, and the absence of appropriate environmental measures, is detrimental to the soil and ecosystem.

Increasing Pressure for Fodder and Fuel Wood. In ecologically fragile arid and semi-arid regions, degradation has also resulted from increasing pressure for fodder and fuelwood on common lands and forests. About 70 per cent of India's geographical area is categorised as dryland (16 per cent arid, 37 per cent semi-arid and 17 per cent dry sub-humid). These areas not only have uncertain water availability but also a restricted natural resource base that offers limited livelihood options. Communities in these regions have evolved survival strategies, but desertification is a growing concern. Changes in frequency and amount of rainfall, reduction in vegetal cover, inappropriate agricultural practices, over-exploitation of natural resources and excessive grazing have resulted in 25 per cent of land undergoing desertification (Ajai et al. 2009).

FIGURE 5.2 Land Degradation



Source: Based on NBSS&LUP (2008).

The discharge of industrial effluents has affected surface and subsurface water which, when used in agriculture, damages cropped land and leads to a decline in yield.

Mining. While mining has gained importance in recent years due to its role in industrial development, energy security and export earnings, it has also negatively impacted local communities. It has exacerbated land degradation due to increased soil erosion caused by the loss of green cover or disturbances such as the dumping of overburden soil—the layers of soil above the mineral deposits, excavated during extraction—in mounds which prevent natural plant growth.

5.2.3 Common Property Resources

In addition to individual land plots, common or community lands have also undergone degradation. Common property resources (CPRs)—most prominent in arid, mountainous and rainfed areas where agriculture poses high risks (Agarwal and Narain 1989)—play an important role in rural life and economy. On average, about 48 per cent of rural households collect materials from CPRs, mostly fuel wood, and the livestock of 20 per cent of households graze on CPRs (NSSO 1999) (see Table 5.1). A significant number of households also depend on common water resources for irrigation, livestock and other household enterprises.

About 48 per cent of households collect materials from CPRs, mostly fuel wood, and the livestock of 20 per cent of households graze on CPRs.

Almost 15 per cent of India's total area falls under CPRs, but the per capita and per household common property land resources are low at about 0.06 ha and 0.31 ha respectively.[6] Over time, there has been a substantial decline in the area and the quality of CPRs. A study across 80 villages in six states found that between the early 1950s and mid-1980s, the area under CPRs declined by as much as 31 to 55 per cent (Jodha 1995). This has severe consequences on the poor who lack other income-generation options and depend heavily on CPRs for their livelihood. Judicious management of CPRs, including forests, could also play an important role in arresting water and wind erosion that account for a majority of land degradation.

Two of the main causes identified for decline are:

- *Land redistribution.* A key component of the government's post-Independence land reforms, land redistribution was intended to benefit the rural poor. But state governments, often unable to acquire surplus land from large farmers, resorted to distributing common lands. These efforts turned out to be counterproductive because a significant share of the redistributed land went to non-poor households (ibid.). These common lands were often of poor quality, more suited to natural vegetation and therefore low yielding and requiring significant investment to develop and, over time, between 23 and 45 per cent of the poor households had to lease our or sell their land (Jodha 1986).

TABLE 5.1 Use of Common Property Resources

Item	Estimate
Households reporting collection of any material from CPRs	48%
of which: collection of fuel wood	45%
Average value of annual collections per household	Rs 693
Ratio of average value of collection to average of consumption expenditure	3
Households reporting grazing of livestock on CPRs	20%
Households reporting use of common water resources for:	
i. Irrigation	23%
ii. Livestock rearing	30%
iii. Household enterprise	2.8%
iv. Fishing	

Note: CPRs include village pastures and grazing grounds, village forests, protected and unclassified government forests, wastelands, watershed drainage, ponds, rivers, tanks, reservoirs, canals, and irrigation channels.
Source: NSSO (1999).

[6]There are wide variations in CPR availability; for example, per household availability of CPRs in Mizoram is more than the area owned per household.

- *Breakdown of Traditional CPR-Management Institutions*. The deterioration of CPRs can also be attributed to the breakdown of traditional institutions of CPR management and the failure of new institutions to adequately protect CPRs (Rao 1988; Jodha et al. 2012). State rules for natural resource management replaced traditional informal community practices that protected CPRs. This alienated communities from CPRs, leading to increasing indifference among them and the disintegration of community stakes in protecting these resources (Jodha 1998). The acquisition of large tracts of local commons for public projects in many places has helped compound the problem.

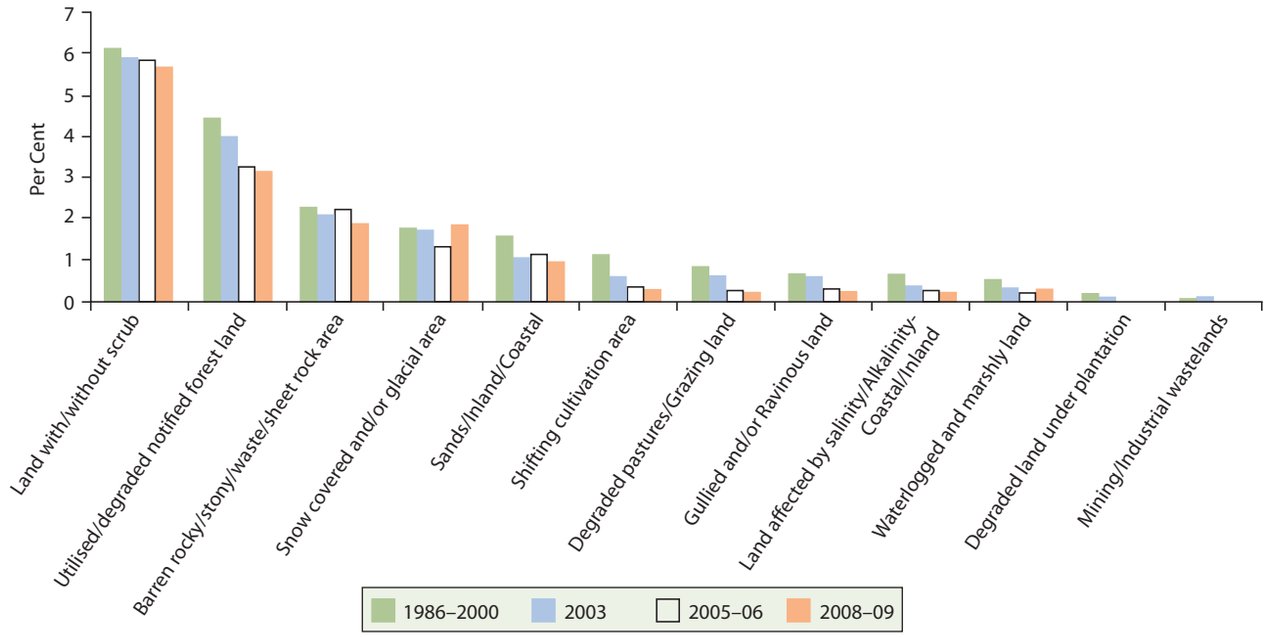
Grasslands. Grasslands[7] have starkly reduced from about 70 mha in 1947 to 38 mha in 1997 and roughly 12 mha in 2003 (Planning Commission 2011a; Dubey et al. 2007). Any grazing lands that remain are either degraded or in the process of degradation, effectively feeding less cattle than their full potential (Planning Commission 2011a). This has occurred for a number of reasons, including: (i) encroachment for agricultural and other purposes; (ii) large-scale transfers to other uses; and (iii) invasion by non-native plant species that do not support the livelihood of villagers. In many instances, traditional village-level institutions that ensured sustainable management of grasslands have broken down. But we lack a comprehensive national policy on pasture management and grazing to ensure adequate nutritional quality and livelihood to those who depend on them (Planning Commission 2013).

Grasslands have starkly reduced from about 70 mha in 1947 to 38 mha in 1997 and roughly 12 mha in 2003.

Wastelands. Wastelands are barren and degraded common lands. Five states—Rajasthan, Jammu and Kashmir, Madhya Pradesh, Andhra Pradesh and Maharashtra—contain over 60 per cent of the country's wastelands. Though degraded, they produce biomass which is commonly used for fodder and fuel. A study of 60 villages in Gujarat, for instance, found that livestock grazed on wastelands in over 90 per cent of villages during the monsoon when cultivable lands were sown and over 50 per cent did so even during the lean season (Bharwada and Mahajan 2012).

Recent efforts to regenerate wastelands have reduced them from around 20 per cent of the total area in 1986–2000 to around 15 per cent in 2005–06 (MoRD and

FIGURE 5.3 Share of Wastelands in Total Geographical Area



Source: Based on MoRD and NRSC (2010, 2011) and http://dolr.nic.in/dolr/wasteland_atlas.asp (accessed in 2013).

[7]Grasslands may be clearings within or around forests. Natural grassland is defined as plant community in which the dominant species are perennial grasses with few or no shrubs and trees (Misri and Singh 1995: 61).

NRSC 2010). Since then, watershed development and other efforts to bring wasteland under cultivation—such as, creating additional water bodies in wastelands under the MGNREGS and regenerating forest land in some states—have helped further reduce wastelands to 14.75 per cent of the total area in 2008–09 (MoRD and NRSC 2011) (see Figure 5.3). But because about two-thirds of this decrease is due to the conversion of wastelands into cropped area and plantations, the disappearance of the commons emerges as a concern.

5.2.4 Alleviation Efforts

Numerous efforts have been made to reverse land degradation, including watershed development and construction of water and soil conservation structures.

Watershed Development

Efforts to arrest land degradation and increase agricultural productivity have taken a watershed approach, particularly in rainfed and resource-poor areas. Such an approach works towards conservation, regeneration and judicious use of natural resources.[8] The programmes that adopted such an approach aimed to improve water conditions, soil fertility and crop productivity, and reduce erosion in cropped areas, while promoting socio-economic development in these resource-poor areas. Interventions under such programmes involved construction of structures to prevent soil erosion (such as vegetative barriers, contour bunds and small water-harvesting structures), changes in agricultural practices (such as in-situ soil and moisture conservation), agro-forestry, pasture development and horticulture.

But watershed programmes that largely took a top-down approach and focused mainly on engineering and construction activities, without community participation, have had limited success. Because they originated from initiatives that protected dams from silting, they had a conservation bias and followed a 'ridge-to-valley approach'[9] that neglected livelihoods and lacked clear development goals (Planning Commission 2012a). Community participation was generally low, and user groups and community-based organisations often became inactive after projects

Watershed programmes that largely took a top-down approach and focused mainly on engineering and construction activities, without community participation, have had limited success.

BOX 5.1 Watershed Transformation in Hiware Bazar, Maharashtra

Like most drought-prone regions, Hiware Bazar faced severe water scarcity. This fuelled migration and left the remaining population dependent on forest resources for sustenance. Over 90 per cent of families lived below poverty line. The village began watershed development efforts after the return of Popatrao Pawar, who had completed his M Com in Pune and was elected as *sarpanch* (head of *Gram Panchayat*, the village council) in 1990.

Watershed efforts were informed by village plans based on local priorities. The village undertook reforestation on hilly forest land and built trenches along contours to trap and slow down rainwater run-off. The overall approach involved activities restricting resource degradation, and joint groundwater use and crop planning. For instance, the village prohibited felling and grazing in watershed development areas, and the drilling of borewells except for drinking water. Cultivation plots were levelled and framed with earthen barriers, or had shallow ponds to hold rainwater within fields. The village budgeted water. Water was allocated according to use and crop plans (by area, type of crop and number of cultivation cycles) were made based on water availability.

Although the village received an average annual rainfall of just 315 mm, due to these measures taken over the past 11 years, it has maintained its water table at a safe level. Hiware Bazar now has assured drinking water. Irrigated area has increased and a *rabi* crop is cultivated. This has helped increase farmers' incomes and allowed them to invest in cattle. Increased grass-cover due to a re-vegetation programme has helped increase milk yield. Hiware Bazar is now in the top income decile in India, with less than 2 per cent of households living below poverty line. Success hinged on community involvement which created a sense of ownership among villagers.

Source: IDFC (2012).

[8]The Drought Prone Area Programme, Desert Development Programme and Integrated Wasteland Development Programme were the country's most important programmes that adopted such an approach.

[9]In watershed development, ridge-to-valley approach is one in which watershed measures are initiated at the highest level and gradually move downward.

were completed. Maintenance in the post-implementation phase accordingly was poor, and often led to siltation, damage and leakage in some watersheds. Fortunately, watershed efforts undertaken *with* community participation, such as Hiware Bazar (see Box 5.1), did succeed. They demonstrate the potential of watershed development.

Recognising the various problems with watershed treatment and that—with funds allocated to date—watershed treatment would take 75 years (MoRD 2006), the government consolidated the three watershed programmes into the Integrated Watershed Management Programme (IWMP) in 2009. The IWMP aims to grant greater flexibility in project selection and envisages greater community participation in planning and executing watershed development programmes. It has incorporated livelihood enhancement as a key focus. Watershed projects under IWMP are implemented by dedicated agencies at the state, district and project levels with community participation. Representatives of agencies implementing MGNREGS and Backward Regions Grant Fund (BRGF) at the district level are to be included in periodic review meetings for convergence.

IWMP focused on completing ongoing projects under the three previous programmes during the Eleventh Plan (2007–12). This led to a sharp increase in the completion of projects—from 2465 in 2008–09 to 9302 in 2010–11 (Planning Commission 2012a). Yet, overall performance of IWMP has been unsatisfactory (ibid.). Practical impediments such as shortage of funds to deploy high quality human resources and inadequate direction have hampered implementation (Shah 2013). Recognising the programme's persistent gaps, Ministry of Rural Development constituted a committee chaired by Dr Mihir Shah to recommend changes, effective from April 2013. The recommended changes include allocating 10 per cent of project costs for human resources, introducing a national strategy for capacity building, creating a central nodal agency for greater support and following a ridge-to-valley approach. The committee also listed indicators and green metrics to be tracked to ensure good quality of physical outcomes.

Overall performance of IWMP has been unsatisfactory. Practical impediments such as shortage of funds to deploy high quality human resources and inadequate direction have hampered implementation.

Correcting Inappropriate Input Use in Agriculture

Green revolution policies ignored soil health by subsidising chemical fertilisers. In 2010, the government moved from a regime of subsidy per fertiliser product to a regime of nutrient-based subsidy (NBS). Under NBS, the government subsidises each macronutrient (P and K), a secondary nutrient (sulphur) and two micronutrients (zinc and boron). Producers can sell products at decontrolled prices. After the introduction of NBS, prices of P and K fertilisers increased significantly.

But NBS does not include urea, the main source of N. While the global urea price averaged 80 per cent of the wheat price during 1980–2005, and is presently around 150 per cent, the urea price in India consistently declined from over 150 per cent of the wheat MSP in the 1980s to about 40 per cent at present (Planning Commission 2013). Because urea is priced lower than other fertilisers, farmers have been replacing decontrolled fertilisers with cheaper N, jeopardising soil health. Efforts to bridge the gap between the price of urea and NBS fertilisers have been inadequate. If left uncorrected, this may further reduce crop productivity (ibid.). Unfortunately, subsidy for chemical fertilisers has also discouraged the use of organic manure (ibid.).

Because urea is priced lower than other fertilisers, farmers have been replacing decontrolled fertilisers with cheaper N, jeopardising soil health.

Efforts are now underway to promote sustainable farming methods. Organic farming first received attention in 2004–05 with the introduction of the National Project on Organic Farming (NPOF). The government has promoted organic farming through NPOF along with the National Horticulture Mission, the National Project on Management of Soil Health and Fertility and the Rashtriya Krishi Vikas Yojana, by providing financial assistance for the creation of compost units and bio-fertiliser and bio-pesticide production units and compensating farmers for a part of cultivation costs. As a consequence, between 2004–05 and 2010 there was a twenty-five-fold increase in the area certified under organic farming. But organic farming still accounts for less than 1 per cent of India's total cultivated area (PIB n.d.). Sikkim has made marked progress and has already brought 40 per cent of its total cultivated land under organic farming, with the intention of bringing the entire state under organic farming by 2015 (ibid.). Bihar too has

sanctioned a scheme to promote organic farming on a large scale.

Many farmers are also switching to sustainable agricultural methods even in the absence of organic certification, in part because eco-friendly methods have brought them better returns. Recognising the benefits, including lower expenditure on chemical fertilisers and pesticides, reduced water requirements coupled with consistent higher yields, many states have adopted sustainable farming practices.[10] The National Rural Livelihoods Mission also has a component on promoting sustainable agricultural methods (see Chapter 2).

Converting Wastelands into Cropped Land

Both the central government and some state governments have tried to bring marginal lands unsuitable for food production under productive use. Many wastelands were cultivated with jatropha and pongamia that produce oil, which can be used as bio-diesel, using limited water, nutrients and capital. But adoption rates have been low due to inadequacies in extension services, price support and lack of experience among farmers (Axelsson et al. 2012). From an equity perspective, the conversion of wastelands into cropped land reduces availability of village commons and also denies pastoralists grazing lands which, though degraded, support their livelihood. Following recent studies that have found jatropha cultivation unviable, the practice has been stopped (see for instance, Varadharajan et al. 2008; Ariza-Montobbio and Lele 2010).

From an equity perspective, the conversion of wastelands into cropped land reduces availability of village commons and also denies pastoralists grazing lands which, though degraded, support their livelihood.

5.3 Forests

Native forests with ecosystems that have evolved over millions of years are rich in biodiversity and play a crucial role in providing resources that sustain us. Forests are critical to water security, as the country's rivers are born in large forests that trap sufficient rainwater. Forests also aid in soil and water conservation by preventing and reducing the severity of floods, avalanches, erosion and drought. The role of forests in carbon sequestration also puts them in the centre of climate change mitigation strategies.

In addition, almost 27 per cent of Indians—about 300 million rural people, including the majority of the tribal population—depend partly or completely on forests for their livelihood (Planning Commission 2011c). Various non-timber forest products (NTFPs), including bamboo, canes, fodder, leaves, gums, waxes, dyes, resins and food items such as nuts, wild fruits and honey, form a major portion of their food and medicines. Selling these products provides rural inhabitants cash income net; around 100 million Indians derive their livelihood from the collection and marketing of NTFPs (MoEF and MTA 2010). Because women use or sell most NTFPs collected, NTFPs also are strongly linked to women's financial empowerment in areas near forests (Planning Commission 2011c).

Almost 300 million rural Indians, i.e. about 27 per cent of the population, depend partly or completely on forests for their livelihood.

Intense and growing human–forest interaction, mainly due to the concentration of valuable mineral-rich land in forested areas, is threatening forest regeneration rates. While this is cause for grave concern, any discussion on forest sustainability must consider not only the imperative of forest conservation but also the livelihood concerns of forest-dwelling communities, the role they can play in managing and protecting forests and issues relating to the growing demands for forest resources and land.

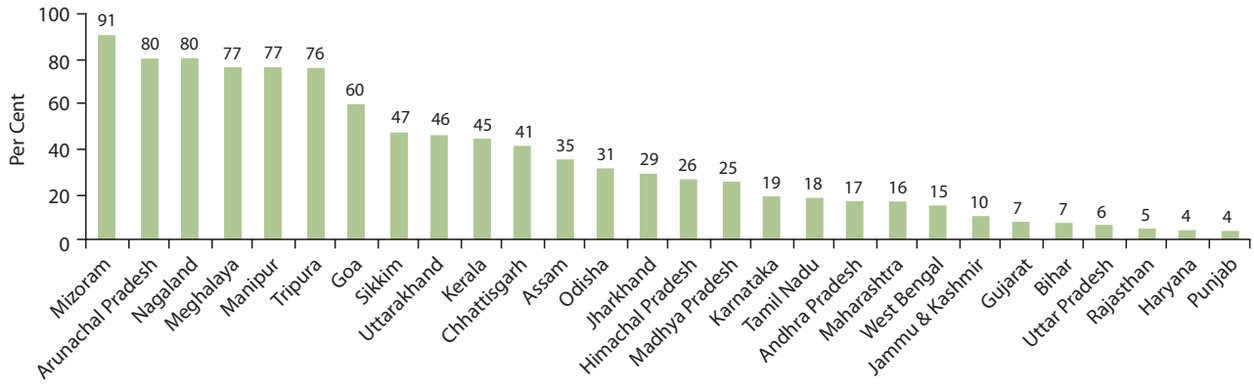
5.3.1 Changes in Forest Cover

India's recorded forest area is 77 mha, but in 2011, the Forest Survey of India (FSI) estimated a forest cover of 69.2 mha or 21 per cent of the total geographical area.[11] The recorded area is larger because it includes barren area classified as forests. With its large population and low area under forest cover, India's per capita forest cover is only 0.06 ha compared to a world average of 0.64 ha (FSI 2011). The North-eastern states and others, such as Goa, Kerala, Uttarakhand, Himachal Pradesh, Chhattisgarh, Odisha, Jharkhand

[10]These include the Community Managed Sustainable Agriculture in Andhra Pradesh and SRI cultivation in Bihar (see Chapter 2).

[11]Very dense forests cover 8.34 mha (2.5 per cent), moderately dense forests cover 32.17 mha (9.8 per cent), open forests cover 28.78 mha (8.8 per cent) and mangroves, in 12 states and union territories, cover 4,63,900 ha.

FIGURE 5.4 Distribution of Forest Cover as a Share of State's Geographical Area, 2011



Source: FSI (2011).

India's per capita forest cover is dismally low at 0.06 ha compared to a world average of 0.64 ha.

and Madhya Pradesh, have a higher forest cover (see Figure 5.4), and many also have a high proportion of tribal population concentrated in the forest areas who largely depend on them for their livelihoods.

According to official surveys, years of forest degradation were reversed in the 1980s. Pressure on land following Independence led to the clearing of about 3.4 mha of forest until 1972, primarily for agriculture (Enters et al. 2004; Manoharan 2011). During the 1970s deforestation accelerated to about 1.3 mha per year (Manoharan 2011). This led to efforts to conserve forests, such as social forestry and later Joint Forest Management. In addition, the Forest Conservation Act 1980 prohibits the conversion of forest land without government approval, and approval is subject to compensatory afforestation of an equivalent area.

But numerous independent researchers and civil society groups have questioned official estimates of forest cover on several grounds. First, the definition of 'forest' has become looser over the years—the minimum area required to qualify as a forest has (as 10 per cent area having tree cover) has fallen from 400 ha in 1987 to just 1 ha in 2001. This means that, now even city parks may be counted as forest area. Second, the satellite technology used for measuring India's forest cover cannot distinguish between forest area and orchards and tea and coffee plantations, and cannot detect forest destruction, due to illegal felling and coal mining in the East Garo hills of Meghalaya, for instance (Gilbert 2012). Many studies have also concluded that the quality of India's forests has been declining. Some estimates say that more than 40 per cent of the forests in the country are degraded (MoEF 2006; Aggarwal et al. 2009a).

Also of concern is the fact that afforestation has often not been with indigenous and native species. Plantations, grown to meet needs for timber, teak, rubber sap and other forest produce, are frequently cut down and do not offer the complex biodiversity of natural forests and also may not support local livelihoods. A recent study shows that plantations have driven forest-cover growth—from 1,46,200 sq km in 1995 to double that of 3,00,280 sq km in 2005—while native forests have declined at an alarming rate of between 0.8 to 3.5 per cent per year or from 5,14,100 sq km in 1995 to 3,90,000 sq km in 2005 (Puyravaud et al. 2010).

Compensatory afforestation programmes to replace degraded forests or to replace forests lost to industrial projects have largely failed because either the money is spent elsewhere or land is not available within the same ecosystem to be able to replicate the biodiversity of the forest lost (Kohli et al. 2011; Rajshekhar 2012).

5.3.2 The Disenfranchisement of Forest Dwellers

Rural communities that historically depended on forest resources also managed the forests. But under colonial forest policy, which was geared towards commercial exploitation, valuable forests were notified as reserve forests and rural commons were often declared as state forests (Sarin 2010; Sharma and Kohli n.d.). After Independence, large areas of forest land of princely states and *zamindar*s (landlord)—including village commons—were notified as protected forests, disenfranchising forest dwellers of their customary rights (ibid.).

TABLE 5.2 Ownership Rights of Indian Forests

Category	Rights Status of Local Population	Ownership	Share of Forests (%)
Reserve Forests			
Reserve forests	No right to reside or collect NTFPs unless permitted	State government (FD)	55
Protected areas (wildlife sanctuaries, national parks)	No right to reside or collect NTFPs		
Notified village forests	Management role; can collect NTFPs if permitted		
Protected Forests	No right to reside; limited rights, such as NTFP collection for household use	State government (FD)	28
Unclassified Forests			
Unclassified state forest	Rights not recognised; tribal disputes in North-East India	State government (District Administrator, FD)	17
Tribal community forests	Disputed by the government	Tribal councils in the North-East	
Village commons		Village administration	
Tree cover outside government recorded forests		Private institutions and owners	

Source: FSI (2011).

The government owns 97 per cent of India's forest area, mainly through state forest departments (FDs) (MoEF 2006). Communities cannot reside in and have very restricted access to NTFPs from reserved and protected forests, which constitute roughly 83 per cent of recorded forest area (see Table 5.2). Even in the North-eastern states, which are accorded special Constitutional status such that communities can manage roughly two-thirds of the forest area, the legitimacy of community-based systems is threatened due to lack of formal mapping, boundary registration and titling (Poffenberger et al. 2006).

The Wildlife Protection Act 1972 was enacted in response to concerns about loss of biodiversity and extinction of species. The Act protects a range of animal species and their habitats, and notifies national parks and wildlife sanctuaries, but lacks a long-term programme for assessing, monitoring and recovering threatened species or habitats (Planning Commission 2011c). And rights of local communities continue to be ignored—forest-dwelling communities lost their customary rights in national parks and had their rights severely restricted in sanctuaries. They were classified as encroachers and evicted in many states (Springate-Baginski et al. 2009). Following conflicts, a programme of 'eco-development' was pursued. Communities continued to be prohibited from using forests, but were provided funds for development and alternative income-generating opportunities. However, this measure, i.e. financial compensation, assumed that forest dependency is only economic—rather than an integral part of a lifestyle—and thus failed to enhance livelihoods (Badola 1999).

The National Forest Policy of 1998 marked a changed approach by entrusting socio-economically weak, forest-dependent people with forest management. The JFM programme (discussed in sub-section titled 'Joint Forest Management' in section 5.3.3), operational on 28 per cent of the forest area, was the first initiative to involve communities in forest management. However, communities are completely excluded from management of nearly 70 per cent of the forest area and play only a minor role in many JFM areas (Aggarwal 2011). In this regard, two recent legislations—Panchayats (Extension to Scheduled Areas) Act (PESA) 1996 and Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act (FRA) 2006—are important because they aim to change the pattern of forest governance.

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The achievements and issues of the various policies and programmes relating to forest management are discussed in the following sections.

5.3.3 Initiatives for Afforestation and Forest Protection

In the late 1970s, two types of government programmes, viz. social and farm forestry, became popular as a means of promoting rural livelihoods and increasing forest cover. While both these government initiatives had certain shortcomings in design and implementation, they nevertheless assisted in improving forest cover and density, and dry wood collection. Community groups in several states also took up forest protection.

Social Forestry. Government social forestry initiatives included planting of trees in village commons, and along roads, canals, rivers, ponds and lakes, normally to hold the banks of rivers or to provide shade. Several afforestation programmes also promoted artificial reforestation in open degraded forests, bare lands or scrub forests. But these afforestation programmes were criticised because the species selected were not native to the area and were often resource-intensive. In the 1980s, for instance, there was a controversy over planting eucalyptus which was not useful for communities and drew a lot of subterranean water (Banerjee 2010). Recognising this, more recent afforestation and reforestation programmes have included indigenous species.

These initiatives mainly benefitted rural communities only indirectly—through wage earning opportunities—and did not directly address their need for access to NTFPs. Even when availability of NTFPs improved, the collection and sale of NTFPs was difficult due to complications in obtaining permits and paying taxes.

Farm Forestry. Farm forestry, or farmers planting trees on private lands, was arguably more successful. It became popular in the late 1970s when the central government promoted it through subsidies for tree planting, following recommendations of the National Commission on Agriculture. The private sector (mainly paper and plywood industries) also promoted farm forestry to meet its raw material requirements. Farm forestry was largely implemented in areas of Gujarat, Uttar Pradesh and Karnataka and helped supplement rural livelihoods.

Farm forestry initially made a significant economic impact. But with market saturation of wood and subsequent price collapse in the 1990s, farm forestry declined. Moreover, farmers did not find the long gestation nature of financial returns attractive, as in the case of teak plantation which takes two decades to yield proper results. Also, farm forestry only marginally reduced the rural population's dependence on natural forests because the production of timber and fuelwood mostly went to industries instead of home consumption.

Self-initiated Forest Protection. While government-led social and farm forestry helped increase tree cover in many forests across the country, local forest-dwelling communities led forest protection. In response to forest degradation and NTFP scarcity in the late 1970s and early 1980s, self-initiated forest protection groups took up community forestry and forest protection. Over 10,000 groups in Bihar, West Bengal, Odisha, Jharkhand, Andhra Pradesh and Maharashtra have been managing and protecting forests with such initiatives being particularly prevalent in Odisha and Jharkhand (Poffenberger and Bhattacharya 1996). The areas under self-initiated protection showed vast improvement with respect to biodiversity and forest density and also helped supplement the income of the poor through NTFPs and dry wood collection (Banerjee 2010). The FD did not recognise this system for many years, viewing it as an informal management system, but these groups have gained acceptance more recently.

Joint Forest Management. The success of the 1972 Arabari experiment, in which a community worked with the FD for forest regeneration (see Box 5.2), laid the foundation for the JFM programme. The JFM programme, developed as part of India's National Forest Policy of 1988, was implemented in various states under guidelines prepared by the Ministry of Environment and Forests (MoEF).

It was the first official effort aimed at involving rural communities in forest fringe areas in conservation, protection and management of forests by sharing benefits with them towards sustainable livelihoods. Under JFM, communities assisted the FD in conservation and afforestation activities and, in turn, were provided access to forest land and subsistence NTFPs through usufruct benefits to grass, tree branches and minor forest produce. The FD also gave them a share of proceeds from the sale of timber and other forest produce.

JFM is estimated to cover about 28 per cent of the country's forest area (Aggarwal 2011). Although not uniformly so, it has had a positive impact on plant diversity and biomass production in degraded sites

BOX 5.2 The Arabari Experiment, West Bengal

The Arabari forest in West Midnapore, West Bengal, is spread over 1271 ha and used by 11 villages. The area became degraded from continuous felling for local subsistence needs. The Arabari experiment aimed to promote community participation in forest management under certain reciprocal conditions, including mutually agreed-to incentives to manage the degraded forest jointly with the FD. The FD and the villagers agreed that the villagers would protect the forest if they were allowed to use firewood and some NTFPs that did not adversely affect vegetation, and if they were given regular employment. This employment was generated by the promotion of paddy cultivation on bare land, planting fruit trees in open portions of the degraded forest and regularly planting sabai grass (*Eulaliopsis binata*), bamboo, *Eucalyptus tereticornis*, *Acacia auriculiformis* and *Cassia siamea*. In a few years, degradation was fully arrested and new shoots of the felled stumps started growing. This success led many villagers in the vicinity to take the initiative to protect adjacent forests, supported by local officials, in the early 1980s and later inspired the national adoption of JFM.

Source: Based on Banerjee (2010).

JFM improved plant diversity and biomass production but failed to adequately include local communities.

(Murali et al. 2004). Some case studies show that as JFM provided people with wage-earning opportunities, it helped reduce out-migration (Banerjee 2010).

But a major drawback of JFM is that its implementation was left largely to local forest officers and the FD retained control over forest management. In many places, JFM committees were constituted by the FD. As a result, though JFM was envisaged to remedy the exclusion of forest dwellers from forest management, in many cases, it merely institutionalised the restrictions on their access to land and forest produce (Planning Commission 2008). In places where local communities had been protecting forests on their own JFM, which was meant to strengthen their role, often led to their losing their grip on the forests. The main focus of JFM therefore remained conservation and tree cultivation on a grand scale, with little attention paid in practice to the livelihoods of communities.

The fact that the FD did not recognise bamboo—which has multiple uses in tribal areas—as an NTFP also reflected the lack of support to the community. Finally, although JFM was based on MoEF guidelines, it has no legislative backing and has thus not been taken seriously by other ministries despite its existence for over twenty years (Unnikrishnan 2009).

Given their dependence on forest resources, various people's movements arose against the marginalisation of forest communities. Two landmark legislations emerged, though, to take forward the underlying spirit of JFM—that of making communities integral to sustainable forestry management. These legislations are PESA 1996 and Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act 2006 (FRA).

5.3.4 Legislative Support for Community Management: PESA and FRA

PESA and FRA underscore the centrality of community management and aim to transfer certain powers of forest management back to communities.

Decentralised governance of forest resources has not succeeded under PESA and its implementation in scheduled areas has been very limited.

The first legislation, the PESA, applies to Schedule V areas[12] with a high proportion of Scheduled Tribes (STs). It empowers the Gram Sabha as the legal custodian of land and other natural resources in PESA areas and has provisions for management of community resources, including forests and ownership of NTFPs. In so doing, the Act envisaged a shift in power from the state apparatus to local communities. But due to various problems in the legislative and executive framework (discussed in Chapter 6), decentralised governance of forest resources has not succeeded under PESA and its implementation in scheduled areas has been very limited. Many states have not aligned their rules with PESA. Consequently, Gram Sabhas and Gram Panchayats have had severely limited roles in the use and management of NTFPs (Planning Commission 2011c). Studies also show that PESA has failed to support the sustainable use and management of NTFPs

[12]Special provisions are made for Schedule V areas mentioned in Article 244(1) of the Constitution of India.

for the livelihood of rural communities (Saxena 2003; Planning Commission 2011c).

The more recently enacted FRA, in effect since 2008, aspires to 'undo historical injustices'. The Act broadly defines forest rights to include:

- The right to hold and live in forest land under individual or common occupation;
- *Nistar* (community rights) to collect, use and dispose NTFPs;
- Entitlements to fish and other products of water bodies;
- The right of nomadic or pastoral communities to access grazing and traditional resources; and
- Defining community forest resources to mean 'customary forest land within traditional or customary village boundaries or seasonal use of landscape in the case of pastoral communities, including reserve forests, protected forests and protected areas such as Sanctuaries and National Parks to which the community had traditional access.' (quoted from FRA 2006)

The Act also supports any other traditional rights that forest-dwelling STs or other traditional forest dwellers customarily enjoy, even if not mentioned. Collection, however, remains a usufruct right[13] and the FD continues to play a management role.

Some states made progress in granting individual rights, so that by the end of March 2013, over 12,64,000 individual titles had been distributed under the Act (MTA 2013). But inter-ministerial friction, coupled with other impediments in constituting Gram Sabhas at the habitation level, led to unsatisfactory implementation of FRA (elaborated in Chapter 6).

The N. C. Saxena Committee Report found wrong recognitions and claim rejections common, in part due to hasty enquiries by senior officials or higher level committees, or because state tribal departments failed to monitor progress at the village level (MoEF and MTA 2010). Consequently, sub-division level committees often rejected claims arbitrarily and without informing claimants the reasons for rejection and their right to appeal (CSD 2010). Importantly, the claims process has generally excluded other traditional forest dwellers on the basis that they had not cultivated the claimed plot for 75 years, this despite their eligibility under the Act if they had primarily resided in forest land for three generations and depended on forests as of December 2005 (MoEF and MTA 2010).

Community claims, which are important from the perspective of livelihoods as well as conservation, were not granted until quite recently. Mendha Lekha in Gadchiroli, Maharashtra, which has been engaged in community conservation activities since the 1970s (elaborated in section 6.4.2), was the first village granted community forest rights 2011. In many other places too, forest-dwelling communities have played an important role in protecting forests, which demonstrates the importance of the recognition of community rights under FRA from a conservation perspective.

Overall progress on the community forest rights' front continues to be slow. By end-March 2013, less

BOX 5.3 Jamguda, Odisha, Sells Bamboo under FRA

The community residing in Jamguda in Kalahandi, Odisha, is one of about 4500 groups in the state that protect about 10 per cent of the state's forested area. Most villagers completely depend on the forest. Recognising its importance, Jamguda's youth committee has protected the forest from illegal timber felling since 1990, allowing harvest of timber and bamboo only for personal use and collection of NTFP for sale. In 2010, the village got recognition of community forest rights in the reserve forest area under the FRA.

While bamboo is recognised as an NTFP under FRA, being denied a transit pass by the FD, the gram sabha of Jamguda was unable to sell its harvested bamboo at a remunerative price outside the village. It had considerable difficulty in obtaining a transit pass. Finally, after months of struggle and political pressure, in March 2013, Jamguda received the transit pass and became the first village in Odisha and the second in the country to exercise its community right to harvest and sell bamboo under FRA. This will allow the village to augment its income, and going forward, the Gram Sabha has planned to harvest bamboo on a rotational basis so as to ensure a sustainable income stream. Proper implementation of the FRA and recognition of community rights simultaneously helps achieve the dual objectives of forest protection and development of the most marginalised communities.

Source: Based on Banerjee (2010) and Ulman and Deo (2013).

[13]Ownership remains with the FD and the local community can use and access certain products provided it does not degrade the forest.

than 18,000 community rights claims had been granted out of nearly 67,000 claims received (MTA 2013). Little information is available on the areas granted community rights. A study in Andhra Pradesh showed that claims that were granted were often made by the FD on behalf of JFM committees, and claims by communities were rejected or approved for fewer areas than actually claimed (Reddy et al. 2011). Even where granted, communities have had trouble effectively implementing their rights, particularly to sell bamboo (see Box 5.3).

State governments, acting through tribal co-operative societies control markets of economically important NTFPs by fixing prices and procurement. These societies are meant to ensure fair remunerative prices to gatherers and reduce exploitation. But because they are managed by the tribal department and controlled by middlemen, in practice, the monopoly procurement policy of the tribal societies prevents collectors from receiving the right market price. Government inefficiencies have led to delayed payments and widespread corruption has allowed contractors to continue to make profits at the expense of the tribals (Burra 2008). Recognising the need for support until competitive markets for NTFPs develop and gatherers build capacity and form self-help groups or producer companies, the Haque Committee recommended intervention in the form of MSP for NTFPs (MoPR 2011). But this has not yet happened.

Effective implementation of the FRA could go a long way in meeting the twin objectives of ensuring sustainability of forests and protecting the livelihoods of the marginalised communities that depend on forest resources.

Various instances of community management of forests have shown the crucial role of forest-dependent communities in protecting forests and ensuring their sustainability. This suggests that effective implementation of the FRA could go a long way in meeting the twin objectives of ensuring sustainability of forests as well as protecting the livelihoods of the marginalised societies that depend on forest resources.

5.4 Water

After decades of over-extraction and mismanagement of water resources, India faces a water crisis that threatens even the basic right to clean drinking water and puts at risk the livelihoods of a large section of the population. With increasing demand for water from a rapidly growing economy, water scarcity will be one of the key limiting factors of development (WWAP 2003). With limited potential to further augment supply, falling water tables, deteriorating water quality and the adverse impacts of climate change, managing our existing water resources is critical.

5.4.1 Water Resources: Imbalances in Availability and Use

India receives an average annual precipitation of 4000 billion cubic metres (BCM), but after allowing for evapo-transpiration and minimum ecological flow, the annual amount usable for human use is only 1123 BCM, i.e. about a quarter of the total annual precipitation (CWC 2010), available in the form of both groundwater and surface water (see Table 5.3).

India faces a water crisis that threatens even the basic right to drinking water and puts at risk the livelihoods of a large section of the population. With increasing demand for water from a rapidly growing economy, water scarcity will be one of the key limiting factors of development.

Over the years, the per capita availability of water has declined from 1816 cubic metres in 2001 to 1588 cubic metres in 2010 (CWC 2010). Climatic and microclimatic changes have also affected water availability. Climate change, for instance, has impacted the rate of glacial melt in the Himalayas with strong implications on the flow of Himalayan rivers. Changes in precipitation patterns in many regions too have led to changes in water availability, often stressing already water-scarce regions.

The availability, accessibility and quality of water vary considerably by season and region. Most rainfall is concentrated in four months, i.e. from June to

TABLE 5.3 Water Availability

Items	Quantity
Annual precipitation (including snowfall) in BCM	4000
Average annual availability in BCM	1869
Per capita availability in cubic metres	1588
Estimated utilisable water resources (Total) in BCM	1123
Surface water resources in BCM	690
Groundwater resources in BCM	433

Source: CWC (2010).

September. While some regions face a continuous threat of excessive water flow and flooding, others face extreme drought. This section discusses some of these challenges, their impacts and steps being taken to address them.

5.4.2 Surface Water

Surface water accounts for over 60 per cent of the country's total estimated usable water resources. But due to topographical constraints, time and period of precipitation, utilisation levels vary significantly across water basins, with the Mahanadi and southern peninsular rivers having the most usable water and Brahmaputra the least (see Table 5.4).

Water Storage

The utilisation of surface water can be enhanced by storing water. Storage currently stands at only 219 BCM or 32 per cent of usable flow, the southern peninsular and west-flowing rivers accounting for 62 per cent of the country's total storage capacity.

But storage is constrained by the fact that a majority of the annual river flow occurs during the four months of the Southwest monsoon (June to September). And the potential for capturing such peak resources through large dams is again limited because in the plains large areas would need to be inundated due to the flat topography, which would displace large populations. The scope for increasing current storage capacity is also limited by other factors. The rivers in the Himalayas create much soil erosion which leads to sedimentation in dams. Also, the North-eastern region is ecologically very sensitive and thereby, building large dams in the North-East raises environmental concerns (Shah 2013).

The peninsular rivers have almost reached maximum capacity and very little additional storage can be created in that basin due to the threat posed to the rivers' natural regenerative capacity. Increase in storage capacity in the Krishna river basin, which now leads with 41.8 BCM of storage capacity, has reduced river discharge and outflow into the sea from an average annual flow of 57.22 BCM during 1950–60 to 24.94 BCM during 1995–2000 (Gaur et al. 2007). This upsets the delicate ecological balance in the sea, which requires freshwater inflow to sustain marine ecosystems. Utilisation levels are also affected by a reduction in vegetation cover which has led to an increase in soil erosion—the top soil flows away with water and results in siltation of water-storage structures and reduces the water content of rivers.

Small reservoirs and micro-storage facilities, on the other hand, are not only more operationally efficient than large dams, but can also be located close to the point of use and are easier to manage (Keller et al. 2000). The southern peninsular rivers which have the most small storage capacity and have helped states

Small reservoirs and micro-storage facilities are not only more operationally efficient than large dams, but also can be located close to the point of use and are easier to manage. Despite this evidence, building small storage capacities such as tanks and ponds have not drawn enough attention.

TABLE 5.4 Distribution of Estimated Usable Surface Water Across Major River Basins

Name of the River Basin	Average Annual Potential in the River (BCM)	Share of River Basin (% of total)	Estimated Utilisable Flow (excluding groundwater) (BCM)	Utilisable Flow as % of Average Annual Potential	Live Storage Capacities Completed (BCM)	Live Storage Capacity Completed as % of Utilisable Flow
Indus and Ganga	598	32	296	49	58	20
Brahmaputra, Barak and others	586	31	24	4	2	8
Southern peninsular rivers	216	12	160	74	78	49
Mahanadi	67	4	50	75	12	24
West-flowing rivers	291	16	105	36	59	56
Others	111	6	55	50	9	16
Total	1869	100	690	37	218	32

Source: Authors compilation from MoWR (2008); CWC (2010).

like Andhra Pradesh, Karnataka and Maharashtra to increase the utilisation potential of their surface water, are a good example in this case.

Despite this evidence, building small storage capacities such as tanks and ponds have not drawn enough attention. In fact, the share of tanks has declined significantly in the past few decades and many small surface water bodies have languished in a state of disrepair and disuse (Planning Commission 2012a). In many instances, micro-storage facilities are even being filled up to create valuable land for other uses.

Impact of Pollution

Pollution is increasingly having a severe impact on the utilisation potential of surface water. Today, more than 70 per cent of India's surface water resource is unsafe for drinking and farming (MoEF 2009). This adversely affects aquatic life, contaminates drinking water and affects human and animal health. Surface water resources are contaminated from indiscriminate discharge of wastewater containing biological and toxic pollutants from industry, agriculture and households. Most polluted stretches of rivers are found around urban centres, with municipal sewage contributing 75 per cent of point-source pollution. Only about 10 per cent of India's wastewater is currently treated; the rest is discharged untreated into water bodies (CAG 2012). Though the nutritional content of wastewater containing organic compost may be high, it allows disease-carrying organisms and algae to proliferate, slows water flow, increases sedimentation and adversely affects the aquatic ecosystem. Agricultural run-off containing pesticide and fertiliser residue also affect surface and groundwater.

Today, more than 70 per cent of India's surface water resource is unsafe for drinking and farming.

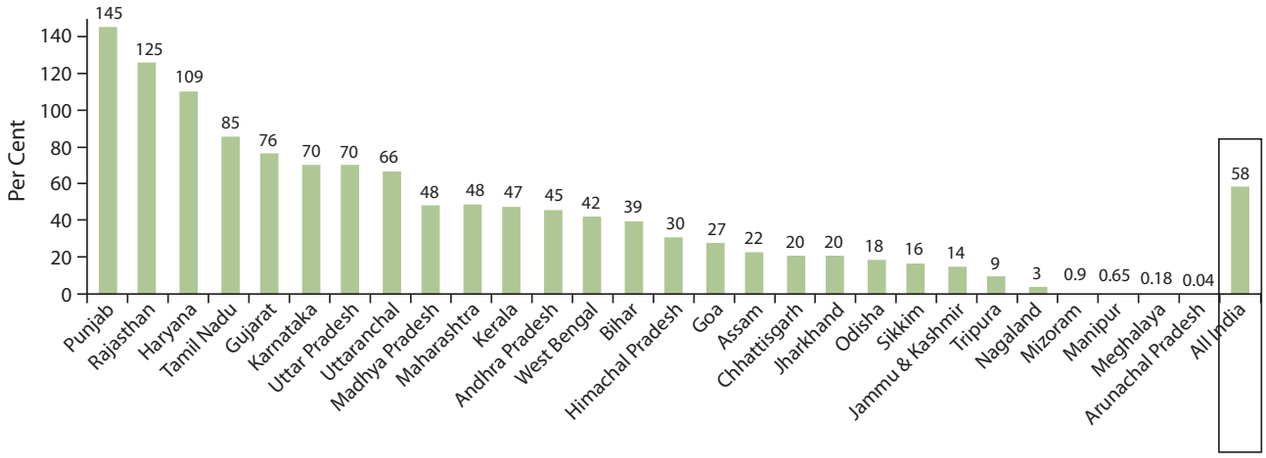
5.4.3 Groundwater

Rural India depends heavily on groundwater for agriculture; roughly 88 per cent of the total annual groundwater drawn from over 27 million tube wells is used for irrigation. Groundwater irrigation has helped ensure food security in times of deficit rainfall and increased agricultural productivity (see Chapter 4 for more on groundwater irrigation). Groundwater also provides 85 per cent of India's drinking water supply (World Bank 2010).

Roughly 88 per cent of the total annual groundwater drawn from over 27 million tube wells is used for irrigation. Groundwater provides 85 per cent of India's drinking water supply.

But groundwater is fast depleting due to heavy over-exploitation that threatens aquifers in many parts

FIGURE 5.5 Stage of Groundwater Development Across States



Note: Stage of groundwater development is the share of annual groundwater draft[14] in the net annual groundwater availability. States exceeding 100 per cent have average annual groundwater consumption greater than the average annual groundwater recharge (CGWB 2011).
Source: CGWB (2011).

[14]Groundwater draft is the quantity of groundwater withdrawn from groundwater reservoirs. For a given structure, it is computed as the product of the average water discharge and annual working hours, or based on the irrigation requirement of crops in the command area of a structure (MoWR 2009).

of the country. The green revolution and supportive irrigation policies had spurred massive development of groundwater potential. Because farmers began to adopt more water-intensive crops (incentivised by procurement and price-support policies) and used fertilisers that required protective irrigation, groundwater use in some states exceeded water recharge rates (see Figure 5.5). In addition to threatening agricultural livelihoods, this is responsible for the drinking water crisis in many parts of the country (discussed in Chapter 4).

Not surprisingly, the green revolution states are amongst those with the worst groundwater over-exploitation. A majority of blocks/districts in Punjab and Haryana are in the 'over-exploited' category, most in West Bengal are in the 'semi-critical' category and some in Uttar Pradesh are critical and semi-critical. These are the states that were fortunate to have deep aquifers, yet they are now experiencing significant decline in groundwater availability due to man-made reasons. In addition, some semi-arid and arid states that have poor aquifers have also experienced groundwater depletion, including areas in Rajasthan with low recharge, and parts of Karnataka and Tamil Nadu with shallow aquifers. In total, of the 5842 monitored assessment units (blocks/mandals/talukas) in India, 14 per cent are categorised as over-exploited, 3 per cent critical and 9 per cent are semi-critical (CGWB 2011).

Groundwater over-extraction has severe health and environmental implications. Deeper groundwater contains higher concentrations of contaminants such as arsenic and fluoride (see Chapter 4). In coastal areas, often there is also salt water contamination as seawater seeps into deep wells. When this contaminated water is used for irrigation, it poses the threat of sodification (excessive accumulation of sodium) and salinisation (excessive accumulation of salts) of the soil and reduces soil fertility and nutrient uptake of crops, which in turn negatively affects agricultural productivity and food security.

Because an increasing number of aquifers approach unsustainable levels of exploitation, reduction in groundwater availability will threaten water security and exacerbate drinking and irrigation water shortages. The implications of groundwater depletion and pollution on health and livelihoods and on economic growth and environmental sustainability are severe, demanding urgent remedial measures and limits on groundwater withdrawal.

Escalating Conflicts over Water Use: Rural versus Industry and Urban

Increased demand from industry and urban areas also contributes to water scarcity in rural areas. Decades ago, *talab*s (artificial lakes) were used within cities to capture and store rainwater, but these have gradually been blocked and lost to commercial development. As a result, growing urban water demands are met by sourcing water from rural areas, sometimes at the cost of depriving rural communities of irrigation water and even basic drinking water, and often meeting strong resistance from villages and farmers. A few instances of resistance of this kind are listed below:

- In 2009, the Chennai municipal water board in Tamil Nadu, 'Metrowater', faced severe resistance from villages around Veeranam Lake from which water is drawn for the city.
- In 2009, in Madhya Pradesh, when water scarcity led to water rationing in some cities, water from rural areas was sought; Dewas had to impose a curfew to protect its 122-km pipeline from damage by farmers, leading to violence and riots.
- Farmers in Maharashtra's Vidarbha region protested diversion of irrigation water to the Sophia Power Plant in 2010.
- In 2010, villagers in Andhra Pradesh resisted irrigation water being diverted for the Jindal Refinery.
- Since 2010, farmers in Gujarat have been protesting against Nirma's takeover of a water body.
- Villagers along the Mahanadi have been protesting against the diversion of water to power, iron and steel plants since 2010.

Industrial pollution too has threatened farmers' surface and groundwater sources. Working out more equitable water-sharing agreements between sectors has to be an integral part of crafting water management plans and policies.

5.4.4 Alleviation Efforts

Clearly, urgent steps must be taken to alleviate the water crisis and effectively manage existing water resources. Several attempts have already been made with varying degrees of success. This section examines some of these efforts, their impacts and some lessons learnt.

To address the wide regional disparities in water availability, the Centre is planning a National River Linking Project to link all major rivers of the country through 30 interlinking canal and dam systems. The rationale for this is that it may help mitigate floods by retaining flowing surface water in the monsoon and ensuring water availability in drier areas, simultaneously combating flood and drought. It would also bring additional land under irrigation, generate hydroelectric power and facilitate transportation through inland waterways. Many, however, have criticised it, arguing

that the social and environmental costs exceed the economic benefits. They calculate that the construction of reservoirs and canals in the peninsular component alone will displace over 2,50,000 people and submerge large areas of forest, agriculture and non-agricultural land causing destruction to many local ecosystems (Shah, Amarasinghe and McCornick 2008). The project is also predicted to have high environmental costs and impact the monsoon cycle.

Instead of large projects such as river interlinking, other local and cheaper options, such as decentralised water harvesting and artificial recharge of aquifers practised in some areas, may be considered.

Instead of large projects such as river interlinking, other local and cheaper options, such as decentralised water harvesting and artificial recharge of aquifers practised in some areas, may be considered (see Box 5.4). These have proven successful in raising and maintaining water tables, particularly when implemented and managed by the local communities themselves.

In addition to local efforts, aquifers should be mapped, monitored and managed at the national level. A proposal for this is discussed in Chapter 4, along with Twelfth Plan recommendations to dovetail watershed and water harvesting efforts with MGNREGS.

Overall, there has been a gradual shift in approach from groundwater development to management. At the national level, the 'Model Bill for the Conservation, Protection and Regulation of Groundwater 2011'[15] identifies groundwater as a public trust and suggests decentralised regulation through groundwater committees at the panchayat level. It provides for demarcation of Groundwater Protection Zones to protect threatened aquifers and ensure groundwater sustainability. It also contains provisions to ensure effective implementation, including annual social audits and a qualified Nyaya Mitra[16] to assist groundwater grievance redressal officers. Similarly, Maharashtra was the first state to recognise the need for legislative backing in the protection of groundwater with the Maharashtra Groundwater (Development and Management) Act 2009. This Act is based on the notion of water as a CPR and aims to facilitate sustainable and adequate supply of groundwater of prescribed quality by institutionalising community water budgeting, crop planning and conjunctive management of surface and groundwater. Various bans, such as on deep borewells, as well as incentives and disincentives for demand management are in place to ensure sustainability of water resources.

Finally, efforts have been made to address pollution which heavily impacts the utilisation of water. But planning and institutional capacity for pollution control has been inadequate (CAG 2012). Some programmes such as the National River Conservation Plan (NRCP) and the National Lake Conservation Plan (NLCP) have

BOX 5.4 Decentralised Rainwater Harvesting Efforts

Rainwater harvesting and groundwater recharge can play an important role in meeting basic water needs. India has had a historical tradition of local water harvesting such as in *ahar-pyne*s in Bihar, *tanka*s in Rajasthan, *dhara*s in the Himalayas, talabs in Bundelkhand and *erie*s in Tamil Nadu. The success of such decentralised initiatives highlights the importance of encouraging rainwater harvesting in rural areas.

*Happa*s are small mud-excavated structures with a command area of 0.6–0.75 acres, constructed on private farming plots in parts of West Bengal affected by continuous natural resource degradation. Funded by MGNREGS and maintained by farmers, they have been found to improve soil and moisture conservation, check soil erosion and enhance livelihoods with increases in yield and cropping intensity, and generate employment.

Farmer initiatives in Kurubahalli, Karnataka, to conserve water using desilting tanks and check dams, helped prevent rainwater from flowing to the drains. After the 1987 drought in Saurashtra, Gujarat, check-dams were constructed to reduce water speed and allow groundwater recharge. This was expanded with NGO assistance until the state government introduced the Sardar Patel Participatory Water Conservation Project under which the government provides 80 per cent of the cost. By end-March 2012, over 70,000 check-dams were constructed.

Source: Based on Jana (2011) and Sekhri (2012).

[15]Available at http://www.planningcommission.nic.in/aboutus/committee/wrkgrp12/wr/wg_model_bill.pdf (accessed in 2013).

[16]As per the Model Bill, every district should have a Nyaya Mitra (or judicial friend) with a minimum qualification of an undergraduate degree in law to assist the groundwater grievance redressal officer in the discharge of her/his duties.

been operational for over a decade, but implementation has been unsatisfactory. For instance, sewage treatment plants (STPs) were to be built under the NRCP to treat the flow of sewage water from towns and cities that were affecting stretches of 39 major rivers across 20 states, but barely a fraction have actually been built. This was either due to lack of financial resources, difficulty in acquiring land for the STPs, contractual problems or cost overruns. The project also failed to take a holistic approach and instead tackled individual towns. This oversight was partially addressed with the formulation of the Ganga Action Plan (GAP) and Yamuna Action Plan (YAP) that take a basin-level approach. But both these programmes have shown limited success as well, for many of the same reasons, including a gap between requirement of sewage treatment and actual pollution load, delays in building STPs and lack of maintenance by municipal corporations. Beyond urban wastewater pollution, the pressing issue of discharge of mining and industrial waste into rivers—such as in the mining areas near the Damodar and Mahanadi rivers—has gone unaddressed.

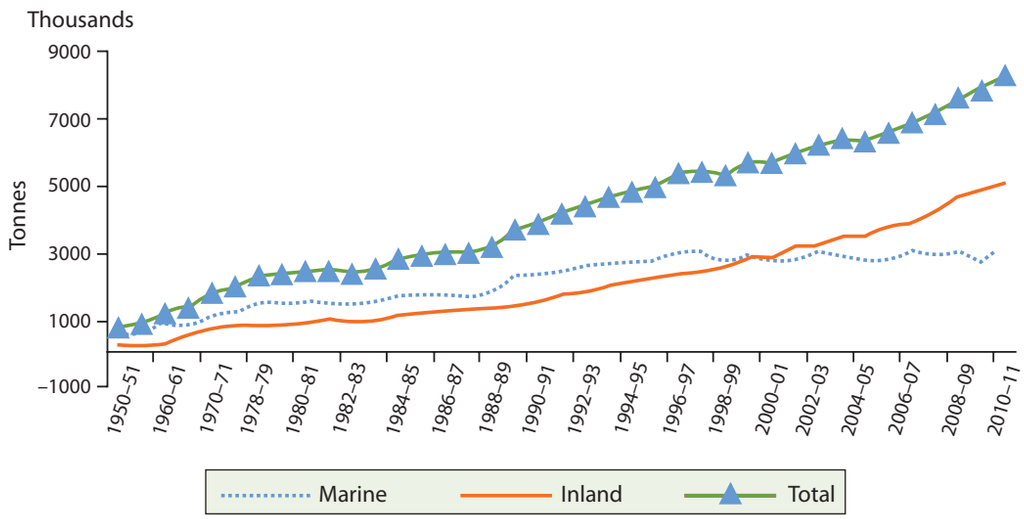
5.5 Fishery

Fishery is a key component of rural development. The sector's contribution to employment generation, foreign exchange earnings and food and nutritional security is now well recognised. Fishery employs about 0.93 million people on a full-time basis, 1.01 million on a part-time basis and 1.39 million in ancillary services (MoSPI 2011; MPEDA 2011). A sustainable approach to fishery envisages providing future generations a steady stream of benefits from living aquatic resources. Consumption patterns of Indian households have shifted from cereals to commodities such as eggs, meat, milk and fish over the period 1999–2000 to 2010, with rural households consuming more fish than urban households (NSSO 2012). All these factors together—including the increased demand for fish—make ensuring the sustainability of fisheries important not only for the ecology but also for the well-being of India's rural community and economy.

Marine capture fisheries comprised a large part of India's total fish production. But its contribution has declined over time from 70 per cent in 1960s to 39 per cent by 2010–11.

Fishery consists of both marine and inland fisheries, further classified as capture and culture fishery. Marine capture fisheries comprised a large part of India's total fish production. But its contribution has declined over time from 70 per cent in the 1960s to 39 per cent by 2010–11 (see Figure 5.6). Culture fishery, including aquaculture (i.e. rearing fish in controlled aquatic environments) and mariculture (ocean-based aquaculture), is playing an increasingly important role in ensuring a steady flow of fish for human consumption and reducing the pressure on marine fish stock.

FIGURE 5.6 Trends in Fishery Production



Source: MoA (2009, 2011).

5.5.1 Marine Fishery

With a coastline of 8100 km, India has a continental shelf of about 5,08,000 sq km. With the declaration of exclusive economic zones (EEZ),[17] India became responsible for conserving, developing and optimally exploiting the marine resources within its EEZ. The harvestable marine-resource potential of the Indian EEZ is about 4.41 million metric tonnes (mmt) of which the pelagic[18] resources account for 2.13 mmt and demersal[19] resources for 2.03 mmt (Planning Commission 2012b).

The marine fisheries census data shows that 8,63,000 fishing households depended on the marine sector for their livelihoods in 2010. Marine fisheries are of particular significance in rural India because their activities are spread over 1376 fish-landing centres and 3322 fishing villages (Fishery Survey of India 2005).

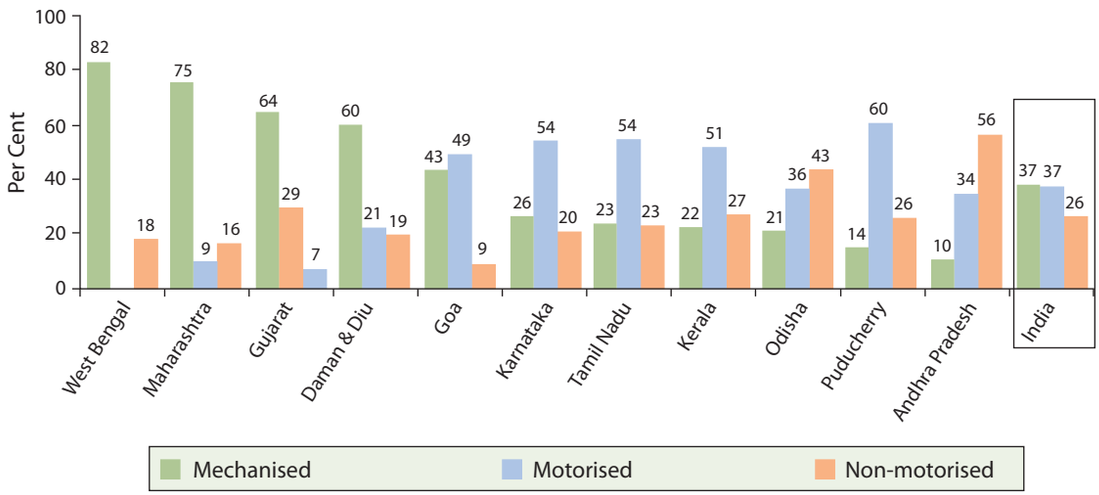
Studies show that an important reason for depleting stocks is the promotion of production intensification. A study in India's west coast reports that 47 per cent of species along the Kerala coast and 55 per cent along the Karnataka coast are declining and attributes this primarily to mechanisation, particularly trawling (Mohamed et al. 2010).

In the early period of fisheries development, expanding annual marine fish catch, mechanising indigenous craft and developing offshore trawling capacity with international assistance were emphasised. With the Third Five-Year Plan (1961–66), growing international demand for shrimp led Indian maritime states to intensify efforts and introduce new technologies of production, including trawler technologies. India also subsidised technologies and fuel in the sector. This led to an export-oriented fishery sector which, in turn, led to unsustainable practices of catching more fish, mainly due to unregulated growth, lack of awareness of and poor compliance with prevailing rules and regulations by marine fishermen and weak enforcement measures by management authorities (Johnson 2001; Sathyapalan et al. 2008).

Unprecedented growth in number of mechanised boats affects the sustainability of marine fisheries because it has led to over-fishing and falling fish catches per boat.

Today, 26 per cent of total fishing crafts are traditional, 37 per cent motorised and the remaining 37 per cent mechanised (see Figure 5.7). The unprecedented growth in number of mechanised boats affects the sustainability

FIGURE 5.7 Distribution of Fishing Crafts Across Maritime States



Source: Fishery Survey of India (2005).

[17]An EEZ is a sea-zone stretching from a state's coast out to 200 nautical miles over which the state has special rights over exploration and use of marine resources including energy production from water and wind under the United Nations Convention on the Law of the Sea.

[18]Living in the upper layers of the sea.

[19]Living close to the floor of seas or lakes.

of marine fisheries because it has led to over-fishing and falling fish catches per boat. Falling fish catches have long-term repercussions on the livelihoods of fishing communities. At present, poorly capitalised trawler owners have been worst hit, but in the long run small-scale fishermen with little income diversification and limited access to improved technology could also be threatened. Other causes cited for resource depletion in the fisheries sector include industrial pollution, catching of under-size fish (trash fish), use of small mesh size in fishing nets, climatic changes and monsoon fishing.

The government has made various attempts to explore new potential fishery resources, such as demersal and deep-sea resources and development of high-value aquaculture to cope with the increasing demand for fish.

Fishery in territorial waters is a state subject; all maritime states of India have enacted respective Marine Fisheries Regulation Acts. The regulation mechanism of marine fishery includes a seasonal ban on trawling, fishing ground earmarked for traditional fishermen and marine protected areas. But with the exception of the seasonal trawling ban, these controls are not effectively enforced. The sustainability of Indian marine fishery depends to a great extent on effective enforcement of control mechanisms and fishermen complying with rules and regulations.

5.5.2 Inland Fishery

Inland fishing sources include rivers, canals, estuaries, floodplain lakes, wetlands, lagoons, upland lakes and reservoirs. These inland fisheries provide full-time employment to over a million fishermen and generate approximately 3.4 mmt of annual fish production (about 61 per cent of total fish production).

(Declining marine fishery output in the 1990s led to the increased popularity of inland culture fishery, making it an important source of rural livelihood and for human consumption. Inland fisheries account for about 75 per cent of the total human resources involved in fishing, aquaculture and associated activities (Planning Commission 2013). Shrimp cultivation has become an important component of inland fishery, and production almost doubled in the last decade with the introduction of new technologies and species. There is scope to further enhance inland fishery production by two to four times in rainfed water bodies such as irrigation reservoirs, natural wetlands and ponds/tanks created as part of watershed development or through government support (Planning Commission 2012b). For instance, inland fish cultivation in Bundelkhand, Madhya Pradesh, by 200 co-operatives of farmer groups that have 48 seed nurseries has benefitted over 12,000 households, with an almost three-fold increase in fish production following the formation of the co-operatives (Planning Commission 2011k).

Inland fisheries provide full-time employment to over a million fishermen and generate approximately 3.4 mmt of annual fish production (about 61 per cent of the total fish production). Inland fisheries account for about 75 per cent of the total human resources involved in fishing, aquaculture and associated activities.

While aquaculture catalysed an increase in the share of inland fisheries, there now seems to be a slowdown in species diversification and yields due to a failure to prioritise sustainable development of inland capture fisheries. The numerous construction activities and infrastructure developments undertaken in recent years pose a threat to India's inland fishery resources and wetlands. Structures such as dams and reservoirs endanger aquatic resources due to disrupted inter-connectivity of inland habitats and threaten the existence of certain aquatic species, particularly those whose lifecycle depends on upstream or downstream migration. Filling up of floodplains, rice fields and wetlands also threatens inland fisheries. The gradual decline of Freshwater Fish Farmer's Development Agencies and Brackish Water Farmer's Development Agencies and weak extension services is also a concern; the Twelfth Plan combines these two agencies into Fisheries and Aquaculture Development Agency to revive extension services.

Also threatening the marine ecosystem is the high dependence of aquaculture farms on fish feed produced from marine capture fishery. Fish feed with locally available ingredients must be promoted and commercial fish feed mills should be encouraged.

5.6 Climate Change

The dependence of large sections of India's rural population on natural resources for their livelihood makes the role of climate particularly significant for the rural economy. Changes in key climate variables pose a severe threat to development due to adverse effects on the rural ecosystem and erosion of adaptive capacity. Preparedness for combating

Dependence of large sections of India's rural population on natural resources for their livelihood makes the role of climate particularly significant for the rural economy.

the impacts of climate change then is an imperative for ensuring sustainable rural development. Given the gravity of the situation, the Working Group on Climate Change constituted by the Planning Commission has estimated large investment requirements over the Twelfth Plan period for putting in place climate resilient infrastructure.

5.6.1 Impacts of Climate Change

Various impact assessment studies have estimated the impact of climate change in India. The melting of the Himalayan glaciers due to a rise in temperature would threaten the livelihood of Indians who depend on agriculture and allied activities. Impact assessment studies have estimated that in low-latitude regions such as India, 1°C rise in temperature may lead to 5–10 per cent reduction in the yield of major crops (WTO and UNEP 2009). Of India's geographical area of 329 mha, 40 mha is flood-prone (MoWR 1980), while almost one-sixth of the area supporting 12 per cent of the population is drought-prone (Jain et al. 2007). Climate change is predicted to increase the severity of droughts and floods (Gosain et al. 2006). Also, floods and sea storms are likely to affect fish breeding, migration and harvests, with severe impacts on small fishermen.

Most alarming is the fact that due to a combination of greater exposure to climatic shocks and low adaptive capacity, the rural poor are likely to be the most affected. Districts with highest climate sensitivity are not necessarily the most vulnerable—most districts in southern Bihar, for example, have only medium sensitivity to climate change but are vulnerable due to low adaptive capacity (O'Brien et al. 2004). This highlights the need to map vulnerability and adopt policy measures for climate change adaptation for the poor. While mitigation initiatives to reduce greenhouse gas emissions are important from a long-term perspective, pursuing them in rural areas will be meaningful only if they offer strong co-benefits to improve the standard of living and livelihood of the rural population.

A combination of greater exposure to climatic shocks and low adaptive capacity, the rural poor are likely to be the most affected.

Impact of Climate Change on Agriculture

Agriculture, backbone of the rural economy, is very vulnerable to the effects of climate change because almost 60 per cent of the country's agricultural areas are rainfed (Planning Commission 2011d). A small variation in temperature and precipitation can reduce yield. Various studies (TERI 2003; IPCC 2007) have confirmed that climate change would impact agriculture production. While productivity of most crops is supposed to decrease marginally by 2020, a decrease of 10–40 per cent by 2080–2100 (IPCC 2007) is possible. The risk is higher for rainfed agriculture due to its low coping mechanisms. The effects of heat on reproduction too are expected to cause animal distress (Aggarwal et al. 2009b).

5.6.2 Government Action

The government released the National Action Plan on Climate Change (NAPCC) in 2008 as India's first official climate change mitigation strategy. It sets out eight missions:

- The **National Mission for Sustainable Agriculture** aims to increase the resilience of agriculture to climate change by developing new varieties of crops and cropping patterns that are resistant to extreme weather, long dry spells and flooding, as well as improving the productivity of rainfed crops. It recommends the development of credit and insurance to promote better agricultural practices. But the mission needs to include programmes focused on soil fertility and pest management, watershed development, marketing and storage facilities, agro-forestry and other services (Ganguly and Panda 2010).
- The **Green India Mission**, recognising the importance of forests as a carbon sink, targets the increase in area under forest and tree cover from 23 per cent to 33 per cent. The mission is in the preparatory stage with an allocation[20] of Rs 4400 crore over 10 years. But it focuses on increasing forest cover and fails to explicitly consider biodiversity, livelihoods and conservation (Byravan and Rajan 2012). Adaptive co-management is considered a key strategy with communities playing a significant role in maintaining the ecosystem.
- The **Jawaharlal Nehru National Solar Mission** identifies solar energy as critical to ensuring energy security. It aims to install 22 gigawatt (GW) of solar capacity by 2022 compared to 10.28 megawatt (MW) in 2010. It anticipates that solar energy will achieve grid parity by 2022. Progress on this mission

[20]The resources are to be mobilised as additionality from the Planning Commission with any deficit financed by assistance from international funding sources.

is encouraging, but it does not adequately emphasise off-grid potential which could serve the poor and help achieve development benefits. Solar energy could enable significant co-benefits in rural areas given the large number of rural households still not electrified, the high cost of electricity grid extension to remote areas and the poor quality of electricity supply in rural areas.

- The **National Water Mission** attempts to manage water resources through conservation, increased storage and minimisation of waste to achieve equitable water distribution. It has developed a framework to increase the efficiency of water use by 20 per cent through regulatory mechanisms using differential entitlements and pricing. It also aims to develop an incentive structure to promote water-neutral technologies and recharge underground water resources. But fragmented authority between the Centre and the states may cause challenges in implementation.
- Because the Himalayan region is one of the most vulnerable to climate change (Planning Commission 2011b), the NAPCC includes a **Mission for Sustaining the Himalayan Ecosystem** focusing on the development of capacities to sustain the ecosystem and for long-term studies to understand and predict changes. It also plans to increase dialogue among stakeholders to formulate a comprehensive strategy to protect the fragile ecosystem.

In addition, there are two missions focused on mitigation in urban areas and one that is geared towards promoting research and technological improvements to assist in both adaptation and mitigation.

- The **Sustainable Habitats Mission** targets improvements in energy use by buildings, recycling of waste materials and improved management of solid wastes such as through technology that generates power from waste, and the promotion of public transport in urban areas.
- The **National Mission for Enhanced Energy Efficiency** proposes initiatives aimed at demand side management of energy. An important provision is the 'Perform Achieve and Trade' scheme where plants have specific energy consumption targets which, if not met, will need to be compensated for by purchase of energy permits from plants that have exceeded their target or payment of penalty. The mission also envisages a shift towards more energy efficient appliances, such as using CDM to finance lighting under the Bachat Lamp Yojana.
- The **National Mission on Strategic Knowledge for Climate Change** aims to promote research and technology development to identify the impacts of and formulate responses to deal with climate change through funding of high quality research.

The NAPCC, however, does not clearly lay down the synergy among missions and possibilities of convergence. NAPCC's success depends on how the various actions are detailed and implemented, how well they are synergised, of course, how well they are financed.

The government has also set up a National Clean Energy Fund (NCEF) by levying a cess of Rs 50 per tonne of domestic or imported coal since 2010. NCEF is intended to fund research and innovative clean technology projects. Individual or consortia of organisations are eligible for funding of up to 40 per cent of the project cost. This could play a key role in finding clean energy solutions at affordable prices. However, the performance of the NCEF is unsatisfactory (CBGA 2012). Funding, conditioned on the organisation providing a minimum 40 per cent financial commitment, is provided on projects not being funded by a government arm. The participation of research institutes is thus difficult (ibid.). The stated objectives of NCEF also seem inconsistent with its operational guidelines which allow projects even with tenuous links to clean energy (Panda and Jena 2012).

Apart from these targeted initiatives, various poverty alleviation measures to provide income security, alternative livelihoods or ensure food security also play a critical role in ameliorating vulnerabilities and safeguarding against climatic shocks in rural areas (Ganguly and Panda 2010).

5.6.3 Rural Adaptation to Climate Change

Being natural resource dependent, rural communities are vulnerable to the impacts of climate change. They have limited adaptive capacity and lack the infrastructure, resources and knowledge to deal with climate-related challenges. Steps should therefore be taken to increase their resilience to shocks. Importantly, while the impacts of mitigation are realised only in the long run, the benefits of adaptation measures are immediate and realised locally. Since most development projects and all infrastructure projects have significant lock-in periods, they must have strong co-benefits and add to adaptive capacity and increased resilience to climate change.

Adaptation has no one-size-fits-all solution, but requires approaches tailored to the locations in and conditions under which communities live (Chaturvedi et al. 2012). Community-based innovative solutions

Adaptation has no one-size-fits-all solution, but requires approaches specific to the locations in and conditions under which communities live.

that simultaneously address climate impacts, livelihood improvements and environmental sustainability must be developed. Various projects undertaken on a pilot basis have found that communities can play a critical role in adaptation activities particularly since maintenance of community resources is under the domain of Panchayat Raj Institutions (PRIs). For instance, PRIs have played an active role in upgrading *harren*s, traditional irrigation systems prevalent in semi-arid areas of Rajasthan (John and Chelat 2012).

Adaptation strategies must also be based on sustainable agriculture practices, possible only through production systems that make efficient use of natural resources without damaging them. The agricultural sector can reduce energy needs by opting for more energy efficient technologies including irrigation pumps with efficient motors and better load management (Planning Commission 2011b). More importantly, better agricultural practices that reduce input requirements must be adopted. For instance, the system of rice intensification (SRI), which uses 40–50 per cent less water and produces higher output, offers a solution of efficient, resource-conserving cultivation (discussed in Chapter 2). It involves using compost instead of chemical fertiliser, reducing pressure on scarce water and aquifer supplies and avoiding complete flooding (Thiyagarajan 2004).

For India's large, poor rural population, actions directed at mitigating emission of local pollutants while mitigating greenhouse gas emissions as a co-benefit would be acceptable and effective. Particulate emissions have major health consequences and their impacts are mainly felt in the region of origin because they do not disperse quickly, making mitigation an important policy imperative (Somanathan and Somanathan 2009). Over 40 per cent of particulate emissions come from wood, agricultural residue and dung from cooking fires, with about a third from forest fires and open burning of agricultural residue after harvests (Venkataraman et al. 2006). Low-cost emission reductions are therefore possible by productive use of residues. A biomass system in Hosahalli, Karnataka, for instance, has helped meet electricity needs since 1988, providing lighting and piped drinking water for over 85 per cent of days between 1998 and 2004 (Ravindranath et al. 2004). But barriers to adoption of biomass power must be addressed. For lighting, transition from kerosene-based lamps to electricity or renewable energy presents an opportunity to reduce particulate emissions. While grid power may imply greenhouse gas emissions and transmission and distribution (T&D) losses, efficient renewable-based decentralised options could help effectively address the problem (see Chapter 4).

For India's large, poor rural population, actions directed at mitigating emission of local pollutants while mitigating greenhouse gas emissions as a co-benefit would be acceptable and effective.

Land management is crucial—forests and grasslands offset emissions and mitigate climate change cost-effectively. Also, containing the loss of natural habitats and preventing deforestation has significant biodiversity, soil and water conservation benefits. In the marine sector, measures like estimation of flood inundation through geographic information system (GIS) techniques, better monitoring mechanisms, infrastructure development near coasts, planting of mangroves and land use control can be undertaken.

5.6.4 Funding Climate Change Projects

Difficulty in capturing return on investment in adaptation may lead to under-investment in such projects. The Green Climate Fund (GCF), which mobilises funds from international sources, is still in its initial stages and operational modalities are not known. The report of the Sub-Group on Climate Change for the Twelfth Five-Year Plan[21] stressed the importance of efforts to increase the participation of banks in financing projects, bundling small projects to reduce transaction costs and increasing average project size. But it also stressed that India must mainly rely on domestic sources for climate finance, primarily budgetary allocations and the NCEF.

Difficulty in capturing return on investment in adaptation may lead to under-investment in such projects.

India also stands to draw economic benefits from climate instruments like the clean development mechanism (CDM) under the Kyoto Protocol. As of May 2012, India had about 835 registered CDM projects, i.e. about 20 per cent of all registered projects

[21]Available at http://planningcommission.gov.in/aboutus/committee/wrkgrp12/enf/wg_climate3001.pdf (accessed in 2013).

(IGES 2012). But CDM has not contributed to the alleviation of rural poverty (Sirohi 2007). Since rural projects tend to be small and CDM entails high transaction costs, ways of consolidating small CDM projects to lower costs and to obtain financial benefits of such carbon-offsetting initiatives must be explored.

5.7 The Way Forward

While rural livelihoods critically depend on natural resources, the indiscriminate overuse of these resources has led to their degradation which, in turn, threatens livelihoods and impedes immediate and long-term rural development. Economic growth so far has largely resulted in ecological poverty and distressed livelihoods. Going forward the following actions should be considered to mitigate the threats to resource sustainability.

Conservation and Efficient Use of Natural Resources

Much of the crisis is man-made and can be rectified. A combination of financial incentives, regulations and institutional support would help ensure conservation and efficient use of resources.

Rational use of inputs can provide ecological and financial benefits. Non-pesticide management adopted in parts of Andhra Pradesh, for instance, uses a combination of physical and biological measures to reduce the use of chemical fertilisers and has significantly reduced cultivation costs and farmer indebtedness (Vijay Kumar et al. 2009).

Inappropriate pricing and subsidy policies have encouraged indiscriminate use of farming inputs. For fertilisers, ongoing efforts to shift towards a nutrient-based subsidy regime and decontrol urea prices to converge towards a uniform, deregulated retail price regime must be expedited to improve a balanced nutrient uptake and minimise contamination of groundwater (Planning Commission 2013). Use of appropriate mixtures of organic fertilisers, chemical fertilisers, and organic/chemical composites specific to soil conditions and crops must be promoted. Farmers are currently compensated for undertaking organic farming, but the continued subsidy on chemical fertilisers and no subsidy for organic manures has been discouraging wider adoption of organic agriculture.

Water too must be used more efficiently and initiatives must be introduced to rectify perverse incentives to over-exploit water, such as subsidised electricity (see Chapter 4 on Jyotigram initiative). Greater efficiency in water use can be ensured through the promotion of less water-intensive cultivation and appropriate technology like drip and sprinkler irrigation or SRI cultivation. Although government subsidies do support capital-intensive drip and sprinkler irrigation, the subsidy cap could hurt farmers if the price of irrigation systems increases. Also of concern is the fact that subsidies are passed directly to the manufacturer with no concrete commitment to provide technical support for operations. This process needs to be reviewed and innovation for more affordable microirrigation systems encouraged. Similarly, for fishery, the diesel subsidy to trawlers needs to be reviewed, given that the size of the trawl fleet—especially mechanised fleet—has contributed to rapid depletion of marine fish.

Improving Availability by Promoting Regeneration and Harvesting

Natural resources must not only be used efficiently, but also regenerated. In rainfed and resource-poor areas, resource regeneration is mainly through the watershed approach with community participation in planning and implementation. Given the limitations of large dams and reservoirs, traditional and other methods of rainwater harvesting should be promoted along with building smaller surface water storage structures. Degraded tanks and ponds should be renovated and the Repair, Renovation and Restoration (RRR) scheme launched in 2005 be made more effective, as proposed in the Twelfth Plan. MGNREGS can be used for all these purposes, especially after the new Operational Guidelines 2013 which expands the set of activities eligible under MGNREGS (MoRD 2013). But there must be a strong emphasis on quality. Improving supply of surface water requires better management and maintenance of the existing canal irrigation system and a more participatory role for water user associations (WUAs) in managing the water delivered (see Chapter 4).

For forests, the Green India mission should assist in natural regeneration, emphasising the protection and nurture of local varieties of trees in degraded forests rather than the planting of non-native species. Efforts should be made to increase forest cover with appropriate plant species at suitable locations, such as in the higher reaches of hills, to tap and slow water runoff, thereby achieving reduced soil erosion, lower siltation of water bodies and regeneration of surface and groundwater. Forest-dependent communities could also undertake cultivation of select NTFP species in forest fringe areas

to reduce the pressure on NTFPs in forests and assist in sustainable NTFP development.

Similarly, increasing investment in cultured fishing could assist in reducing the pressure on marine fishery.

Community Participation and PRIs

Past experience tells us that traditional, community-managed systems work fairly well in equitably sharing, conserving and maintaining resources. There is, therefore, a compelling case to increase and improve community involvement in activities that fundamentally concern them. But effective community participation depends on members deriving benefits from their efforts and being autonomous in operations, without powerful elites cornering the benefits.

Community participation is critical to ensuring water-source sustainability, negotiating competing uses for water within and between villages and other users, managing irrigation systems (i.e. role played by WUAs) and maintaining drinking-water delivery systems. Communities can play a key role in monitoring the proposed National Aquifer Management Programme (NAMP) that hopes to map and monitor all the country's underground aquifers (see Chapter 4). Through fishery co-management systems, local communities can monitor compliance with fishing rules and regulations.

Experience has also shown that local PRIs can effectively manage, restore and regenerate village commons (see Chapter 6). The most efficient way is to permit PRIs to perform day-to-day operations while the state administers laws and regulations. MGNREGS gives PRIs an opportunity to govern their CPRs more efficiently by undertaking projects that address degraded resources and create a durable asset base such as watershed and forestry.

Institutional Strengthening and Capacity Building

Given India's vast agro-climatic diversity, policies governing the use and management of natural resources must account for local conditions rather than having blanket national policies. Because this involves actors at various levels—central, state and local—clarity of roles and responsibilities would ensure better conservation and management. Efficient forest management, for example, requires the combined participation of local communities, the FD and the tribal department. The parameters of the various statutes, such as the Indian Forest Act 1927 and the Forest Rights Act, should be clarified.

Capacity building and awareness among the administrative machinery and communities would go a long way in ensuring sustainability. Soil testing by farmers in laboratories and expert recommendations regarding fertiliser use according to soil conditions, for instance, are both necessary for the balanced use of fertilisers. Despite initiatives in this regard, farmers are still unaware of soil-testing facilities and its benefits, and the administrative machinery lacks the capacity to reach out to farmers. Similarly, State Pollution Control Boards have limited staff to regulate and enforce industrial pollution norms. Regular and reliable data collection and inventory of natural resources also are key to the formulation of effective and required policies and their going forward.

Combating Climate Change

Rural India, in early stages of infrastructure development, has a unique opportunity to pursue sustainable development that manages emissions and adapts to the effects of climate change. Considering the significant lock-in period of infrastructure, development projects should be low-carbon. Initiatives should present economic co-benefits that can aid in poverty alleviation. Infrastructure development in rural areas, for instance, should encourage the use of decentralised renewable energy as with the Green House Scheme in Tamil Nadu (see Chapter 4). Similarly, various low-carbon and less water-intensive technologies in agriculture have multiple co-benefits. Climate policy should be formulated to promote equity within poor, vulnerable communities (Ananthapadmanabhan et al. 2007). Implementation of such a policy at the grassroots level depends on the collective efforts of civil society, businesses and governments at all levels.

Finally, efforts to address the impacts of climate change must form an integral part of rural development policy and consider impacts on poverty and livelihoods. The focus must be on building the rural population's capacity to adapt and on increasing their resilience to sudden impacts of climate change.

Bibliography

Ackerman, R. 2012. 'New Directions for Water Management in Indian Agriculture'. *Global Journal of Emerging Market Economies* 4 (2): 227–88.

Agarwal, A. and S. Narain. 1989. 'Towards Green Villages: A Strategy for Environmentally Sound and Participatory Rural Development'. Delhi: Centre for Science and Environment.

Aggarwal, Ashish. 2011. 'Implementation of Forest Rights Act, Changing Forest Landscape and "politics of REDD+" in India'. *Resources, Energy and Development* 8 (2): 131–48.

Aggarwal A., V. Paul and S. Das. 2009a. 'Forest Resources: Degradation, Livelihoods, and Climate Change'. In *Looking Back to Change Track*, ed. D. Datt and S. Nischal, 91–108. New Delhi: TERI

Aggarwal, P. K., H. C. Joshi, S. D. Singh, A. Bhatia, N. Jain, Shiv Prasad, A. Chaudhary, N. Gupta and H. Pathak. 2009b. 'Agriculture and Environment'. In *Hand Book of Agriculture*, 62–92. New Delhi: Directorate of Information and Publication Agriculture, ICAR.

Ajai, A. S. Arya, P. S. Dhinwa, S. K. Pathan and K. Ganesh Raj. 2009. 'Desertification/land degradation status mapping of India'. *Current Science* 97 (10): 1478–83.

Ananthapadmanabhan, G., K. Srinivas and Vinuta Gopal. 2007. 'Hiding Behind the Poor'. Bangalore: Greenpeace India Society.

Axelsson, Lisa, Maria Franzén, Madelene Ostwald, Göran Berndes, G. Lakshmi and N. H. Ravindranath. 2012. 'Jatropha Cultivation in Southern India: Assessing Farmers' Experiences'. *Biofuels, Bioproducts and Biorefining* 6 (3): 246–56.

Badola, Ruchi. 1999. 'People and Protected Areas in India'. *Unasylva: Decentralisation and Devolution in Forestry* 50 (4). Italy: Food and Agriculture Organisation of the United Nations, http://www.fao.org/docrep/x3030e/x3030e00.htm#Contents, accessed on 11 July 2013.

Ballabh, V. 2003. 'Politics of Water Management and Sustainable Water Use'. *Indian Journal of Agricultural Economics* 58 (3): 467–77.

Banerjee, Ajit Kumar. 2010. 'Multiplicity of Indian Forest Management and Its Relative Contribution to Livelihood'. *RULNR Monograph*. Hyderabad: Centre for Economic and Social Studies.

Bharwada, Charul and Vinay Mahajan. 2012. 'Let it be Banni: Understanding and Sustaining Pastoral Livelihoods of Banni'. *RULNR Monograph* 13. Hyderabad: Centre for Economic and Social Studies.

Bhattacharya, Prodyut, Lolita Pradhan and Ganesh Yadav. 2009. 'Joint Forest Management in India: Experiences of Two Decades'. *Resources, Conservation and Recycling* 54 (8): 469–80.

Bhide, Shashanka and Jeena T. Srinivasan. 2004. 'Development Policies, Priorities and Sustainability Perspectives in India'. *Social and Economic Change Monographs* 6. Bangalore: Institute for Social and Economic Change.

Burra, N. 2008. 'The Political Economy of Tribals in India in the Context of Poverty and Social Exclusion'. Paper prepared for the study 'Poverty and Social Exclusion in India'. Delhi: Indian Institute of Dalit Studies.

Byravan, Sujatha and Sudhir Chella Rajan. 2012. *An Evaluation of India's National Action Plan on Climate Change*. IMFR and IIT Madras, www.indiaclimatemissions.org, accessed on 7 March 2013.

CAG (Comptroller and Auditor General of India). 2011. 'Performance Audit of Water Pollution in India'. Report No. 21 of 2011–12. Delhi: CAG, Government of India.

———. 2012. 'Performance Audit of Water Pollution in India'. Delhi: CAG, Government of India.

CBGA (Centre for Budget and Governance Accountability). 2012. 'Framework and Performance of National Clean Energy Fund (NCEF)'. Policy Brief No. 1, July. New Delhi.

CGWB. 2011. 'Dynamic Ground Water Resources of India'. Delhi: Ministry of Water Resources, Government of India.

———. 2012. 'Ground Water Year Book 2011–12'. Delhi: Ministry of Water Resources, Government of India.

Chand, Ramesh, P. A. Lakshmi Prasanna and Aruna Singh. 2011. 'Farm Size Productivity: Understanding the Strengths of Small holders and Improving their Livelihoods'. *Economic and Political Weekly* 46 (26 and 27): 5–11.

Chaturvedi, Ashish, Rachna Arora, Arnab Mukherji, Mayuri Chaturvedi, Ronjon Chakrabarti, Sibylle Kabisch, Till Mohns and Wilhelm Kiewitt. 2012. 'Adaptation Financing and Practice: Observations from Community-based Projects in India', http://static.weadapt.org/knowledge-base/files/942/4fa7b4bf767c1article-adaptation-financing-and-practice-final-120131.pdf, accessed on 18 March 2013.

Chopra, Kanchan and P. Dasgupta. 2002. 'Common Pool Resources in India: Evidence, Significance and New Management Initiatives'. Report for DFID project on policy implications of common pool resource knowledge in India, Tanzania and Zimbabwe, http://www.-cpr.geog.cam.ac.uk, accessed on 7 March 2013.

Chopra, Kanchan and S. C. Gulati. 1998. 'Environmental Degradation, Property Rights and Population Movements: Hypotheses and Evidence from Rajasthan (India)'. *Environment and Development Economics* 3 (1): 35–57. February.

CPCB (Central Pullution Control Board). 2009. *Status of Water Supply, Wastewater Generation and Treatment in Class-1 Cities and Class-II Towns of India*. Control of Urban Pollution Series: CUPS/70/2009-10. Delhi: CPCB, Ministry of Environment and Forests, Government of India.

CRS (Centre for Rural Studies). 2010. 'Impact and Effectiveness of "Watershed Development Programmes" in India'. Mussoorie: CRS, National Institute of Administrative Research.

CSD (Council for Social Development). 2010. 'Summary Report on Implemention of the Forest Rights Act'. Hyderabad: CSD.

CWC (Central Water Commission). 1982. *Water and Related*

Statistics. Delhi: CWC, Ministry of Water Resources, Government of India.

———. 2010. *Water and Related Statistics*. Delhi: CWC.

———. 2012. 'Annual Report 2011–12'. Delhi: CWC.

Deshpande, R. S. 2011. 'Water and Livelihood'. Status Paper No. 4 by Research Unit for Natural Resources and Livelihood. Hyderabad: Centre for Economic and Social Studies.

Dubey, P. C., S. N. Mishra and Arjun Tiwari. 2007. 'Loss of Bio Diversity with Reference to Important Medicinal Plants in Vindhya Region and their Threat'. *Tropical Forestry* 23 (I and II), January–June.

Enters, Thomas and Patrick B. Durst. 2004. 'What does it take? Incentives and their Impact on Plantation Development'. Bangkok: Asia-Pacific Forestry Commission, Food and Agriculture Organization of the United Nations. http://www.fao.org/docrep/007/ae535e/ae535e0f.htm, accessed on 11 July 2013.

Fishery Survey of India. 2005. 'National Marine Fisheries Census 2005: Union Territories of Andaman & Nicobar and Lakshadweep Islands'. Delhi: Ministry of Agriculture, Government of India.

FSI (Forest Survey of India). 2009. 'India State of Forest Report 2009'. Delhi: Ministry of Environment and Forests, Government of India.

———. 2011. 'India State of Forest Report 2011'. Delhi: Ministry of Environment and Forests, Government of India. Available at http://www.fsi.org.in/sfr_2011.htm, accessed on 2013.

Ganguly, Kaushik and Gyana Ranjan Panda. 2010. 'Adaptation to Climate Change in India: A Study of Union Budgets'. Oxfam India Working Papers Series (OIWPS) 1. Delhi: CBGA and Oxfam India.

Gaur, Anju and Priyanie Amerasinghe. 2011. 'A River Basin Perspective of Water Resources and Challenges'. In *India Infrastructure Report 2011: Water—Policy and Performance for Sustainable Development*, ed. IDFC, pp. 3–17. Delhi: Oxford University Press.

Gaur, Anju, P. G. McCornick, H. Turral and S. Acharya. 2007. 'Implications of Drought and Water Regulation in the Krishna Basin, India'. *International Journal of Water Resources Development* 23 (4): 583–94.

Gilbert, Natasha. 2012. 'India's Forest Area in Doubt'. *Nature* 489 (7414). Available at http://www.nature.com/news/india-s-forest-area-in-doubt-1.11344, accessed on 7 March 2013.

GoK (Goverment of Kerala). 2008. *Compendium of Government Orders and Circulars on Participatory Forest Management*. Thiruvanathapuram, Kerala.

Gosain, A. K., Sandhya Rao and Debajit Basuray. 2006. 'Climate Change Impact Assessment on Hydrology of Indian River Basins'. *Current Science* 90 (3): 346–53.

Grogan, Paul, F. Lalnunmawia and S. K. Tripathi. 2012. 'Shifting Cultivation in Steeply Sloped Regions: A Review of Management Options and Research Priorities for Mizoram State, Northeast India'. *Agroforest Syst* 84:163–77.

Hussain, Intizar, and Munir A. Hanjra. 2004. 'Irrigation and Poverty Alleviation: Review of the Empirical Evidence'. *Irrigation and Drainage* 53 (1): 1–15.

IDFC (Infrastructure Development Finance Company Limited). 2012. 'Hiware Bazar: A Water-Led Transformation of a Village'. *IDFC Quarterly Research Note* No. 16, June.

IGES (Institute for Global Environmental Strategies). 2012. 'Market Mechanisms Country Fact Sheet: India', http://enviroscope.iges.or.jp/modules/envirolib/upload/984/attach/india_final.pdf, accessed on 18 March 2013.

IPCC (Intergovernmental Panel on Climate Change). 2001. 'Third Assessment Report'. Cambridge: Cambridge University Press.

———. 2007. 'Climate Change 2007: Synthesis Report'. An Assessment of IPCC presented at the IPCC Plenary 27 at Valencia, Spain, 12–17 November.

Jain, Sharad K., Pushpendra K. Agarwal and Vijay P. Singh. 2007. *Hydrology and Water Resources of India*. The Netherlands: Springer.

Jana, Sebak Kumar. 2011. 'Sustainable Small Scale Irrigation Experiment in the Dry Zones: A Case Study on Happa (Small-Tank) Model in the State of West Bengal, India'. MPRA Paper No. 29553, http://mpra.ub.uni-muenchen.de/29553/, accessed on 15 March 2013.

Jodha, Narpat. S. 1986. 'Common Property Resources and Rural Poor in Dry Regions of India'. *Economic and Political Weekly* 21 (27): 1169–81.

———. 1995. 'Common Property Resources and Dynamics of Rural Poverty in India's Dry Regions'. *Unasylva* 46. FAO.

———. 1998. 'Poverty and Environmental Resource Degradation: An Alternative Explanation and Possible Solutions'. *Economic and Political Weekly* 33 (36–37): 2384–90

———. 2000. 'Waste Lands Management in India: Myths, Motives and Mechanisms'. *Economic and Political Weekly* 35 (6): 466–73

———. 2008. 'Rural Commons and Livelihood Strategies in Dry Regions of India'. *The European Journal of Development Research* 20 (4): 597–611. London: Routledge.

Jodha, Narpat S., Naveen P. Singh and Cynthia S. Bantilan. 2012. 'The Commons, Communities and Climate Change'. *Economic and Political Weekly* 47 (13): 49–56.

John, Jacob, and Seema Chelat. 2012. 'Community-Based Adaptive Measures to Address Climate Change In India'. *Social Action* 62, July–September.

Johnson, Derek. 2001. 'Wealth and Waste'. *Economic and Political Weekly* 36 (13): 1095–102.

Kadekodi, G. K. 2001. 'Environment and Development'. In *Environmental Economics: An Indian Perspective*, ed. R. N. Bhattacharya, pp. 162–217. Delhi: Oxford University Press.

Keller, Andrew, R. Sakthivadivel and David Seckler. 2000. 'Water Scarcity and the Role of Storage in Development'. *Research Report* 39. Colombo: International Water Management Institute (IWMI).

Kishwan, Jagdish, Rajiv Pandey and V. K. Dadhwal. 2009. 'India's Forest and Tree Cover: Contribution as a Carbon Sink'. Technical Paper. Dehradun: Indian Council of Forestry Research and Education.

Kohli, K., M. Menon, V. Samdariya and S. Guptabhaya. 2011. *Pocketful of Forests: Legal Debates on Valuating and Compensating Forest Loss in India*. New Delhi: Kalpavriksh and WWF-India.

Kumar, M. Dinesh, and O. P. Singh. 2001. 'Market Instruments for Demand Management in the Face of Scarcity and Overuse of Water in Gujarat, Western India'. *Water Policy* 5 (3): 387–403.

Kumar, Rakesh, R. D. Singh and K. D. Sharma. 2005. 'Water Resources of India'. *Current Science* 89 (5): 794–811.

Lakra, W. S., U. K. Sarkar, V. K. Dubey, R. Sani and A. Pandey. 2011. 'River Inter-Linking in India: Status, Issues, Prospects and Implications on Aquatic Ecosystems and Freshwater Fish Diversity'. *Reviews in Fish Biology and Fisheries* 21 (3): 463–79.

Manjunatha, A. V., S. Speelman, M. G. Chandrakanth and G. Van Huylenbroeck. 2011. 'Impact of Groundwater Markets in India on Water Use Efficiency'. *Journal of Environmental Management* 33 (2011): 1–6.

Manoharan, T. R. 2011. *Supply Determinants of Timber Trade in India*. World Wildlife Fund. Supported by the Planning Commission, Government of India.

Misri, Bimal, and J. P. Singh. 1995. 'Grass Covers of India and their Production Potential'. In *Forage Production and Utilisation*, ed. R. P. Singh, 60–72. Jhansi: Indian Grassland and Fodder Research Institute.

MoA (Ministry of Agriculture). 2009. *Handbook of Fisheries Statistics 2008*. Delhi: Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture, Government of India.

———. 2011. 'Annual Report, 2010–11'. Delhi: Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture, Government of India.

———. 2012a. 'State of Indian Agriculture 2011–12'. Delhi: Ministry of Agriculture, Government of India.

———. 2012b. 'Agricultural Statistics at a Glance'. Delhi: Ministry of Agriculture, Government of India.

———. 2012c. 'All India Report on Number and Area of Operational Holdings', Agriculture Census, 2010–11. Delhi: Ministry of Agriculture, Government of India.

MoEF (Ministry of Environment and Forests). 2006. 'Report of National Forest Commission'. Delhi: MoEF, Government of India.

———. 2009. 'State of Environment Report 2009'. Delhi: Ministry of Environment and Forests, Government of India.

MoEF and MTA (Ministry of Tribal Affairs). 2010. 'Manthan'. Report by the National Committee on Forest Rights Act, http://www.cgforest.com/Media/FRA_COMMITTEE_REPORT_FINAL_Dec_2010.pdf, accessed on 11 December 2012.

Mohamed, K. S., T. V. Sathianandan, P. U. Zacharia, P. K. Asokan, P. K. Krishnakumar, K. P. Abdurahiman, Veena Shettigar and R. N. Durgekar. 2010. 'Depleted and Collapsed Marine Fish Stocks Along South-West Coast of India: A Simple Criterion to Assess the Status'. In *Coastal Fishery Resources of India: Conservation and Sustainable Utilisation*, ed. B. Meenakumari, M. R. Boopendranath, Leela Edwin, T. V. Sankar, Nikita Gopal and George Ninan, 67–76. Cochin: Society of Fisheries Technologists.

MoPR (Ministry of Panchayati Raj). 2011. 'Report of the Committee on Ownership, Price Fixation, Value Addition and Marketing of Minor Forest Produce'. Delhi: Government of India.

MoRD (Ministry of Rural Development). 2006. 'Report of the Technical Committee on Watershed Programmes in India: From Hariyali to Neeranchal'. New Delhi: Government of India.

———. 2012a. *Greening Rural Development in India* 1. New Delhi: UNDP.

———. 2012b. *Outcome Budget (2012–2013)*. New Delhi: Department of Land Resources, Government of India.

———. 2012c. *MGNREGA Sameeksha: An Anthology of Research Studies on the Mahatma Gandhi National Rural Employment Guarantee Act, 2005 (2006–2012)*. Delhi: Orient BlackSwan.

———. 2013. *The National Rural Employment Guarantee Act—Operational Guidelines*. Delhi: MoRD, Government of India.

MoRD and NRSC (National Remote Sensing Centre). 2010. *Wasteland Atlas of India 2010*. Hyderabad: NRSC, Indian Space Research Organisation, Government of India.

———. 2011. *Wasteland Atlas of India 2011*. Hyderabad: NRSC, Indian Space Research Organisation, Government of India.

MoSPI (Ministry of Statistics and Programme Implementation). 2011. 'Annual and Quarterly Estimate of GDP at Current Prices, Base Year 2004–05'. Delhi: MoSPI, Government of India, http://mospi.nic.in/Mospi_New/site/inner.aspx?status=3&menu_id=82, accessed on 14 March 2013.

MoWR (Ministry of Water Resources). 1980. 'Report of Rashtriya Barh Ayog (National Commission on Floods) 1980'. Delhi: MoWR, Government of India.

———. 2008. 'Preliminary Consolidated Report on Effect of Climate Change on Water Resources'. Delhi: MoWR, Government of India.

———. 2009. 'Report of the Ground Water Estimation Committee: Ground Water Resource Estimation

Methodology'. New Delhi: Government of India. Available at: http://cgwb.gov.in/documents/gec97.pdf, accessed on 2013.

MPEDA (The Marine Product Export Development Authority). 2011. 'Marine Products Exports from India during 2011–12'. Delhi: MPEDA, Ministry of Commerce and Industry, Government of India, http://www.mpeda.com/inner_home.asp?pg=trends, accessed on 14 March 2013.

MTA (Ministry of Tribal Affairs). 2013. 'Status Report on Implementation of the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 for the period ending 31st March 2013'. Delhi: Government of India.

Murali, K. S., Indu K. Murthy, B. C. Nagaraj and N. H. Ravindranath. 2004. 'A Decade of JFM and its Ecological Impacts'. In *Roots to Canopy*, ed. Bahuguna V. K., Kinsuk Mitra, Doris Capistrano and Sushil Saigal, pp. 275–96. Delhi: Winrock International India and Commonwealth Forestry Association, India chapter.

NAAS (National Academy of Agricultural Sciences). 2012. 'State of Indian Agriculture 2011–12'. Delhi: NAAS.

NBSS & LUP (National Bureau of Soil Survey and Land Use Planning). 2008. 'Harmonization of Degraded Lands/ Wastelands Datasets of India: A GIS-based Approach'. Nagpur: NBSS&LUP.

NCIWRDP (National Commission for Integrated Water Resources Development Plan). 1999. 'Integrated Water Resources Development: A Plan for Action'. Delhi: NCIWRDP, Ministry of Water Resources, Government of India.

NSSO (National Sample Survey Organisation). 1999. 'Common Property Resources in India', Report No. 452, NSS 54th Round, December. Delhi: Ministry of Statistics and Programme Implementation, Government of India.

———. 2012. 'Household Consumption of Various Goods and Services in India, July 2009–June 2010'. Report No. 541, NSS 66th Round. Delhi: Ministry of Statistics and Programme Implementation, Government of India.

O'Brien, Karen, Robin Leichenko, Ulka Kelkar, Henry Venema, Guro Aandahl, Heather Tompkins, Akram Javed, Suruchi Bhadwal, Stephan Barg, Lynn Nygaard and Jennifer West. 2004. 'Mapping Vulnerability to Multiple Stressors: Climate Change and Globalization in India'. *Global Environmental Change* 14 (2004): 303–13.

OECD (The Organization for Economic Co-operation and Development). 2000. 'Production, Externality and Public Good Aspects of Multifunctionality: Introduction'. Paris: OECD.

Palanisami, K. and D. Suresh Kumar. 2009. 'Impacts of Watershed Development Programmes: Experiences and Evidences from Tamil Nadu'. *Agricultural Economics Research Review* 22:387–396.

Panda, Gyana Rajan and Narendra Jena. 2012. 'Evaluating the Performance of the National Clean Energy Fund'. *Economic and Political Weekly* 47 (37): 18–21.

Pande, S. K. and Devendra Pandey. 2004. 'Impact of Incentives on the Development of Forest Plantation Resources in India'. Bangkok: Asia-Pacific Forestry Commission, Food and Agriculture Organization of the United Nations, http://www.fao.org/docrep/007/ae535e/ae535e06.htm#fn48, accessed on 11 July 2013.

Ariza-Montobbio, Pere and Sharachchandra Lele. 2010. 'Jatropha Plantations for Biodiesel in Tamil Nadu, India: Viability, Livelihood Trade-offs, and Latent Conflict. *Ecological Economics* 70 (2): 189–95. 15 December. Available at http://www.sciencedirect.com/science/article/pii/S0921800910002016, accessed on 2013.

PIB (Press Information Bureau). n.d. 'Organic Farming in India'. Press Information Bureau, Government of India, http://pib.nic.in/newsite/efeatures.aspx?relid=72921, accessed on 11 December 2012.

Planning Commission. 2008. 'Development Challenges in Extremist Affected Areas: Report of an Expert Group to Planning Commission'. New Delhi. Available at: http://planningcommission.nic.in/reports/publications/rep_dce.pdf, accessed on 2013.

———. 2010. 'Mid-Term Appraisal for Eleventh Five-Year Plan 2007–12'. Delhi: Planning Commission, Government of India.

———. 2011a. 'Report of Sub-Group III on Fodder and Pasture Management'. Working Group on Forestry and Sustainable Natural Resource Management. Delhi: Planning Commission, Government of India.

———. 2011b. 'Climate Change and 12th Five-Year Plan'. Report of Sub-Group on Climate Change. Delhi: Planning Commission, Government of India.

———. 2011c. 'Report of the Sub-Group-II on NTFP and their Sustainable Management in the Twelfth Five-Year Plan'. Planning Commission's Working Group on Forests and Natural Resource Management. Delhi: Planning Commission, Government of India.

———. 2011d. 'Report of the XII Plan Working Group on Natural Resource Management and Rainfed Farming'. Delhi: Planning Commission, Government of India.

———. 2011e. 'Report of the Working Group on Sustainable Groundwater Management'. 2 October. Delhi: Planning Commission, Government of India.

———. 2011f. 'Draft Model Bill for the Conservation, Protection and Regulation of Groundwater'. Delhi: Planning Commission, Government of India.

———. 2011g. 'Report of the Working Group on Major and Medium Irrigation and Command Area Development for the XII Five-Year Plan'. Delhi: Planning Commission, Government of India.

———. 2011h. 'Report of the Working Group on Ecosystem Resilience, Biodiversity and Sustainable Livelihoods for

the XII Five-Year Plan'. Delhi: Planning Commission, Government of India.

———. 2011i. 'Report of the XII Plan Working Group on Natural resource Management and Rain-fed Farming for the XII Five-Year Plan'. Delhi: Planning Commission, Government of India.

———. 2011j. 'Report of the Working Group on Forests and Sustainable Management of Natural Resources for the Twelfth Five-Year Plan'. Delhi: Planning Commission, Government of India.

———. 2011k. 'Report of the Working Group on Development and Management of Fisheries and Aquaculture for the XII Five-Year Plan: 2012–2017'. Delhi: Planning Commission, Government of India.

———. 2011l. 'Report of the Working Group on Flood Management and Region Specific Issues for XII Plan'. Delhi: Planning Commission, Government of India.

———. 2011m. 'Report of the Sub Group-I on Forestry'. Delhi: Planning Commission, Government of India.

———. 2012a. 'Final Working Group Report on Minor Irrigation and Watershed Management for the Twelfth Five-Year Plan (2012–17)'. Delhi: Planning Commission, Government of India.

———. 2012b. 'Report of the Working Group on Fisheries for the 12th Five-Year Plan'. Delhi: Planning Commission, Government of India.

———. 2012c. 'Report of the Working Group on Rural Drinking Water for the 12th Plan'. Delhi: Planning Commission, Government of India.

———. 2013. 'Twelfth Five-Year Plan 2012–17'. Delhi: Planning Commission, Government of India.

Poffenberger, Mark, and Prodyut Bhattacharya. 1996. 'Grassroots Forest Protection: Eastern Indian Experiences'. Berkeley: University of California Press.

Poffenberger, Mark, S. K. Barik, Drupad Choudhury, Vincent Darlong, Vishal Gupta, S. Palit, Ivan Roy, Ibobi Singh, B. K. Tiwari and Sanjay Upadhyay. 2006. 'Forest Sector Review of Northeast India'. Background Paper No. 12, March. Santa Barbara: Community Forestry International, http://siteresources.worldbank.org/INTSAREGTOPWATRES/Resources/Background_Paper_12.pdf, accessed on 11 July 2013.

Puyravaud, J. P., P. Davidar and W. F. Laurance. 2010. 'Cryptic Destruction of India's Native Forests'. *Conservation Letters* 3 (6): 390–94.

Rajshekhar, M. 2012. 'Guess Who Calls Lodhi Gardens a Forest?' *The Economic Times*, Special Feature: Forest Health. 15 April. New Delhi edition.

Rao, C. H. Hanumantha. 1988. 'Agricultural Development and Ecological Degradation: An Analytical Framework'. *Economic and Political Weekly* 23 (52–53): A142–A146.

Ravindranath, N. H., H. I. Somashekar, M. S. Nagaraja, P. Sudha, G. Sangeetha, S. C. Bhattacharya and P. Abdul Salam. 2004. 'Assessment of Sustainable Non-Plantation Biomass Resources Potential for Energy in India'. Bangalore: Centre for Sustainable Technologies.

Rechatin, C., Lavoux Theys J. T. and V. Piveteau. 1997. 'Indicators of Sustainable Development: A Synopsis of Work Abroad and Key Points for Discussion'. Orleans, France: Institut Francais de l'Environnement (IIFEN).

Reddy, V. R. 2003. 'Land Degradation in India: Extent, Costs and Determinants. *Economic and Political Weekly* 38 (44): 4700–13.

Reddy, M. Gopinath, K. Anil Kumar, P. Trinadha Rao and Oliver Springate-Baginski. 2011. 'Issues Related to Implementation of the Forest Rights Act in Andhra Pradesh'. *Economic and Political Weekly* 46 (18): 73–81.

Reddy, V. Ratna, Sanjit Kumar Rout, T. Chiranjeevi and S. S. P. Sharma. 2012. 'Performance and Factors Influencing the Impact of Watershed Development Programme in Rajasthan'. *Indian Journal of Agricultural Economics* 67 (1): 116–38.

Sagar, V. 2010. 'Dry Lands in India: Natural Resources and Livelhoods'. Status Paper by Research Unit for Natural Resources and Livelihood. Hyderabad: Centre for Economic and Social Studies.

Saigal, Sushil and Divya Kashyap. 2002. 'The Second Green Revolution: Analysis of Farm Forestry Experience in Western Tarai Rregion of Uttar Pradesh and Coastal Andhra Pradesh'. India Country Sub-study Report. Delhi: Ecotech Services (India) Pvt. Ltd.

Saleth, M. R. 1996. *Water Institutions in India: Economics, Law and Policy*. Delhi: Commonwealth Publishers.

Sarin, Madhu. 2010. 'Democratising India's Forests through Tenure and Governance Reforms'. *Social Action*. Vol. 60, April–June.

Sarkar, Anindita. 2011. 'Socio economic Implications of Depleting Groundwater Resources in Punjab: A Comparative Analysis of Different Irrigation Systems'. *Economic and Political Weekly* 46 (7): 59–66.

Sarma, V. P. 2012. 'India's Agricultural Development under the New Economic Regime: Policy Perspective and Strategy for the 12th Five-Year Plan'. *Indian Journal of Agricultural Economics* 67 (1): 46–78.

Sathyapalan, Jyothis. 2010. 'Impact of Dry land Salinity on Agriculture and Drinking Water: A Study from the coastal Gujarat'. Hyderabad: Centre for Economic and Social Studies.

Sathyapalan, Jyothis, Jeena T. Srinivasan and Joeri Scholtens. 2008. 'Maintaning a Vaible Small Scale Fishery: A Case Study of Trawler Sector in the Palk Bay'. *CESS Monograph* 5. Hyderabad: Centre for Economic and Social Studies.

Saxena, N. C. 2003. 'Livelihood Diversification and Non-Timber Forest Products in Orissa: Wider Lessons on the Scope for Policy Change?'. Working Paper 223. London: Overseas Development Institute. Available at:

http://www.odi.org.uk/sites/odi.org.uk/files/odi-assets/publications-opinion-files/2460.pdf, accessed on 2013.

Sekhri, Sheetal. 2012. 'Sustaining Groundwater: Role of Policy Reforms in Promoting Conservation in India'. Presented at the NCAER (National Council of Applied Economic Research) India Policy Forum 2012, Delhi, 17–18 July.

Shah, Mihir. 2013. 'Water: Towards a Paradigm Shift in the Twelth Plan'. *Economic and Political Weekly* 48 (3): 40–52.

Shah, Tushaar. 2007. 'The Groundwater Economy of South-Asia: An Assessment of Size, Significance and Socio-Ecological Impacts'. In *The Agricultural Groundwater Revolution: Opportunities and Threats to Development*, ed. M. Giordano and K. G. Villholth, pp. 7–36. Wallingford: CABI.

Shah, Tushaar, and Shilp Verma. 2008. 'Co-management of Electricity and Groundwater: An Assessment of Gujarat's Jyotigram Scheme'. *Economic and Political Weekly* 43 (7): 59–66.

Shah, Tushaar, Christopher Scott, Avinash Kishore and Abhishek Sharma. 2004. 'Energy-Irrigation Nexus in South Asia Improving Groundwater Conservation and Power Sector Viability'. Second (Revised) Edition Research Report 70. Colombo: International Water Management Institute.

Shah, Tushaar, J. Burke and K. Villholth. 2007. 'Groundwater: A Global Assessment of Scale and Significance'. In *Water for Food, Water for Life*, ed. D Molden, pp. 395–423. London: Earthscan and Colombo: International Water Management Institute.

Shah, Tushaar, O. P. Singh and A. Mukherji. 2006. 'Groundwater Irrigation and South Asian Agriculture: Empritical Analyses from a Large-scale Survey of India, Pakistan, Nepal Terai and Bangladesh'. *Hydrogeology Journal* 14 (3): 286–309.

Shah, Tushaar, Upali Amarasinghe and Peter McCornick. 2008. 'India's River Linking Project: The State of the Debate'. *Strategic Analyses of the National River Linking Project of India Series* 2. Colombo: International Water Management Institute.

Sharma, Bharat R., Upali Amarasinghe and Cai Xueliang. 2009. 'Assessing and Improving Water Productivity in Conservation Agriculture Systems in the Indus-Gangetic Basin'. Invited Lead paper for the 4th World Congress on Conservation Agriculture-Innovations for Improving Efficiency, Equity and Environment at New Delhi, 4–7 February 2009. Delhi: National (Indian) Academy of Agricultural Sciences, http://cpwfbfp.pbworks.com/f/WCCA-Paper_BRS_.pdf, accessed on 15 March 2013.

Sharma, J. V. and Priyanka Kohli. n.d. 'Forest Governance and Implementation of REDD+ in India'. Delhi: TERI and MoEF, http://moef.nic.in/assets/redd-bk1.pdf, accessed on 21 June 2013.

Sharma, V. P. 2012. 'India's Agricultural Development under the New Economic Regime: Policy Perspective and Strategy for the 12th Five-Year Plan'. *Indian Journal of Agricultural Economics* 67 (1): 46–78.

Singh, Prem, Hari Charan Behera and Aradhana Singh. n.d. 'Impact and Effectiveness of "Watershed Development Programmes" in India'. Mussoorie: Centre for Rural Studies.

Sirohi, Smita. 2007. 'CDM: Is it a 'Win–Win' Strategy for Rural Poverty Alleviation in India?' *Climatic Change* 84:91–110.

Somanathan, E. and Rohini Somanathan. 2009. 'Climate Change: Challenges Facing India's Poor'. *Economic and Political Weekly* 64 (31): 51–58.

Springate-Baginski, O., M. Sarin, S. Ghosh, P. Dasgupta, I. Bose, A. Banerjee, K. Sarap, P. Misra, S. Behera, M. G Reddy and P. T. Rao. 2009. 'Redressing "Histrorical Injustice" through the Indian Forest Rights Act 2006: A Historical Institutional Analysis of Contemporary Forest Rights Reform'. *IPPG Discussion Papers Series* 27, August.

Srinivasan, Jeena T. and Ratna V. Reddy. 2009. 'Impact of Irrigation Water Quality on Health: A Case Study in India'. *Ecological Economics* 68 (11): 2800–07.

UNDP (United Nations Development Programme). 2004. 'Water Governance for Poverty Reduction: Key Issues and UNDP Response to Millennium Development Goals'. New York: UNDP.

TERI (The Energy Research Institute). 2003. *Coping with Global Change: Vulnerability and Adaptation in Indian Agriculture*. New Delhi: TERI. Available at: http://www.iisd.org/pdf/2004/climate_coping_global_change.pdf, accessed on 2013.

Thiyagarajan, T. M. 2004. 'On-farm Evaluation of SRI in Tamiraparani Command Area, Tamil Nadu'. Presented at the World Rice Research Conference, Tsukuba, Japan, November.

Ulman, Yashmita, and Sudhansu Sekhar Deo. 2013. 'Jamguda: A New Beginning Under FRA'. *Community Forestry* 27, Jan–April. Odisha: Regional Centre for Development Corporation.

Unnikrishnan, P. N. 2009. 'Forest Act, Forest Rights Act and Forest Administration'. Unpublished report. Forest Headquarters, Thiruvanathapuram, Kerala.

Varadharajan, A., W. S. Venkateswaran and R. Banerjee. 2008. 'Energy Analysis of Biodiesel from Jatropha'. In *World Renewable Energy Congress (WRECX)*, ed. A. Sayigh. UK: WREC.

Venkataraman, C., G. Habib, D. Kadamba, M. Shrivastava, J. F. Leon, B. Crouzille, O. Boucher and D. G. Streets. 2006. 'Emissions from Open Biomass Burning in India: Integrating the Inventory Approach with High-Resolution Moderate Resolution Imaging Spectroradiometer (MODIS) Active-Fire and Land Cover Data'. *Global Biogeochemical Cycles* 20 (2): 1–12.

Vijay Kumar, T., D. V. Raidu, Jayaram Killi, Madhavi Pillai, Parmesh Shah, Vijayasekar Kalavakonda and Smriti

Lakhey. 2009. 'Economically Sound, Economically Viabile'. Learning note. Washington: World Bank, http://www.csa-india.org/sites/csa-india.org/files/Ecologically_Sound_Economically_Viable-_Community_Managed_Sustainable_Agriculture_in_Andhra_Pradesh_India_1.pdf, accessed on 12 July 2013.

World Bank. 2010. 'Deep Wells and Prudence: Towards Pragmatic Action for Addressing Groundwater Overexploitation in India'. Policy Paper No. 51676. Washington: IBRD/World Bank.

———. 2011. *Poverty and Social Exclusion in India*. Washington: World Bank.

WTO (World Trade Organization) and UNEP (United Nations Environment Programme). 2009. 'Trade and Climate Change'. A WTO-UNEP report, http://www.wto.org/english/res_e/booksp_e/trade_climate_change_e.pdf, accessed on 20 March 2013.

WWAP (World Water Assessment Programme). 2003. 'Water for People, Water for Life'. Paris: UNESCO Publishing and Berghahn Books.