

2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020

EAST ASIA SUBREGIONAL REPORT

Asia-Pacific Forestry Sector Outlook Study II



RAP PUBLICATION 2010/15

ASIA-PACIFIC FORESTRY COMMISSION

EAST ASIAN FORESTS AND FORESTRY TO 2020

SUBREGIONAL REPORT OF
THE SECOND ASIA-PACIFIC FORESTRY SECTOR OUTLOOK STUDY

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
Bangkok, 2010

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of the Food and Agriculture Organization of the United Nations concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. The mention of specific companies or products of manufacturers, whether or not these have been patented, does not imply that that these have been endorsed or recommended by FAO in preference to others of a similar nature that are not mentioned.

All rights reserved. Reproduction and dissemination of material in this information product for educational or other non-commercial purposes are authorized without any prior written permission from the copyright holders provided the source is fully acknowledged. Reproduction of material in this information product for resale or other commercial purposes is prohibited without written permission of the copyright holders. Applications for such permission should be addressed to: Chief, Electronic Publishing Policy and Support Branch, Communication Division, FAO, Viale delle Terme di Caracalla, 00153 Rome, Italy, or by e-mail to: copyright@fao.org

Cover design: Chanida Chavanich

For copies, write to:

Patrick B. Durst
Senior Forestry Officer
FAO Regional Office for Asia and the Pacific
39 Phra Atit Road
Bangkok 10200
Thailand
Tel: (66-2) 697 4000
Fax: (66-2) 697 4445

E-mail: patrick.durst@fao.org

Printed and published in Bangkok, Thailand.
Food and Agriculture Organization of the United Nations
Regional Office for Asia and the Pacific
Bangkok, Thailand

2010 © FAO

ISBN 978-92-5-106699-7

FOREWORD

Twelve years after the publication of the first Asia-Pacific Forestry Sector Outlook Study in 1998, FAO welcomes this opportunity to once again contribute, at the behest of the Asia-Pacific Forestry Commission, to the regional forestry dialogue. Countries and their forestry sectors are becoming ever more closely linked as economic liberalization and regional integration accelerate. Since the first outlook study, it has become increasingly clear that a regional perspective is essential in negotiating a better position for forestry and the values with which it is associated. With the advancement of globalization some of the most important effects on forests and forestry in many countries in the region are the result of international and regional developments.

Heightened awareness of the values of forests and their greater inclusion in international climate change agreements has increased the importance of linking spatial levels and broadening understanding of issues and opportunities likely to affect forestry in the coming years. Identification of key trends in forestry – both physical and political – and construction of scenarios for the future adds a valuable dimension to regional forestry discussions. Building responsiveness into institutional mechanisms and adapting to change constitutes one of the most important steps in creating a robust sector in a fast-evolving world.

Great changes have occurred and major advances have been made in Asia-Pacific forestry since the first outlook study was published. Significant challenges remain in many parts of the region and it is increasingly evident that countries cannot develop forestry policies in isolation – rights and responsibilities are increasingly spilling across borders and across sectors as populations increase, demands on resources heighten and economies integrate. The collegial nature of the process through which this outlook study was developed gives credence to the success of collaborative regional action and sharing in a common future. By openly contributing information, the countries and organizations involved in the outlook study have demonstrated their commitment to the future of forests and forestry and their desire to improve upon the benefits from forests that the current generation has received.

Many organizations and individuals have put huge effort into this study and have gone to considerable lengths to share the fruits of their experiences. In bringing together this subregional report, four country reports have been prepared and 15 thematic papers, prepared under APFSOS II, have also contributed. The first Asia-Pacific Forestry Sector Outlook Study provided a benchmark in regional and global forestry and was followed by a series of regional outlook studies around the world. We hope that this study will be as well received and that this contribution to the subregion's forestry sector is both timely and appropriate and will challenge countries to build forests that future generations will value.



Hiroyuki Konuma

Assistant Director-General and Regional Representative for Asia and the Pacific.

Food and Agriculture Organization of the United Nations

CONTENTS

FOREWORD	i
CONTENTS	iii
BOXES	vi
ACRONYMS AND ABBREVIATIONS	vii
ACKNOWLEDGEMENTS	viii
EXECUTIVE SUMMARY	ix
1 INTRODUCTION	1
1.1 Background.....	1
1.2 Objectives and key questions	1
1.3 Scope of the study	1
1.4 Structure of the study	2
2 SUBREGIONAL PROFILE.....	3
2.1 Socio-economic profiles.....	3
2.2 Land-use patterns.....	4
2.3 Forest extent and change	6
Forest cover	6
Forests by designation	7
Recent changes in forest extent	7
Plantations	9
Growing stock	9
Urban forests and trees outside forests	10
2.4 Forest landownership, management and institutions	11
Roles of the public and private sectors	11
2.5 Policy and legal framework.....	13
Forest policies and legislation	13
3 CURRENT STATE OF THE FORESTRY SECTOR	17
3.1 Economic dimension of forests – production and consumption of forest products	17
Industrial roundwood	17
Sawnwood	18
Wood-based panels	19
Pulp and paper	20
Furniture and other secondary processed forest products	21
Non-wood forest products	22
3.2 Forest products trade: high level of import dependence for primary products	22
Shifting roles of players in the international market	24
Wood energy	26
3.3 Socio-economic importance of the forestry sector	27
Industrialization of the forestry sector	27
Employment	27
Value added	28

Rural development and poverty reduction	29
3.4 Environmental and social services/functions of forests.....	31
Biodiversity and conservation	31
Threats of forest degradation and loss	32
Watershed functions of forests	33
Recreational functions of forests	34
Forests and climate change	35
4 KEY DRIVERS OF CHANGE TO THE YEAR 2020	37
4.1 Overview of changing characteristics in the subregion	37
4.2 Demographic drivers	38
Population growth	38
Urbanization and pressures on land	39
Changes in age structure: increasing median age	40
4.3 Economic drivers	41
Long-term projections in GDP and macroeconomic conditions	41
Income and per capita spending	44
Poverty and socio-economic disparity	44
Structural changes in the economy	45
International trade, globalization and its impacts	46
Energy demand	47
4.4 Environmental concerns as drivers	48
Environmental threats	48
Political commitment to climate change and other international and global agendas	50
Increasing levels of environmental awareness and social investments	52
4.5 Political direction and institutional capacity	53
Democracy and political participation	54
Governance	55
5 PROBABLE SCENARIOS.....	57
5.1 Varying initial conditions	57
High-income and stable democracies	57
Emerging economies or democracies	58
Low-income developing economies	58
5.2 Major determining factors and possible scenarios	58
High-growth scenario	59
Low-growth scenario	59
The green-economy scenario	60
6 FORESTRY IMPLICATIONS UNDER VARIOUS SCENARIOS	63
6.1 Forestry implications under a high-growth scenario	63
Forest extent and change under a high-growth scenario	63
Production and consumption of forest products under a high-growth scenario	64
Environmental and social services of forests under a high-growth scenario	67
6.2 Forestry implications under a low-growth scenario	68
Forest extent and change under a low-growth scenario	68
Production and consumption of forest products under a low-growth scenario	69
Environmental and social services of forests under a low-growth scenario	70

6.3 Forestry implications under the green-economy scenario	71
Forest extent and change under a green-economy	71
Production and consumption of forest products under a green-economy	71
Environmental and social services of forests under a green-economy	72
6.4 Overview of forestry implications by scenario	73
7 PREPARING FOR A GREENER ECONOMY	75
7.1 Priorities	75
7.2 Strategies	76
Institutional changes	76
Building capacity at all levels	77
Advancing technology	77
Regional and international collaboration and corporate governance	78
Awareness raising	78
7.3 Overview of priority areas and strategies	78
REFERENCES	81

BOXES

Box 2.1	Programmes promoting China's plantation expansion	9
Box 2.2	Japan and ROK: shifting focus to forest quality	10
Box 2.3	Economic viability of forest smallholders in Japan and ROK	11
Box 2.4	Transitions in forest management from private to public sector	12
Box 2.5	Increasing the role of communities in forest management in emerging economies	12
Box 2.6	Japan's policy shifts for a maturing society	13
Box 2.7	The green contracts law in Japan	14
Box 2.8	ROK's national forest plan	14
Box 3.1	China's furniture sector	21
Box 3.2	Increasing wood self-sufficiency in Japan and ROK	23
Box 3.3	Shifts along the supply chain: Taiwan P.O.C's furniture industry	26
Box 3.4	Ageing of the forestry labour force in Japan	28
Box 3.5	The grain for green programme in China	30
Box 3.6	ROK's mountain village development project	30
Box 3.7	The green belt programme of Mongolia	33
Box 3.8	The Green Dam initiative in ROK	34
Box 3.9	Japan's forestry sector contributions to the Kyoto Protocol commitment	35
Box 4.1	Urbanization and its implications for ROK	39
Box 4.2	Short-term projections and the impacts of the global economic downturn	42
Box 4.3	Improvements in China's energy efficiency	50
Box 4.4	Rising awareness of forest functions in Japan	53
Box 4.5	Strengthening democracy in Mongolia	55

ACRONYMS AND ABBREVIATIONS

APFC	Asia-Pacific Forestry Commission
APFSOS	Asia-Pacific Forestry Sector Outlook Study
ASEAN	Association of Southeast Asian Nations
CBD	Convention on Biological Diversity
CDM	Clean Development Mechanism
CITES	Convention on Trade in Endangered Species
CSR	Corporate Social Responsibility
DPRK	Democratic People's Republic of Korea
EIU	Economist Intelligence Unit
FAO	Food and Agriculture Organization of the UN
FAS	Foreign Agricultural Service (USDA, USA)
FTA	Free Trade Agreement
FY	Fiscal Year
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Greenhouse Gases
GNI	Gross National Income
IEA	International Energy Agency
IMF	International Monetary Fund
ITTO	International Tropical Timber Organization
KFS	Korea Forest Service
MAFF	Ministry of Agriculture, Forestry and Fisheries (Japan)
MEA	Multi-lateral Environmental Agreements
MDF	Medium Density Fibreboard
MNE	Ministry of Nature and Environment (Mongolia)
NBSP	National Biodiversity Strategy Action Plan
NWFP	Non-Wood Forest Product
OECD	Organisation for Economic Co-operation and Development
PES	Payments for Environmental Services
PPP	Purchasing Power Parity
P-PP	Public-Private Partnerships
REDD	Reducing Emissions from Deforestation and Forest Degradation
ROK	Republic of Korea
RWE	Roundwood Equivalent
SFA	State Forestry Administration (China)
SPFP	Secondary Processed Forest Products
SRI	Socially Responsible Investment
TIMO	Timber Investment Management Organization
TOE	Tonnes of Oil Equivalent
UNCCD	UN Convention to Combat Desertification
UNFCCC	UN Framework for Convention on Climate Change
WTO	World Trade Organization

ACKNOWLEDGEMENTS

FAO expresses sincere appreciation and gratitude to all who contributed to this subregional report of the Second Asia-Pacific Forestry Sector Outlook Study (APFSOS). Governments in the region nominated national focal points who met early in the process to discuss their roles and to agree upon a common national report structure. The national focal points were instrumental in running national level outlook consultation processes, collecting country-level data and information, clarifying issues and verifying statistics and coordinating submission of country outlook papers. The work that went into compiling and developing the country outlook papers, which formed the foundation for this report is duly acknowledged and greatly appreciated.

The implementation of the overall regional outlook study was endorsed by the Twenty-First session of the Asia-Pacific Forestry Commission, which was chaired by Shri J.C. Kala (Director-General of Forests and Special Secretary, Ministry of Environment and Forests, Government of India); and reviewed at the Twenty-Second session chaired by Mr. Nguyen Ngoc Binh (Director-General, Forest Department, Ministry of Agriculture and Rural Development, Government of Viet Nam).

Implementation of the regional study was co-ordinated by CTS Nair and Patrick Durst, and assisted by Desk Officers Chris Brown and Jeremy Broadhead under the supervision of He Changchui, Michael Martin and Hiroyuki Konuma. Implementation was overseen by a Scientific Steering Committee comprised of Sairusi Bulai (Secretariat of the Pacific Community); Neil Byron (Australia Productivity Commission, Government of Australia); Barney Chan (eSFM Tropics, Malaysia); Lu De, Bai Weigao and Zhang Zhontian (State Forestry Administration, Government of China); Steve Elliott (Forest Restoration Research Unit, Chiang Mai University), Steven Johnson (International Tropical Timber Organization); Togu Manurong (Bogor Agricultural University, Indonesia); Kaosa-ard Mingsarn (Chiang Mai University, Thailand); Javed Mir (Asian Development Bank); Ram Prasad (Indian Institute of Forest Management); Victor Ramos (Secretary of Environment and Natural Resources (retired), Philippines); Tonny Soehartono (Ministry of Forestry, Indonesia), Rowena Soreiga (Asia Forest Network); Takako Teranishi and Hiro Miyazono (International Forestry Cooperation Office, Japan); James Turner (Scion Research) and CTS Nair, Patrick Durst, Purushottam Mudbhary, Aru Mathias, Jeremy Broadhead, Chris Brown, Rebecca Rutt and Akiko Inoguchi (FAO).

National reports were submitted by government forestry agencies from nearly all countries in the East Asia subregion, contributors to these reports are attributed in those documents and thanked for their efforts. The following individuals served as National Focal Points or participated in National Focal Points' meetings: Lu De, Yong Qing Meng and Zhang Zhongtian (China); Takako Teranishi (Japan); Rikiya Konishi (Japan); Hijaba Ykhanbai (Mongolia); Rin Won Joo (Rep. Korea).

This subregional report was prepared by Akiko Inoguchi assisted by Jeremy Broadhead, Chris Brown, CTS Nair, Patrick Durst, Rebecca Rutt and Adrian Whiteman. The report was edited by Robin Leslie and formatted by Somchai Singsa. Finally, special thanks go to FAO Bangkok staff who worked to provide essential secretarial support: Kallaya Meechantra and Sansiri Visarutwongse, and to Janice Naewboonien for proofreading.

EXECUTIVE SUMMARY

The East Asia subregion comprises five countries – the People's Republic of China (China) including Taiwan Province of China (P.O.C.), Macao and Hong Kong Special Administrative Region (S.A.R.); the Democratic People's Republic of Korea (DPRK); Japan; Republic of Korea (ROK); and Mongolia. The subregion encompasses 1.147 million hectares and housed 1.530 million people in 2006.

Forest cover accounts for 22.5 percent of the subregion's land area of 255 million hectares. Total forest cover in China is by far the largest among the countries, and accounts for 81 percent of the forest cover in the subregion. Of the other 20 percent, forests in Japan account for roughly half; and forests in Mongolia, ROK and DPRK constitute 3 to 4 percent respectively. Japan, ROK and DPRK have the highest proportion of forest cover each with over 50 percent (FAO 2010).

Forest cover in the subregion has undergone remarkable expansion in recent years. Between 1990 and 2010, forest cover expanded by 45 million hectares, upheld largely by China's afforestation efforts. On the other hand, DPRK saw the biggest loss of over 30 percent; Mongolia lost approximately 1.6 million hectares, or roughly 13 percent of its total forest cover (FAO 2010). East Asia's forest area per capita increased from 0.15 to 0.16 hectares per person between 1990 and 2005, mainly due to increase in forest cover contributed by China (FAO 2005).

The changes in the subregion's forest resources which occurred in the last decade have been regionally and globally significant. China's forestry sector, for example, is driven by its expanding economy and demand and increased capacity for production.

The developed economies of the subregion – Japan and ROK – are shifting focus from quantity to quality improvement of forest resources. The recent trajectory of these countries represents a picture of maturing consumer countries faced with the challenges of balancing economic, environmental and social values and the functions of forests. The global role these countries play as timber importers is also gradually changing.

With significantly smaller domestic markets, forestry trends in Mongolia and DPRK have been less dynamic. Rural livelihoods, as opposed to forest industries, have been major contributing factors to forest exploitation and degradation trends, increasingly so in Mongolia since its transition to democratic government (FAO 2000). Institutional challenges in translating policy to implementation have been central.

For all economies, demands on forests are changing and diversifying. China's growing demands for forest products are likely to place increasingly severe pressures on forests. In the case of Japan and ROK, growing awareness of social and environmental issues is carving out new trends in ecotourism and urban forests. These shifts reflect national socio-economic trends. The mounting and diversifying demands on the forestry sector will continue to be determined by trends which take place in sectors outside forestry.

Against the backdrop of the subregion's initial conditions during the decade preceding 2010, certain 'drivers of change' will define the future scenarios that may evolve. Economic drivers are some of the strongest in defining not only consumption and trade trends, but also public and private spending as well as government strategies and priorities. Thus two divergent scenarios can be drawn out:

- The high-growth scenario; and
- The low-growth scenario.

The high-growth scenario assumes a quick recovery from the economic recession and greater social and economic mobility translating into diversifying demands, while other aspects of society remain constant. Government commitment in balancing economic and environmental priorities remains at current levels, as does civil society's awareness of environmental and social issues. As a result of robust growth concentrating in urban areas and industries without sufficient focus on integrating rural economies, there is bound to be greater economic and social disparity between urban and rural segments.

The low-growth scenario is characterized by a slower-than-expected recovery from the economic recession and stagnating growth towards the later half of the decade. The immediate social repercussions of the slow recovery will be cuts in environmental and social spending by both the public and private sectors.

Other critical factors that will further define the scenarios include civil society's social and environmental awareness and ability to check and balance public and private sector activities, as well as governments' role in navigating the future. Striking a sustainable balance between the various priorities will most fundamentally depend on governments' political commitment and capacity to develop and implement policies and undertake institutional adjustments.

Provided governments deliver on their strong commitment to balance social and environmental agendas with economic goals, civil society groups and the private sector will function as a mechanism for checks and balances. Under these basic conditions another possible scenario emerges: the 'green-economy' scenario.

The green-economy scenario is an optimistic view that assumes a quick recovery from the economic recession, similar to the high-growth scenario, while social and environmental awareness of civil society groups is more robust, leading to more dynamic social participation and partnerships.

For developed economies, a relatively even future for forestry is projected. Economies in these countries are matured (or maturing) and more or less stable demand will unfold in the future. In these countries, direction is determined through democratic governance where civil society groups, government and the private sector mutually agree checks and balances. Provided that this balance is maintained and society continues to function likewise, values such as sustainability in natural resource management will not be easily undermined.

Variability between implications of scenarios is greatest for emerging economies. Whether governments will show and demonstrate strong commitment for the forestry sector and whether the balance between economic and environmental goals will be determined by various factors, not the least of which will be macroeconomics. The role of civil society groups will have major implications in determining the balance between priorities. Another challenge will be reforming institutions and developing capacity for implementation at various levels.

Scenario implications for forests and forestry in low-income countries with authoritarian regimes depend primarily on regime stability. As long as regimes remain stable, domestic demands on forestry will not differ significantly.

What is likely to unfold in the decade up to 2020 is the continued overall increase in the subregion's forest area, largely driven by China. Increased focus on management for

conservation and improving forest quality will be observed with developed economies taking the lead and emerging economies following in the trend.

The three scenarios portray the extremes among the possibilities that can be realistically forecasted. What will most likely unfold will be a combination of the scenarios. But what remains clear is that one scenario – the green-economy scenario – is the most sustainable scenario for which countries need to prepare.

Public forestry sector agencies hold a key to unfolding the green-economy scenario, which requires strong political commitment to balance socio-economic and environmental goals in forest management. A major challenge then is to reflect the political commitment to securing sufficient resources to implement appropriate programmes and legislation. Political commitment is also needed within various layers of forestry agencies. A critical factor will be building partnerships with various stakeholders. The role of civil society groups in performing checks and balances will also be crucial.

Supporting technology dissemination to improve resource use efficiency, while at the same time raising awareness of energy and resource-saving among consumers, will be important. The public and private sector both have responsibilities for investing in technology as well as awareness-raising. The role of industry and private sector companies will also be important.

On the production side, countries will need to deliver on mounting and diversifying demands through participation and collaboration among various stakeholders, particularly the engagement of the private sector and local communities. This will require investment in building the capacity of public sector agents and private sector players.

1

CHAPTER 1 INTRODUCTION

1.1 Background

In 1998, through endorsement of the Asia-Pacific Forestry Commission (APFC), FAO completed the first Asia-Pacific Forestry Sector Outlook Study (APFSOS), which considered status, trends and prospects for the regional forestry sector towards 2010. Approximately ten years later, the world and the region are faced with socio-economic, biophysical and political changes occurring at an unprecedented pace.

In order to better prepare the forestry sector for the future and fulfil future expectations, forestry sector proponents will first need to be equipped with skills and capacity to understand the changes taking place in the larger society outside the sector, and then to analyse and identify sector priorities and strategies. Against this backdrop the second APFSOS 'Asia-Pacific Forestry Towards 2020' was commissioned at the recommendation of the 21st Session of the APFC in April 2006.

1.2 Objectives and key questions

The aim of the report is to prepare the forestry sector for the coming decade of turbulent change by identifying possible scenarios and forestry implications under each of them. Specifically, the report addresses the following objectives:

- Identify emerging drivers of change in society at large;
- Draw out the possible scenarios of societal development;
- Analyse the implications of the scenarios on the forestry sector; and
- Identify priority areas and strategies towards a better future in forestry.

Some key questions which the report attempts to address are:

- How will East Asia's forests look in 2020; will there be increased forest cover and improved quality?
- What major societal trends will affect forests and how will forests be affected?
- What will be the major sources of forest financing? What new mechanisms of financing will emerge?
- Is there a path for a sustainable 'green economy' and how can the forestry sector get there?

1.3 Scope of the study

This study addresses the geographical areas from Japan in the east, to China in the west, including the Korean peninsula and Mongolia. Data on Taiwan P.O.C., Macao and Hong

Kong S.A.R. are included in China's statistics, unless otherwise specified.

This report forms part of a series of subregional studies with geographic focus on South Asia, Southeast Asia and the Pacific subregions. Another study covers the entire Asia-Pacific region shedding light on the overall regional perspective and trends.

Studies focusing on the country level have also been commissioned, in part as a capacity building process for national forestry officials in forecasting long-term trends and scenario building for the future. The subregional and regional papers draw from these country studies. The People's Republic of China (China) (FAO 2009b), Japan (FAO 2009c), ROK (FAO 2009d) and Mongolia (FAO 2009e) prepared papers for the East Asia subregion.

1.4 Structure of the study

The report is composed of two main parts; Part I sets the scene with an overview of the current status of the forestry sector and Part II looks to the future.

Chapter 2 of Part I provides a subregional profile, including the current biophysical status of forests and the institutional context. Chapter 3 then reviews the economic, socio-economic and environmental dimensions of the sector to draw out trends in the subregion in the preceding decade.

In Part II, Chapters 4 and 5 step away from the forestry sector to look at larger societal trends. Chapter 4 identifies the key drivers of change for the next decade and Chapter 5 draws out possible developmental scenarios which the subregion may see towards 2020. In Chapter 6, the focus returns to the forestry sector to review the implications on forestry under each of the scenarios. One clear sustainable scenario for which priority areas and strategies are drawn up has been conceived in Chapter 7.

2

CHAPTER 2 SUBREGIONAL PROFILE

The East Asia subregion comprises the People's Republic of China (China) including Taiwan Province of China (P.O.C), Macao and Hong Kong Special Administrative Region (S.A.R.); the Democratic People's Republic of Korea (DPRK); Japan; Republic of Korea (ROK); and Mongolia. The subregion expands over 1.147 million hectares and houses 1.530 million people (World Bank 2008).

The subregion encompasses a wide variety of ecological zones and ecosystems from subtropical, temperate and alpine forests to coastal mangroves as well as dry zones of steppe and desert lands (**Figure 2.1**).

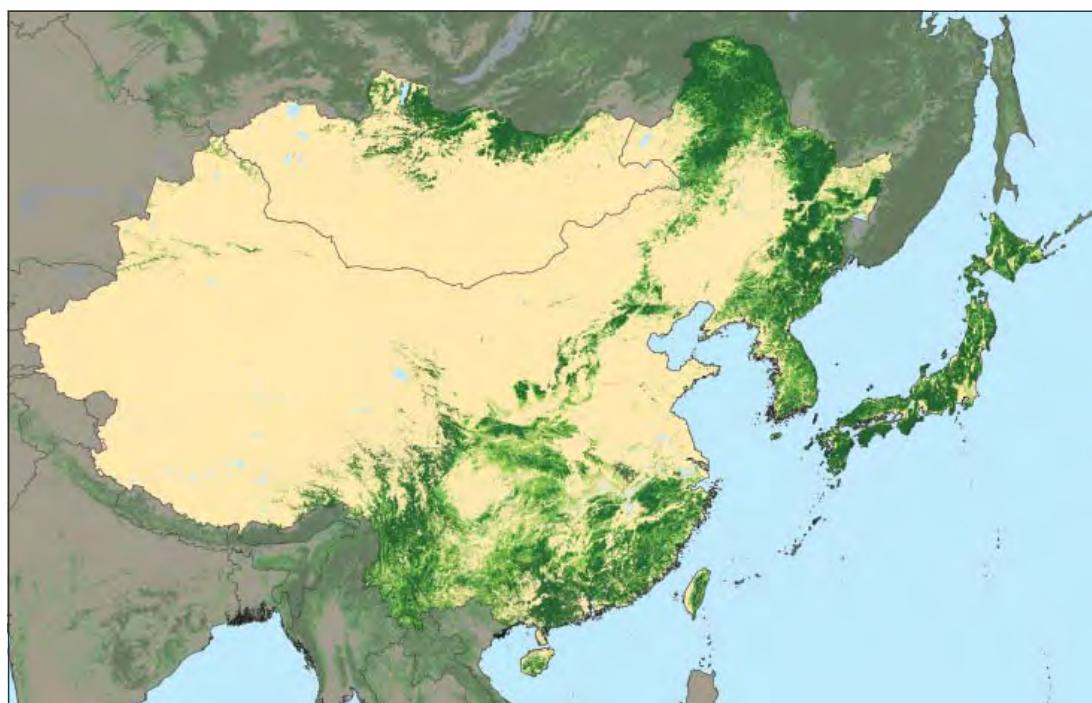


Figure 2.1: Land cover in East Asia 2000

Source: Global Land Cover 2000 database.

2.1 Socio-economic profiles

Socio-economic factors in countries of the subregion, which substantially define the context of development including trends in natural resource management, are extremely diverse. In terms of demographics, the subregion is home to one of the most sparsely populated countries in the world – Mongolia – as well as some of the densest

(**Table 2.1**). While DPRK, China and Mongolia have a relatively young population, ROK, and particularly Japan are leading high-age societies in the world.

Table 2.1: Population and density by country

	China	Japan	ROK	DPRK	Mongolia
Total population (million)	1 326.5	127.8	48.4	23.7	2.6
Density (persons/km ²)	142	350	490	197	2

Source: WDI (2006).

Levels of per capita income and economic development also vary, with low-income DPRK, and high-income Japan and RO. The sizes and levels of global integration of national economies also vary; the sub-region is home to two of the world's three largest economies (China and Japan) which inevitably play a major role in the global economy; then there is DPRK which has chosen to stay largely isolated from the global economy (**Table 2.2**).

Table 2.2: Economic indicators by country

	Japan	ROK	China	Mongolia	DPRK
Income level ^a	High	High	Lower middle	Lower middle	Low
Gross Domestic Product (billion US\$PPP† 2005) ^b	3 870.3	1 027.4	5 333.2	6.7	13.0‡
Per capita Gross National Income (US\$PPP at 2006 current prices) ^b	38 630	17 690	2 000	1 000 (est.)	≤ 905 (est.)
Main origins and share of GDP in 2007 (%)	Service 69 ^b	Service 57 ^b	Industry 48 ^b	Industry 35.7 ^c	Service 34.1 ^c

†PPP: purchasing power parity.

‡ PPP unadjusted.

Sources: a World Bank 2009; b World Bank (2008); c EIU (2009a-g).

Political regimes and forms of state include the full democracies of Japan and ROK, the emerging democracy of Mongolia, the one-party socialist republic of China and the one-party state of DPRK. The levels of political participation in civil society vary accordingly.

2.2 Land-use patterns

Defined partially by geographical locations and ecological zones, there are some common characteristics among countries in land allocation by use. A relatively large share of land is occupied with temperate forests in Japan and the two Koreas. Mongolia is characterized by vast expanses of dry grass and pasturelands where the traditional nomadic lifestyles take place, in the southwest part of the country, and forests in the north-central part of the country. In China, 90 percent of the country's arable land is in the southeast region, forests are mainly found in the northeast, southern and northern

regions (very few in the northwest), whereas 80 percent of all grassland is in the northwestern arid and semi-arid areas and on the Tibetan Plateau (**Table 2.3**).

Table 2.3: Land-use patterns and forest cover change by country

	China	DPRK	Japan	ROK	Mongolia																																																		
Total area (1 000 ha)	932 700	12 000	36 500	9 900	156 700																																																		
Forest average annual change rate 2000- 2005 (%) ^a	1.39	-2.10	0.04	-0.11	-0.7																																																		
Land use ^b	<table border="1"> <tr><td>Arable land</td><td>19%</td></tr> <tr><td>Permanent crops</td><td>22%</td></tr> <tr><td>Permanent meadows</td><td>43%</td></tr> <tr><td>Forest area</td><td>15%</td></tr> <tr><td>Other land</td><td>1%</td></tr> </table>	Arable land	19%	Permanent crops	22%	Permanent meadows	43%	Forest area	15%	Other land	1%	<table border="1"> <tr><td>Arable land</td><td>25%</td></tr> <tr><td>Permanent crops</td><td>23%</td></tr> <tr><td>Permanent meadows</td><td>2%</td></tr> <tr><td>Forest area</td><td>19%</td></tr> <tr><td>Other land</td><td>12%</td></tr> </table>	Arable land	25%	Permanent crops	23%	Permanent meadows	2%	Forest area	19%	Other land	12%	<table border="1"> <tr><td>Arable land</td><td>68%</td></tr> <tr><td>Permanent crops</td><td>19%</td></tr> <tr><td>Permanent meadows</td><td>12%</td></tr> <tr><td>Forest area</td><td>1%</td></tr> <tr><td>Other land</td><td>1%</td></tr> </table>	Arable land	68%	Permanent crops	19%	Permanent meadows	12%	Forest area	1%	Other land	1%	<table border="1"> <tr><td>Arable land</td><td>64%</td></tr> <tr><td>Permanent crops</td><td>17%</td></tr> <tr><td>Permanent meadows</td><td>16%</td></tr> <tr><td>Forest area</td><td>2%</td></tr> <tr><td>Other land</td><td>1%</td></tr> </table>	Arable land	64%	Permanent crops	17%	Permanent meadows	16%	Forest area	2%	Other land	1%	<table border="1"> <tr><td>Arable land</td><td>74%</td></tr> <tr><td>Permanent crops</td><td>19%</td></tr> <tr><td>Permanent meadows</td><td>6%</td></tr> <tr><td>Forest area</td><td>1%</td></tr> <tr><td>Other land</td><td>1%</td></tr> </table>	Arable land	74%	Permanent crops	19%	Permanent meadows	6%	Forest area	1%	Other land	1%
Arable land	19%																																																						
Permanent crops	22%																																																						
Permanent meadows	43%																																																						
Forest area	15%																																																						
Other land	1%																																																						
Arable land	25%																																																						
Permanent crops	23%																																																						
Permanent meadows	2%																																																						
Forest area	19%																																																						
Other land	12%																																																						
Arable land	68%																																																						
Permanent crops	19%																																																						
Permanent meadows	12%																																																						
Forest area	1%																																																						
Other land	1%																																																						
Arable land	64%																																																						
Permanent crops	17%																																																						
Permanent meadows	16%																																																						
Forest area	2%																																																						
Other land	1%																																																						
Arable land	74%																																																						
Permanent crops	19%																																																						
Permanent meadows	6%																																																						
Forest area	1%																																																						
Other land	1%																																																						

Sources: ^a FAO (2010); ^b FAOSTAT.

A diverse collection of forest types are found in the subregion including the extremes of tropical and boreal forest (**Table 2.4**).

Table 2.4: Ecological zones in the subregion

Country/region	Domain	Global ecological zone name
China	Temperate	Temperate oceanic forest Temperate continental forest Temperate steppe Temperate desert
	Subtropical	Subtropical humid forest Subtropical mountain forest
	Tropical	Tropical moist deciduous forest Tropical mountain systems
	Boreal	Boreal coniferous forest
Korean Peninsula	Temperate	Temperate continental forest
	Subtropical	Subtropical humid forest
Japan	Temperate	Temperate continental forest Temperate mountain system
	Subtropical	Subtropical humid forests Subtropical mountain system
Mongolia	Temperate	Temperate steppe Temperate desert Temperate mountain system
	Boreal	Boreal mountain system

Source: FAO (2001).

2.3 Forest extent and change

Forest cover

Forest cover accounts for 22.1 percent of the subregion's land area of 255 million hectares (**Figure 2.2**). Total forest cover in China is by far the largest among the countries, and accounts for 81 percent of the forest cover in the subregion. Of the other 20 percent, forests in Japan account for roughly half; and Mongolia, ROK and DPRK have 3 to 4 percent each. Japan, ROK and DPRK have the highest forest cover of over 50 percent (FAO 2010).¹

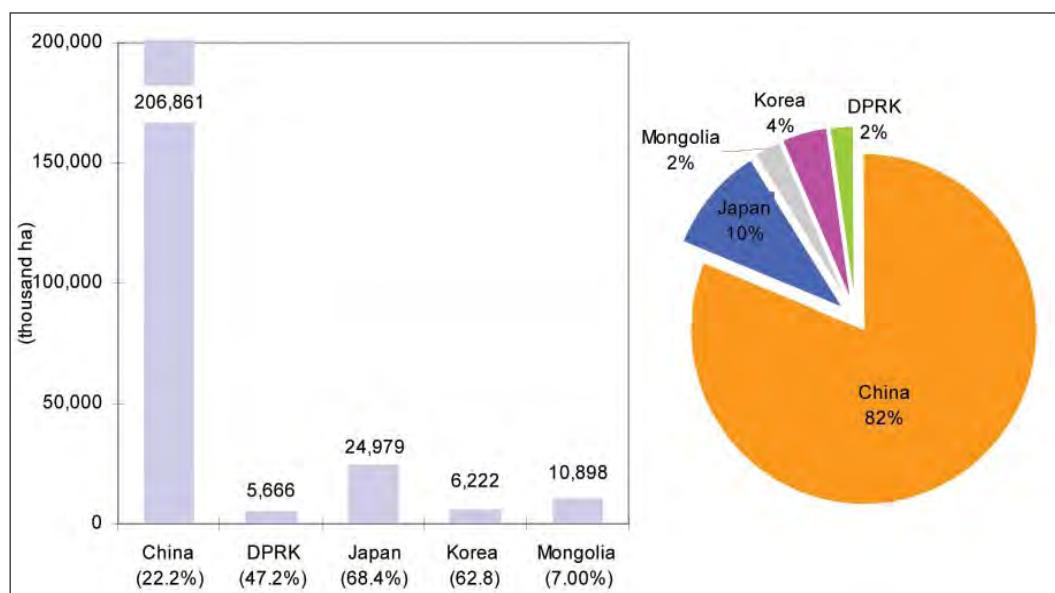


Figure 2.2: Extent and share of forest cover in East Asia countries (left) and share in forest area in the subregion (right) (2010)

Source: FAO (2010).

In contrast to its low forest cover in relation to the rest of the subregion, Mongolia has the highest per capita forest cover at approximately four hectares per person. This is nearly 30 times that of ROK and 26 times that of China (**Table 2.5**).

Table 2.5: Area of forest per person (2010)

Country	Area (ha)
China	0.15
DPRK	0.26
Japan	0.20
ROK	0.13
Mongolia	3.94
Subregion	0.16

Source: FAO (2009a).

¹ Data based on field survey and estimates. For DPRK, latest available information was from 1996. For other countries, latest available information was from 2000 to 2005.

Forests by designation

Forests can be categorized into primary functions including production, protection, conservation and other functions such as social services. In China, DPRK and ROK, production forests compose the largest share, accounting for over half of the total forest area (**Figure 2.3**). However, the recent trend in ROK is for conversion from production oriented forest management to sustainable forest management with a focus on multiple values of forests including ecosystem protection, forest recreation and culture. This form of management is already pursued in Japan and in China there has also been a major shift towards forest protection.

Japan designates 70 percent of its total forest area to protection. Mongolia's designation of protection and conservation, combined, add up to over 50 percent of its total forest area, and less than 10 percent for production (FAO 2010)

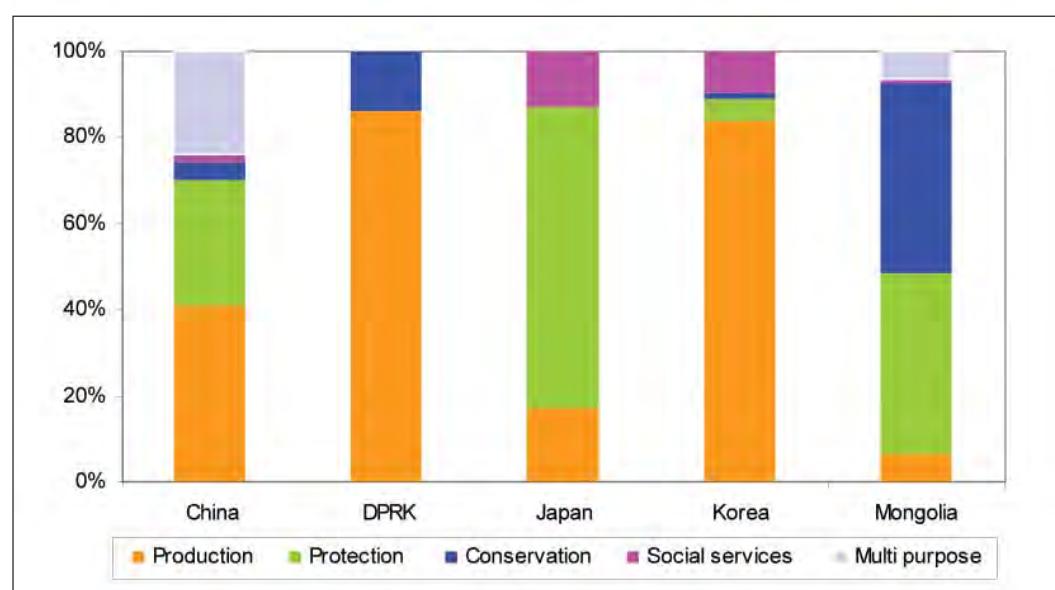


Figure 2.3: Share of forest area by primary designation (2005)

Source: FAO (2010).

Recent changes in forest extent

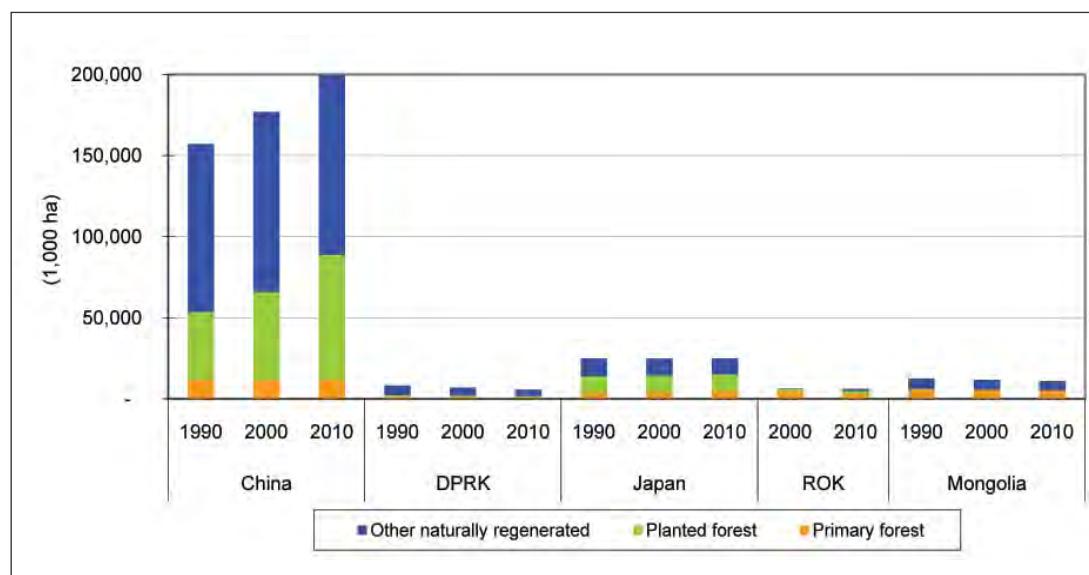
The subregion's forest cover has expanded in recent years. Between 1990 and 2010, net forest cover increased by approximately 45 million hectares (**Table 2.6**). The increase was accounted for by afforestation in China. All other countries demonstrated a reduction in net forest cover over the same period.

Between 1990 and 2010, China had net-gain of over 45 million hectares in forest area, an increase of over 22.1 percent, mainly through new forest plantations. DPRK saw the biggest loss of over 30 percent; Mongolia lost approximately 1.6 million hectares, or roughly 13 percent of its total forest cover (**Figure 2.4**). East Asia's forest area per capita increased from 0.15 to 0.16 hectares per person between 1990 and 2005, mainly due to increase in net forest area contributed by China (FAO 2005).

Table 2.6: Change in forest cover in East Asia (1990-2010)

	1990 (1 000 ha)	2000 (1 000 ha)	2010 (1 000 ha)
China	157 141	177 001	206 861
DPRK	8 201	6 821	5 666
Japan	24 950	24 876	24 979
Mongolia	11 492	10 665	10 898
ROK	6 371	6 300	6 222
Total East Asia	208 155	225 663	254 626

Source: FAO (2010).

**Figure 2.4: Changes in forest area by forest characteristics (1990–2010)¹**

Source: FAO (2010).

In the industrialized economies of Japan and ROK with low levels of dependence on forests for livelihoods, forest loss was minimal. Where it did occur, modified and semi-natural forests have usually been converted for non-agricultural purposes, particularly construction of infrastructure. Between 1990 and 2010, ROK recorded a reduction of 148 000 hectares (FAO 2010).

¹ Complete data for DPRK are not available.

Plantations

Plantations play a major role in the forestry sectors of China, Japan and ROK.

China experienced a remarkable expansion of forest plantations where nearly 13 million hectares were reportedly planted between 1990 and 2005 (**Figure 2.4; Box 2.1**).

While both ROK and Mongolia have lost forest cover overall, since 1990 planted forests in these countries had expanded by 616 000 hectares (by 2005) and 120 000 hectares respectively (FAO 2005; FAO 2010). In ROK and Japan, governments are shifting their focus in plantation management from area expansion to improved management for higher-quality forests (**Box 2.2**).

Japan's plantation area was reduced marginally, reflecting its declining trend in overall consumption and demand for forest products.

Box 2.1. Programmes promoting China's plantation expansion

The Government of China has initiated six major forestry programmes to contribute to the development of a sustainable forest resource management scenario, in line with the national forestry strategy. The programmes commonly referred to as the Six Major Forestry Programmes expanding across most of China's counties, cities and regions include:

- i) The Natural Forest Protection Programme (through logging bans and afforestation with incentives to forest enterprises);
- ii) The Conversion of Cropland for Forests and Grassland Programme (also known as the Grain for Green Programme) converts cropland on steep slopes by providing farmers with grain and cash subsidies;
- iii) The Sandification Control Programme for areas in the vicinity of Beijing;
- iv) The Key Shelterbelts Programme (three in northern shelter forests, and others in the Yangtze River basin);
- v) The Wildlife Conservation and Nature Reserve Development Programme; and
- vi) The Fast Growing and High Yielding Forests Base Construction Programme.

The objectives and approaches differ among the programmes, however common to all has been the application of afforestation technologies, and accompanying incentives for promoting afforestation activities. The programmes generated over 58 million hectares of afforested land (including naturally regenerated forests) by 2005.

Growing stock

In Japan and ROK where massive government-led tree planting programmes were undertaken in the aftermaths of wars, plantations are reaching maturity and stock volumes are increasing (**Table 2.7**). While overall forest cover growth was recorded to be negative in Japan and ROK during the last decade, total growing stock increased substantially. The dominant share of growing stock is found in planted coniferous stands – the result of policy-induced planting schemes implemented since the 1950s in Japan and since the 1970s in ROK. Japan's planted stands are past maturity, whereas most of ROK's stands will reach maturity in the coming decade (**Box 2.2**).

Table 2.7: Annual change of forest cover and growing stock 1990–2010

	Annual change in forest cover (1 000 ha/year)		Annual change in growing stock (1 000 m ³ /year)	
	1990-2000	2000-2010	1990-2000	2000-2010
China	1 986	2 986	186 560	234 000
DPRK	-127	-127	-6 800	-8 000
Japan	-7	10	74 200	79 200*
ROK	-7	-7	15 900	20 000
Mongolia	-82	-82	-10 800	-11 000

*Figures for 2000-2005.

Source: FAO (2010).

Box 2.2. Japan and ROK: shifting focus to forest quality

New afforestation activities have been limited in Japan and ROK in recent years and focus is shifting to application of appropriate silvicultural practices in existing forests. Planted stands are expected to play a larger role in feeding local demand in both countries; in Japan this role is expected to be enhanced by government and civil society campaigns for promoting local timber use and sustainable forest management; in ROK, the contributing factor will be maturing of stands planted during government-led afforestation programmes in the 1970s and 1980s. Focus on the quality of forests is increasing in both countries, although this is more apparent in Japan where forests are suffering economically; this is having repercussions on forest health and vitality.

In Japan, where planted coniferous stands account for over half of the forest stock, but lack appropriate management, forest management plans are being designed to advance a shift in forest structure into multistorey, modified natural forests – departing from the monoculture plantation model of the past.

Urban forests and trees outside forests

As urbanization increases, conversion of limited open spaces into so-called ‘urban forests’ is taking place.

The aims of urban forests are often to improve local climatic conditions through air purification, mitigation of urban heat island effects and aesthetic improvement. In China, the government has been promoting establishment of urban forests and tree coverage of urban areas has expanded considerably (FAO 2009b).

In Japan and ROK, local governments are establishing programmes to promote urban forests in urban locations, including roof tops. Japan revised its law on urban greening along with two other laws on landscaping, with the aim of further expanding urban trees and parks. In ROK, urban forests are being promoted by the government in public areas including schools, in recognition of their role in connecting people to forests, and enhancing understanding of forests and forest ecosystems.

2.4 Forest landownership, management and institutions

Roles of the public and private sectors

Forest land ownership regimes in the subregion largely fall into two patterns with variation in the role of the private sector.

Among industrialized economies that underwent land reform in the decade immediately following the Second World War, the private sector plays a greater role as owner and manager of forests and forest lands. Privately owned forest comprises most forest lands in both Japan and ROK, where individuals, households, corporate entities and other types of non-public entity are the direct owners and have the primary responsibility for management and planning (**Figure 2.5, Box 2.3**). Forests under public sector ownership are smaller in area but national forests and prefectural forests still play an important role particularly in relation to protected areas. Public ownership includes the national government, local governments as well as collectives such as forest cooperatives.

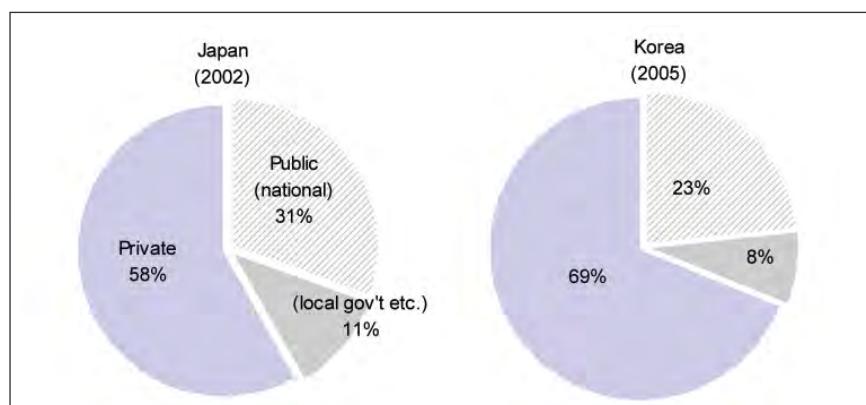


Figure 2.5: Share of forest area by ownership in Japan and ROK

Sources: Forestry Agency, Japan (2007); Korea Forestry Service (2008).

Box 2.3. Economic viability of forest smallholders in Japan and ROK

Currently, smallholder households are the largest contingent of forest owners in both Japan and ROK. In Japan, there are 920 000 forest owner households with more than 1 hectare of forest land. Of these more than half own less than three hectares.

Even among households which own forests of more than 50 hectares, forestry is becoming less lucrative. Annual profit per household from forest activities dwindled from ¥520 000 in 2003 to ¥290 000 in 2005 (approximately US\$2 600 whereas the average annual household income was approximately US\$47 500) (MAFF, Japan 2008).

The situation is similar in ROK where there are close to 2 million forest owners; 940 000 have more than 1 hectare. The average size of holding is approximately 2.3 hectares.

Owning forest lands in these countries is increasingly perceived in less positive terms, as sagging timber prices and existing tax burdens shade hopes of profit.

An emerging trend in industrialized countries in the subregion, where the contribution of the agriculture sector (including forestry) to livelihoods is declining, is the transition of forest management from the private to the public sector. In some cases, public ownership of forests is also increasing (**Box 2.4**).

Box 2.4. Transitions in forest management from private to public sector

Japan and ROK have similar forest ownership characteristics, where smallholders with an average of less than 3 hectares of forest predominate. This contributes significantly to the difficulty in maintaining a viable forest industry and delivery of appropriate forest management practices. As a result of the lack of economies of scale and high labour costs, an increase in subcontracting of forest management to collectives or public entities has been seen. Cases of abandoned forests among private smallholders in Japan are also emerging. Interestingly, a shift is taking place in forest management and ownership from the households and individuals to local collective forestry units such as forestry cooperatives. What may transpire is a more optimal scale of forest management with a critical mass of forest lands surrendered from less enthusiastic owners.

In the emerging economies and democracies of China and Mongolia, the public sector plays a more dominant ownership role and has a larger stake in forest management. In these countries, all forest lands are designated as public land implying ownership by the central government, local governments, or collectives. In recent years however, the role of the private sector including households, collective units of households, as well as corporations is increasing in these countries as a result of tenure reforms, recognition of increased local management rights and a general transition of the economy towards market orientation (**Box 2.5**). Where tenure rights are secured through legal institutions, the effects on forest management and forest cover have generally been positive.

Box 2.5. Increasing the role of communities in forest management in emerging economies

In China, forest land tenure reform is facilitating significant changes in forestry sector development. The reforms which have been continuing since the late 1990s were initiated in southern provinces such as Fujian and Jiangxi and have gradually expanded throughout the country. Provincial rural poverty reduction and income generation programmes supported the reforms which institutionalized forest tenurial rights for households and collective units of households. The 70-year inheritable tenurial instrument provides rural farmers with the rights of resource ownership, management, tending (promoting resource conservation and use) and income generation, and acts as an incentive for investment in sustainable management. The results have included major increases in market-responsiveness and in planting in both plantation and production forests, particularly in the southern regions of China, where forest ownership has long been collective (local governments were previously the primary managers).

In Mongolia, co-management of state-owned forests is being promoted through leasing arrangements for local communities. This has been institutionalized through the 2007 Forest Law as well as through government programmes for co-management of natural resources.

2.5 Policy and legal framework

Forest policies and legislation

In response to contemporary societal conditions and needs, countries in the subregion have adopted new policies and strategies that have impacted forests and forestry.

Among countries in the subregion, there are two general trends in forest policies; emphasis on conservation and protection (as in the case of China and Mongolia) and focus on multiple functions to be offered by forests (as in the case of Japan, and increasingly ROK).

Forest policy objectives are achieved through various means, including legislation, programmes, and plans. Recent developments in forest sector-related policies (including legislation) within subregional countries include the following:

China: The Decision on Acceleration of the Forestry Sector Development (2003) provides clear direction in placing conservation goals before production. Other areas promoted through this Decision and other statements and declarations include: biodiversity and eco-system restoration (through National Biodiversity Actions Plans [updated in 2008], the National Wetland Conservation Action Plan [2000] and the National Plan of Action to Combat Desertification [2000]); implementation of a commercial logging ban in the natural forests of the upper reaches of the Yangtze and Yellow Rivers (Natural Forest Protection Programme [1998]); forest land tenure and forest management reform (officiated by the Guidelines on Fully Promoting Collective Forest Tenure System Reform [2008]); and forest industry development through privatization of forest industries and plantations.

Japan: The Basic Law on Forests and Forestry (2001) – recognizing the changing demands on forests resulting from economic growth and globalization, Japan restructured its national forest policy from the earlier Forestry Basic Law of 1964. The new law takes into account the comprehensive set of functions that forests offer to meet diverse demands such as conservation of land and water resources, mitigation of global warming, conservation of biological diversity and provision of opportunities for recreation and forest/environmental education.

Box 2.6. Japan's policy shifts for a maturing society

Against the backdrop of a maturing society and economy, the Japanese forestry sector is, although subtly, undergoing an important change to meet emerging and evolving public needs. A major impetus for change has been the identification and national consensus on the role of forests in achieving the national Kyoto carbon reduction commitment. In 2002, the government adopted a ten-year strategic outline on forests' role in sequestering and storing carbon. The strategies focus on appropriate silvicultural management – particularly thinning practices; management of protection forests; utilization of woody biomass energy; public participation in forest management; and strengthening monitoring and reporting of forest carbon sequestration.

Box 2.7. The green contracts law in Japan

Other key environmental regulations that have been put in place during the last decade include the law on 'green contracts' (2007). In tandem with the 2001 Green Procurement Law this regulates public sector (primarily the state and its independent administrative entities) procurement and service contracts to be accountable for not only price competitiveness, but also environmental performance. The underlying objective has been to prompt nationwide demand and trigger competition in the market for environmentally sound products and services, besides the public sector becoming environmentally accountable. In 2004, the Green Procurement Law specified that only legally harvested wood or wood derived from forests certified as sustainably managed could be procured by public agencies.

ROK: The Framework Act on Forests 2001 was followed by three other acts including the Act on Promotion and Management of Forest Resources; the Act on National Forest Management and the Act on Forest Culture And Recreation all promulgated in 2005. Together they form the central strategies for forestry management, which in focusing on economic, environmental and social values of forests, depart from the Forest Law of 1961 where rehabilitation and restoration of degraded forests was the main theme.

Box 2.8. ROK's national forest plan

The Fourth National Forest Plan (1998-2007) marks the final phase of the government-led reforestation programmes under which the primary objective was to establish a foundation for sustainable forest management. The five key policy goals are: forest resources development, expanding forest services, prevention of forest calamities, rational management of forest land and reinforcement of forest industry (KFS 2008).

The Fifth Plan (2008-2017) will address integrated management objectives, shifting focus from the earlier production-orientation.

Mongolia: The National Forestry Programme (revised in 2006) sets out a shift from a traditional utilization approach to forest management, towards focus on conservation and protection. Priorities identified under the programme include: institutional restructuring, forest fire and pest management, reforestation, enhancing quality and efficiency in timber processing. The New Forest Law (2007) supports community-based co-management of forest resources on the basis of leasing and allocation of forest resources to local communities.

Table 2.8 outlines key forest policies, legislation and institutions in these four countries.

Table 2.8: Key forest policies, legislation and institutions in four East Asian countries

Country	Forest policy	Key legislation	National programmes	Key government institutions
China	Forest Action Plan for China's Agenda 21	Decision On Acceleration of the Forestry Sector Development (2003)	Six major forestry programmes	State Forestry Administration (SFA)
Japan	National Forest Plan	Basic Law on Forests and Forestry (2001)	As per forest policy	Forestry Agency, Ministry of Agriculture, Forestry and Fisheries (MAFF)
ROK	5 th National Forest Plan	Framework Act on Forests (2001)	As per forest policy	ROK Forest Service (KFS)
Mongolia	National Forestry Statement (1998)	New Forest Law (2007)	National Forestry Programme	Ministry of Nature and the Environment (MNE)

3

CHAPTER 3 CURRENT STATE OF THE FORESTRY SECTOR

The changes in the subregion's forest resources that occurred in the last decade have been regionally and globally significant. China has been largely accountable for this significant positive shift in forest coverage; its forestry sector is driven by its expanding economy and demand and increased capacity for production. The forestry sector in China and economic growth overall have been upheld by global demand and more recently, strengthening domestic demand is reinforcing growth.

On the other hand, other subregional countries such as Japan and ROK are shifting focus from quantity to quality improvement of forest resources. The recent trajectory of these countries shows maturing consumer countries faced with the challenges of balancing economic, environmental and social values and functions of forests.

3.1 Economic dimension of forests – production and consumption of forest products

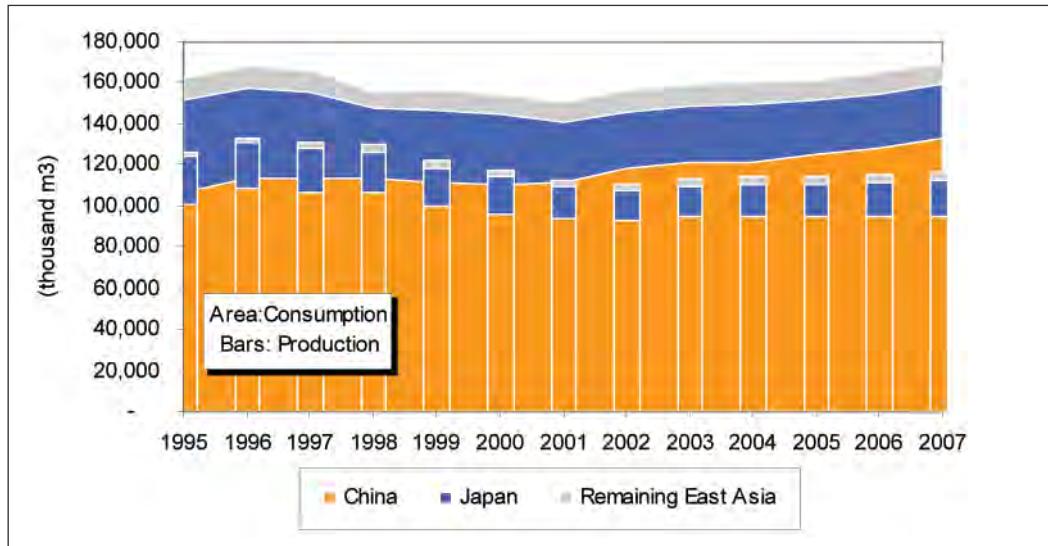
Consumption trends¹ for forest products in the subregion during the past decade have been characteristically divergent, with China's robust growth in almost all product groups, gradual decline in Japan and modest growth in ROK, Mongolia and DPRK. Production trends have generally been consistent with consumption trends in all subregional countries, shrinking in Japan and growing at various rates in the other countries. China has emerged as the world's biggest consumer and importer for a number of wood products including industrial roundwood, waste paper and pulp. China, with a strong flow of investments directed towards the forestry sector (reaching US\$12 billion in 2007) has a rapidly growing wood processing industry. Some of the biggest expansions have been in wood-based panels, particularly for plywood, and furniture industries, which have become net exporting sectors.

Industrial roundwood²

Changes in production volume of industrial roundwood have been marginal in all countries except China, where as a result of its 1998 policy to restrict commercial logging in natural forests, production has fallen. On the other hand, consumption of industrial roundwood declined considerably in Japan, but China experienced a significant increase in recent years, particularly in softwoods. A major source of the logs imported by all countries in the subregion has been the Russian Federation. An emerging trend has been an expanding share of imports sourced from the Russian Federation and a decline in the share of imports into the subregion from North America.

1 Consumption volumes are calculated in terms of (Production + Imports – Exports) using FAOSTAT data.

2 Industrial roundwood includes sawlogs and veneer logs, pulpwood and other industrial roundwood. Statistics for trade include, as well as roundwood from removals, the estimated roundwood equivalent of chips and particles and wood residues.

**Figure 3.1: Trends in industrial roundwood consumption and production levels¹**

Source: FAOSTAT.

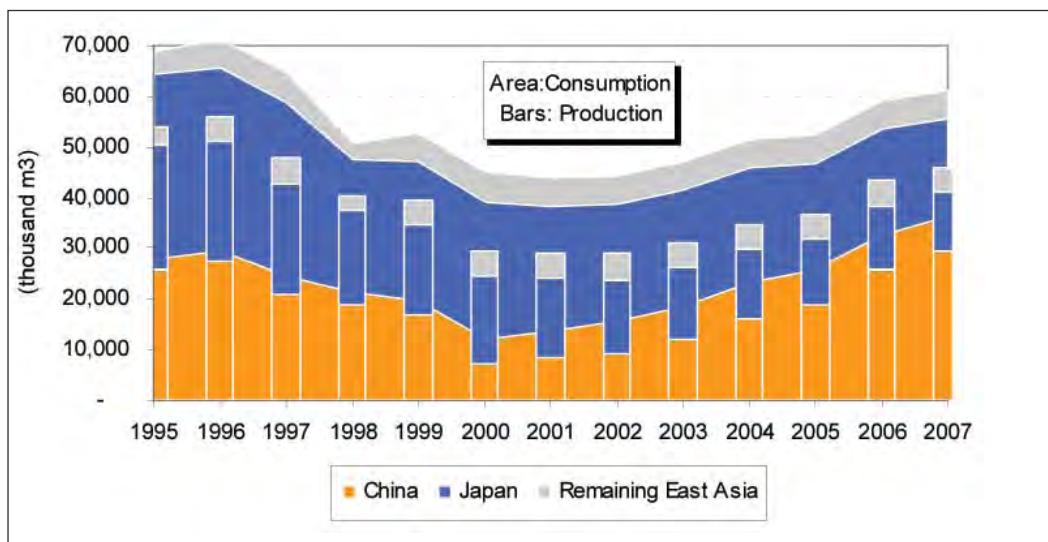
Sawnwood

Sawnwood has been one of the most important wood products groups for domestic markets in the subregion, where the construction sector is a major consumer of wood materials. Japan experienced a drastic fall in consumption of sawnwood in the late 1990s, reflecting a slump in housing starts. The recent years have been more stable, but a general decline in consumption and production is evident. From 2000 to 2007, housing starts in Japan fell from 1.22 million to 1.09 million (MILT 2008), while in ROK, the number jumped from 0.43 million to 0.56 million, peaking at 0.67 million in 2002 (MLTM 2008). Wood material imports and consequently overall consumption trends have corresponded with housing start trends in both countries.² In China, sawnwood production started to fall significantly in the late 1990s reaching its lowest level in 2000. Since then, production has recovered primarily through imported hardwood logs from Southeast Asia.

Production and consumption of sawnwood in Mongolia was reported to be around 300 000 cubic metres in 2007 in Mongolia, up from 61 000 cubic metres in 1995.

1 Though it is noted that the aggregate volume (RWE) of annual sawnwood consumption (**Figure 3.2**), wood-based panels consumption (**Figure 3.3**), and paper and paper board products consumption (**Figures 3.4 and 3.5**) are greater than the total consumption volume of industrial roundwood expressed in **Figure 3.1** (for countries except Japan and ROK), this discrepancy in data is not analysed in this study.

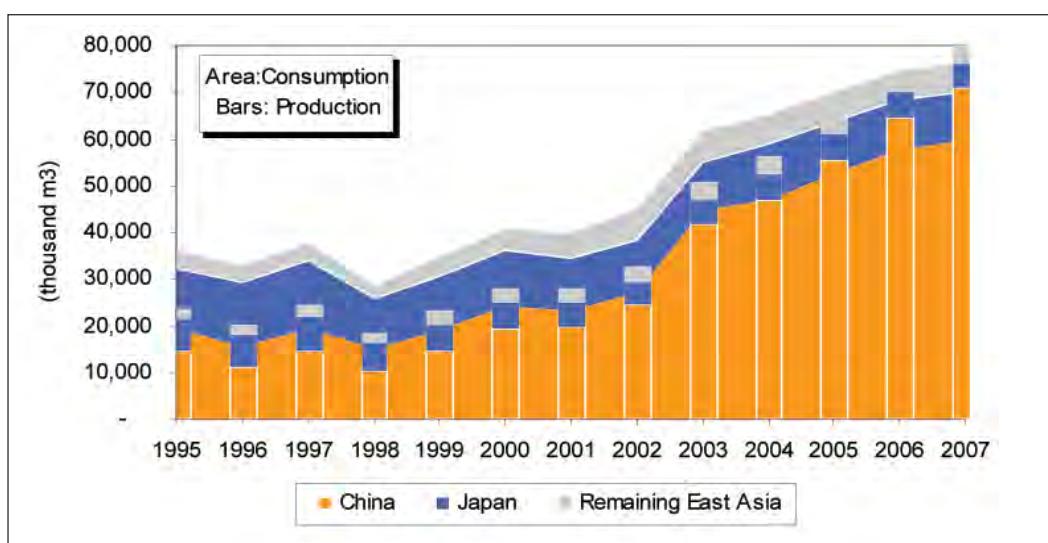
2 In Japan overall wood consumption was approximately 100 million tonnes (RWE) in 2000, stabilizing at between 80 and 90 million tonnes (RWE) since 2004.

**Figure 3.2: Trends in sawnwood consumption and production per country**

Source: FAOSTAT.

Wood-based panels

Movement in the wood-based panels industry during the past decade well reflects the overall economic growth patterns of countries in the subregion. China's panels industry has received huge investments, both domestic and foreign, in response to preferential tax policies by the government as well as market opportunities. China is now the world's largest producer of plywood, and a net exporter. Medium density fibreboard (MDF) production is also growing in China at some of the world's fastest growth rates, with exports reaching major MDF producer countries such as the United States.

**Figure 3.3: Consumption and production trends in wood-based panels¹**

Source: FAOSTAT.

¹ Includes veneer sheets, plywood, particle board and fibreboard compressed or non-compressed.

Pulp and paper

The pulp and paper industry is also an important consumer of wood materials in the subregion. Historically a major consumer of woodchips, Japan's pulp and paper output has been on a gradual decline since around 2005. The larger markets of China, Japan and ROK are more or less self-sufficient in paper production, but input materials of woodchips and pulp are heavily dependent on imports. As a result of intensive investments – both domestic and foreign – China's pulp and paper production capacity has been growing rapidly into one of the largest and most advanced paper production industries in the world.

It is noteworthy that all three major subregional markets rely heavily on recovered material for paper production. Of all pulp fibre used for domestic production of paper products in all three countries, more than 50 percent is derived from recovered materials, and in ROK the rate exceeds 90 percent (FAOSTAT).

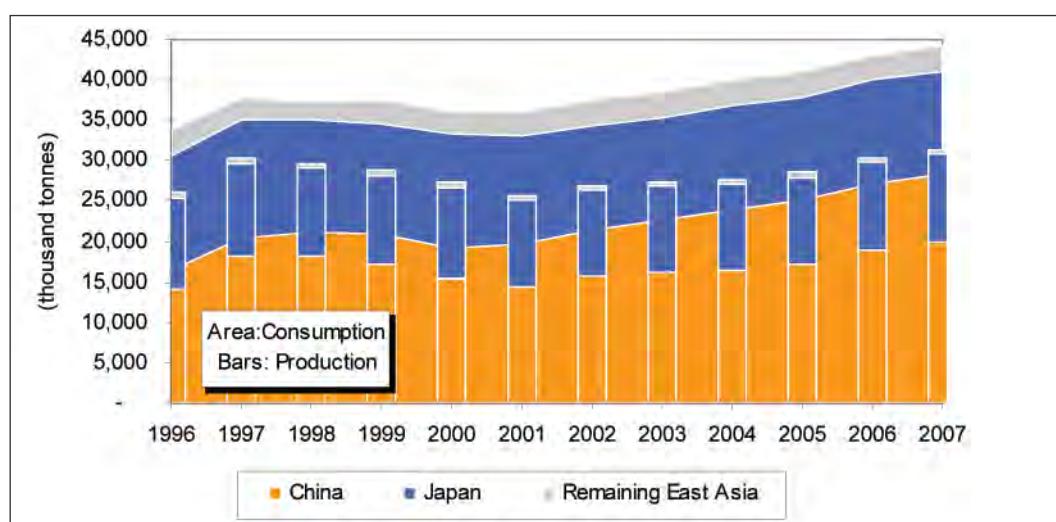


Figure 3.4: Trends in pulp products consumption and production

Source: FAOSTAT.

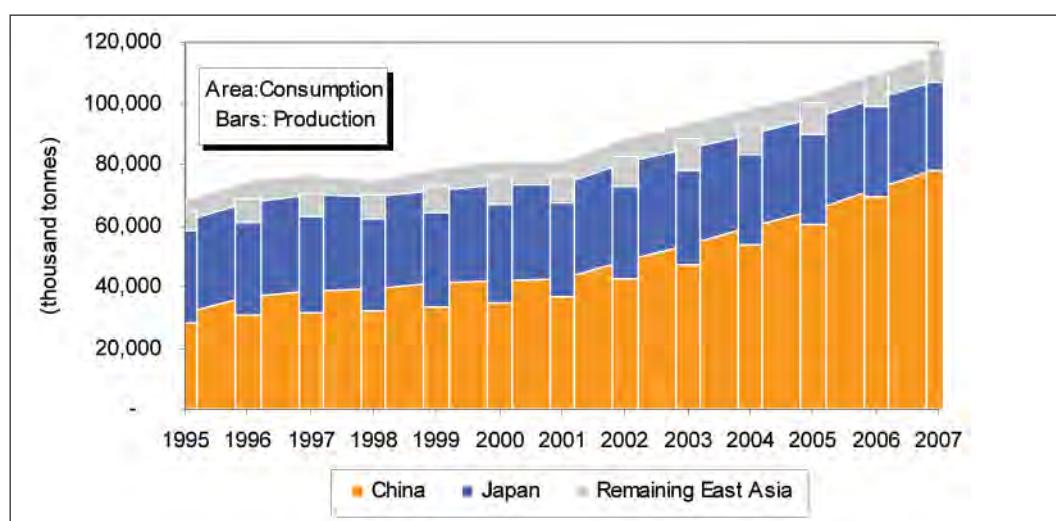


Figure 3.5: Trends in paper and paper board consumption and production

Source: FAOSTAT.

Furniture and other secondary processed forest products (SPFP)

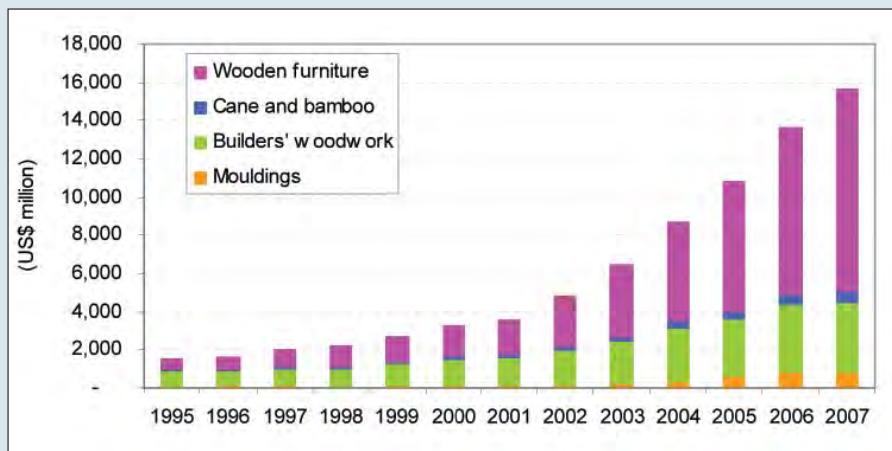
For the labour-intensive SPFS and furniture sector, low wages can be a major incentive for foreign investment. China, with a competitive wage scale, is the only large-scale furniture producer – one that has emerged rapidly and recently taken the position as the world's largest exporter (**Box 3.1**). Between 1995 and 2007, China's export of furniture grew more than 15 times in value terms (and more than 9 times in volume terms). China replaced Canada as the main supplier to the United States – the world's biggest furniture market – in 2003. Exports of furniture from China accounted for more than 60 percent of all exports from Asia, and approximately 20 percent of world exports in 2007 (UN COMTRADE).

Box 3.1. China's furniture sector

China has expanded its production and trade of SPFPs remarkably, more than doubling exports in the past five years. With SPFP exports valued at US\$7.5 billion in 2003, it overtook Italy as the world's largest exporter. Behind the growth of the furniture industry in China have been two factors – the low wage and the favourable exchange rate.

Production which had previously been undertaken in countries such as the United States or Canada, has been relocated to China, often through outsourcing arrangements or establishment of joint ventures in the special economic zones of China. Increasingly, larger Chinese furniture manufacturers are gaining direct access to the United States market, some even offering retail franchises.

In 2004, the United States imposed preliminary anti-dumping duties on some wooden bedroom furniture from China (UNECE/FAO 2004). However price competitiveness maintained growth of Chinese furniture exports. China is also succeeding in accessing not only the United States market but other large markets including the European Union and Japan, and more recently, the Middle East.



China's export of furniture and other SPFPs

Source: UN COMTRADE.

However, a declining United States economy and demand for furniture has had severe implications on the Chinese industry, resulting in the closure of about 7 000 furniture enterprises from January to October 2008 (ITTO 2009.) While there

is increased share of domestic demand backing the growth of the industry, the industry remains susceptible to global economic implications. Also, as much as China has benefited from outsourcing contracts from the global furniture industry, economic growth and resulting minimum wage increases will provide reason for these industries to reconsider investments in China, seeking countries with still cheaper wages.

Non-wood forest products (NWFPs)

Non-wood forest products, or NWFPs, include plants and animals for a wide range of uses such as medicines, food, ornamentals, pets and so forth. In the subregion and also in the world, China is one of the world's biggest – if not the biggest – producer and exporter (and also a major consumer and importer).

NWFPs also play important roles in livelihoods and as export industries in other subregional countries. Numerous NWFPs originating from the subregion have become global niche products fetching high prices in the global market, such as ginseng and matsutake mushrooms. Due to the informal operations often associated with NWFP harvest and processing, information and statistics on production (including collection) and export of NWFPs is extremely unbalanced, with very limited information available for many species, whereas some major products such as bamboo and rattan have sizeable formalized industries for which information is readily available. However, it is increasingly evident that unsustainable collection and harvesting practices are threatening some species with extinction and are a major threat to biodiversity conservation.

China's most prominent products are medicinal plants; several thousand plant species forming the basis for traditional Chinese medicine are now being marketed globally. Other important products include bamboo-related products and edible fungi.

Bamboo forests in China have been expanding at the rate of approximately 50 000 hectares per year, for the last two decades (Zhaohua 2001). Industrialization of the bamboo industry in southern China has generated important economic development for the region, tripling annual bamboo industry output over the last two decades; there was notable improvement in 2006, when production output increased by 14 percent from 2005 (FAO, 2009b) and increasing per capita income for local farmers engaged (Zhaohua 2001). Industrialization of the industry was accomplished with strong local government leadership and investment, and collaboration with the private-sector and local communities, addressing all links along the supply chain. Through this process, the industry realized major improvements in bamboo survival rates in the field, material-use efficiency and product line-up and design.

3.2 Forest products trade: high level of import dependence for primary products

As explained in the previous section, the subregion's forest products industry is characterized by demand from the two consumer giants of China and Japan, and steadily growing demand from ROK. ROK's demand is dwarfed by the consumption levels of the other two giants, but represents one of the largest demand markets in the Asia-Pacific region, following China and Japan.

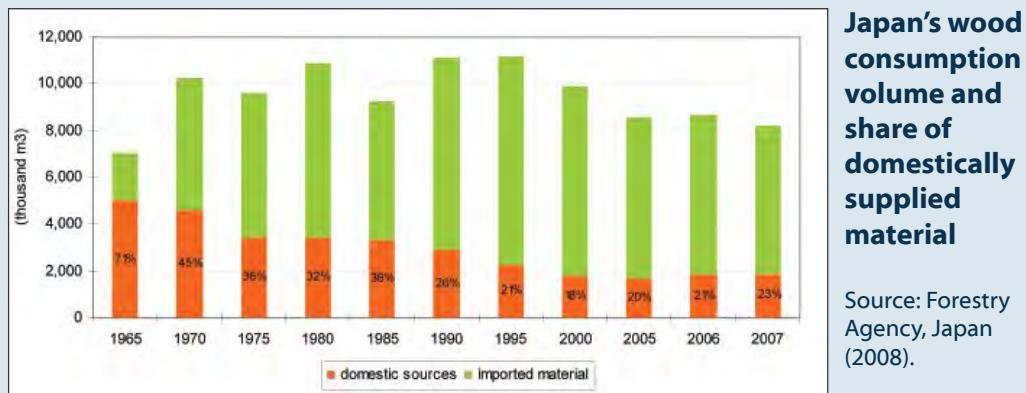
The share of domestically sourced wood material over consumption (wood self-sufficiency rate) was 6 percent for ROK in 2006 (KFS 2008), approximately 22.55 percent for China in 2007 (SFA), and 22.6 percent for Japan in 2007. For wood-producing countries, the implications of the high import dependence of these major consumer countries are enormous. The effect of a small dent or slow down in the Chinese market may see major repercussions, particularly for small countries whose economies depend on forest resource exports.

Box 3.2. Increasing wood self-sufficiency in Japan and ROK

Efforts are being made, most visibly in Japan, to increase wood self-sufficiency, through promotion of domestically sourced materials. During the last decade, Japan's wood self-sufficiency rate has been on a slightly upward trend, exceeding 20 percent in the last few years. This is partially attributed to renewed government campaigns to promote use of domestically sourced material.

In the last few years, these efforts combined with a number of other factors including strong civil society demand for safer construction standards, and advancement in technology for use of small-diameter softwoods in plywood and laminated boards, began a slow but significant trend of increase in the share of domestically sourced material (MAFF 2008). Between 2001 and 2006, the share of domestically sourced material for plywood increased by approximately six times and doubled for laminated boards. Between 2005 and 2008, woodchips consumption in Japan dropped from 35.5 to 34.2 million tonnes, but the share of domestically sourced woodchips climbed from 30 to 34 percent (Japan Paper Association 2009). Despite shrinking demand, the share of domestically sourced material for woodchips for all purposes was approximately 12.2 percent in 2006 (MAFF 2008).

Though there is optimism, close to 80 percent of wood materials consumed in Japan are imported.



The goal for gradual increase in wood self-sufficiency is also mentioned in ROK's sector policies. However, for ROK whose industrial plantations were mostly established in the 1970s and 1980s and have yet to reach maturity, the share of domestically sourced materials over total consumption is lower (KFS 2008). Thus practical dialogues on increasing use of domestic resources have not taken place yet, but as stands reach maturity in the coming decade, the sector is expected to follow a path similar to that of Japan's.

Shifting roles of players in the international market

There is an ongoing significant shift among players in the market. Japan, the biggest market for tropical timber up till the mid-1990s has seen consistently shrinking demand since then. Import of timber in 2009 recorded the lowest level in 47 years (ITTO 2010) and was approximately one-fourth of 2000 levels (MAFF 2010).

China's emergence as the world's largest consumer has triggered outstanding redirection of global timber flows. While the Russian Federation has claimed an outstanding place in timber trade to China, it is other countries with smaller individual trade with China, that are increasing their overall significance; these countries are often economies which largely depend on forestry such as the Pacific Island countries and increasingly some African suppliers (**Figure 3.6**).

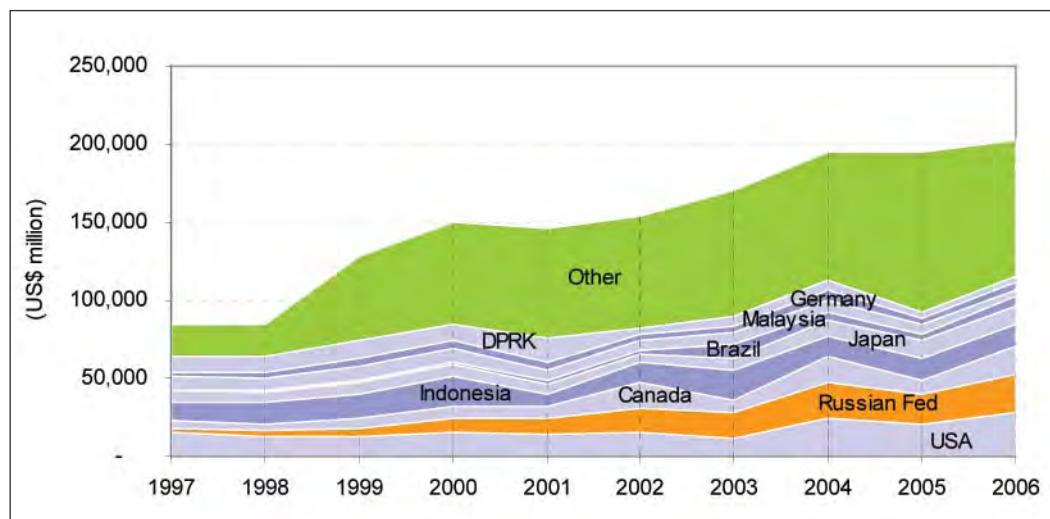


Figure 3.6: Trends in share among imports of wood products to China (in value terms)

Source: FAOSTAT.

Major import items in Japan and ROK include woodchips, sawnwood and industrial roundwood. A similar trend in both countries – despite its overall decline in imports and consumption in the case of Japan – is the emergence of several new trade partners while the traditional exporting countries of North America are losing their share (**Figures 3.7 and 3.8**). Emerging exporters include China (particularly for plywood and paper board products) and Viet Nam (particularly for woodchips going to Japan).

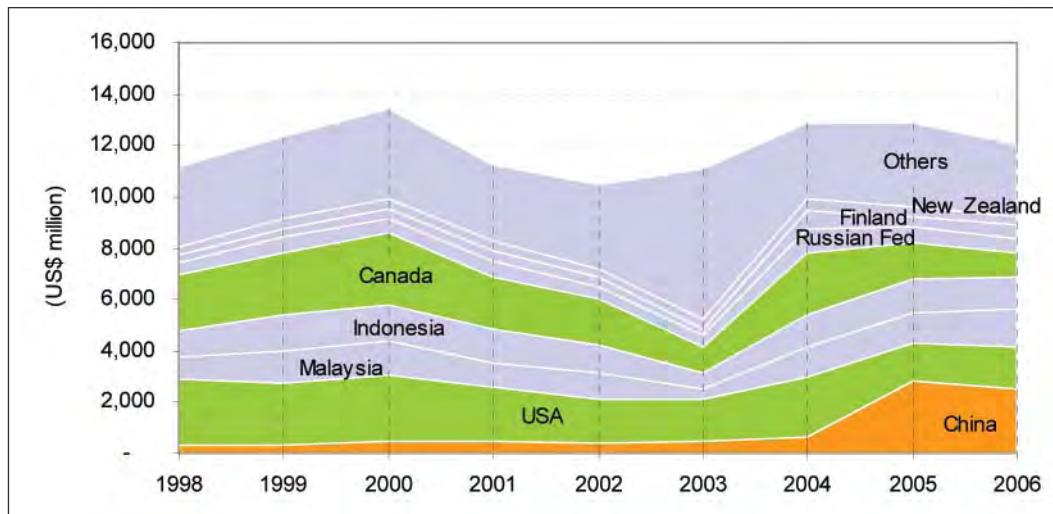


Figure 3.7: Trends in share among imports of wood products to Japan (in value terms)

Source: FAOSTAT.

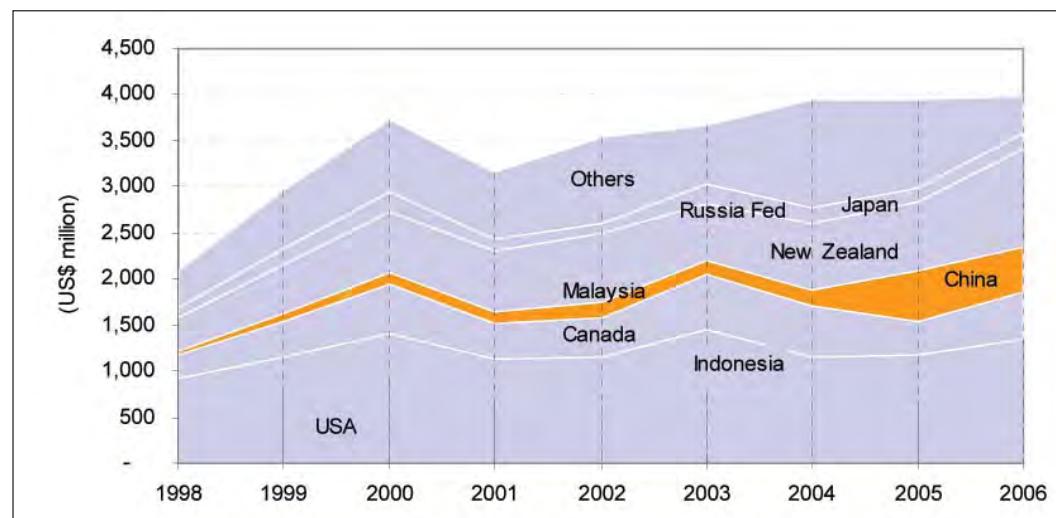


Figure 3.8: Trends in share among imports of wood products to ROK (in value terms)

Source: FAOSTAT.

For Mongolia and DPRK, China and the Russian Federation have been the two top exporters of wood-based products during the last decade (FAOSTAT).

The Russian Federation's role in timber exports to East Asia in the last decade has been unique. With its great harvestable stock, the Federation has emerged as a major source of wood products to consumer countries in the region, particularly in the form of logs. Since the late 1990s, it has claimed its position as the biggest exporter of roundwood to all subregional countries with the exception of ROK for which it was second only to New Zealand in 2005 (FAOSTAT). China imports as much as 66 percent of its total industrial roundwood from the Federation, and is the largest importer in this respect. The rapid increase of the Federation's log exports to China reached approximately 19 million cubic metres in 2005, or approximately 195 percent of 1997 levels.

Since the 2007 implementation of export taxes on unprocessed logs, major Japanese importers have shifted to investing in processing facilities in the Russian Federation, while altering their internal processing facilities to accommodate the product shift from logs to sawnwood. The import of roundwood from the Federation decreased by one fifth in 2007 and further halved in 2008 to approximately two million tonnes (Japan Wood-Products Information and Research Center 2008). The implications of a further hike in export taxes on log exports (up to 80 percent from the 25 percent since 2008) will have been particularly painful for China with its high dependence. The decision to delay its implementation (till no earlier than 2011, as of October 2009) came as a huge relief to importers.

Wood energy¹

Consumption of fuelwood is on a decreasing trend in the subregion, where wood for fuel accounts for approximately 33 percent of all wood removals, slightly lower than the global and regional average (**Figure 3.9**). This rate is significantly higher in Mongolia and DPRK. In Mongolia, about 65 percent of all harvested wood is being used by the rural and urban poor as fuelwood for heating and cooking (World Bank 2003). In DPRK, industrial use of fuelwood is still significant and fuelwood including subsistence and industrial use accounts for up to one-quarter of its primary energy supply (Hayes 2009). Wood biomass remains an important energy source for local livelihoods in China, Mongolia and DPRK, and in the latter two countries, consumption has been increasing in recent years (FAO 2007). The lack of a realistic alternative for fuelwood poses a threat to forest resources and biodiversity in these countries (World Bank 2003).

Box 3.3. Shifts along the supply chain: Taiwan P.O.C's furniture industry

In Taiwan P.O.C. a notable transition is taking shape. Taiwan, a regional leader in furniture export in the 1980s, has been reducing its exports since the early 1990s, giving way to emerging competitive markets in Southeast Asia and mainland China. But Taiwan's reduction in exports has not signalled the decline for its furniture industry in its entirety.

Impacted by competition for cheaper labour costs and tightening environmental protection conditions, many Taiwan P.O.C.-based forest product manufacturers have transformed themselves as transnational players in the region, shifting from use of domestic materials to use of imported materials. Companies have been relocating parts of their production lines in more strategic locations such as mainland China and in Southeast Asia in recent years. Major destinations for Taiwanese investments in wood processing are China (focused on Guangdong Province), Viet Nam, the Philippines and other Southeast Asian countries. According to the Taiwan P.O.C Furniture Manufacturers' Association, in 2006, Taiwanese furniture manufacturers exported US\$2.8 billion out of China and US\$500 million out of Southeast Asia every year in addition to exports out of Taiwan (USDA and FAS 2007).

¹ For discussions on bioenergy see section 4.3.

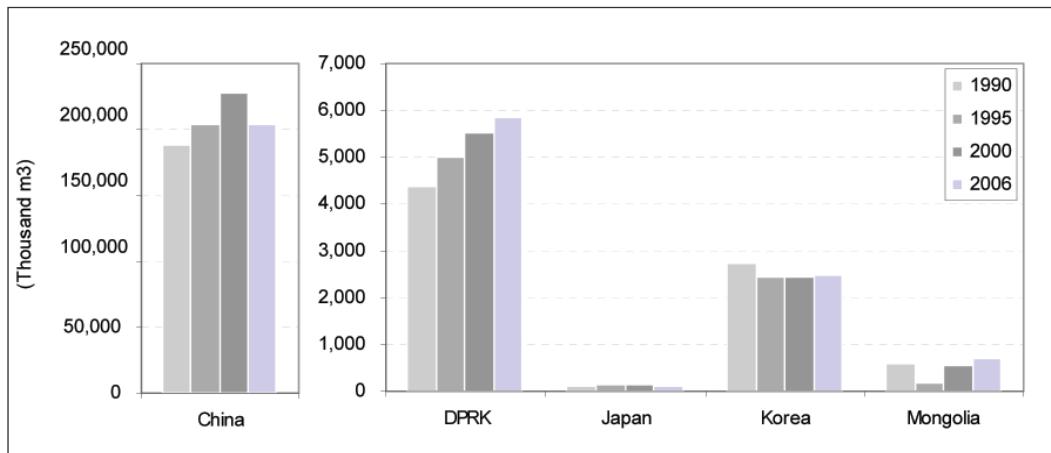


Figure 3.9: Trends in fuelwood consumption (1995-2006)

Source: FAOSTAT.

3.3 Socio-economic importance of the forestry sector

Industrialization of the forestry sector

In Japan, ROK and China, industrialization of the forestry sector is taking place, although heavily concentrated towards the processing end of the supply chain. The pulp and paper subsector – for its economies of scale – is generally among the most heavily industrialized subsectors in any of these countries, often relying on globalized supply chains involving large players like multinational companies or state enterprises from the stump to the wholesaler. Other quickly industrializing subsectors include the wood-based panel industry (particularly plywood) in China.

On the other hand, forest management itself is largely unindustrialized in any of the subregional countries. NWFPs with niche markets (such as rare medicinal plants) and furniture are also generally less-industrialized subsectors, but with strong demand, industrialization trends are easily changed.

Employment

Employment statistics for the forestry sector are extremely difficult to analyse, due to the wide variations in types of employment – from the informal sector, part-time workers, seasonal workers, among others. However official employment figures offer information on emerging trends.

For all countries and regions, absolute numbers of employment in the forestry sector as well as share over the entire workforce have been decreasing over time (**Tables 3.1, 3.2**). Taking into account the increase in overall population in all countries except Japan, the decline in the forestry workforce suggests automation taking over what previously had been manual processes.

In the case of Japan, the decline in employment over the years reflects the sector's challenges in attracting the younger generation. Not only is the size of the labour force engaging in forest management work declining, but the labour force itself is ageing rapidly (**Box 3.4**).

Box 3.4. Ageing of the forestry labour force in Japan

Over time, employment in the sector has contracted substantially, to approximately 50 000 in 2005, and ageing of the labour force has been an outstanding trend. In 2005, over 25 percent of the sector's labour force was over the age of 65 (MAFF 2008). Government efforts to close this labour gap have not had significant success so far, but increased resources are being channeled towards nurturing sustainable forest management businesses and managers. In addition, with recession and mounting redundancies throughout the country, there is heightened opportunity that a win-win game may evolve with the sector securing long-needed labour by absorbing redundancies.

Table 3.1: Share of forestry sector employment over workforce (%)

	1990	1995	2000	2005
China	0.6	0.6	0.4	0.4
Taiwan P.O.C	1.6	1.1	0.9	0.8
DPRK	0.3	0.2	0.3	0.2
Japan	1.0	0.9	0.7	0.6
ROK	0.6	0.5	0.4	0.4
Mongolia	2.5	1.2	0.2	0.1

Source: FAO (2008).

Table 3.2: Number of workers per 10 000 hectares of forests

	1990	1995	2000	2005
China	120	119	84	62
Taiwan P.O.C	44	29	29	24
DPRK	15	16	37	31
Japan	31	24	18	12
ROK	11	12	13	18
Mongolia	15	8	1	1

Source: FAO (2008).

Value added

Gross value added is a measure of the contribution to GDP made by a sector. For the subregion's forestry sector, gross value added for the entire sector (forestry, logging and related service activities; manufacture of wood products except furniture; and manufacture of paper and paper products) increased from US\$77 billion to US\$124 billion (in 2006 US\$ constant) during the period 1990-2006 (**Figure 3.10**, FAO 2008.) This growth is largely reflective of growth in China, which experienced a 3.5-fold increase in gross value addition and the dampened Japanese performance which fell by approximately 25 percent during the same period. For countries with major consumer markets, namely China, Japan and ROK, the biggest contributions to the gross value

added came from the pulp and paper industry, whereas for the countries with smaller forest industries (Mongolia and DPRK), the wood products and logging sectors were the greatest contributors, respectively.

Throughout the last decade, no subregional country's forestry sector contributions to GDP exceeded 2.5 percent and declining trends are still exhibited in Japan and ROK, whereas DPRK and China are exhibiting increase (FAO 2008.)

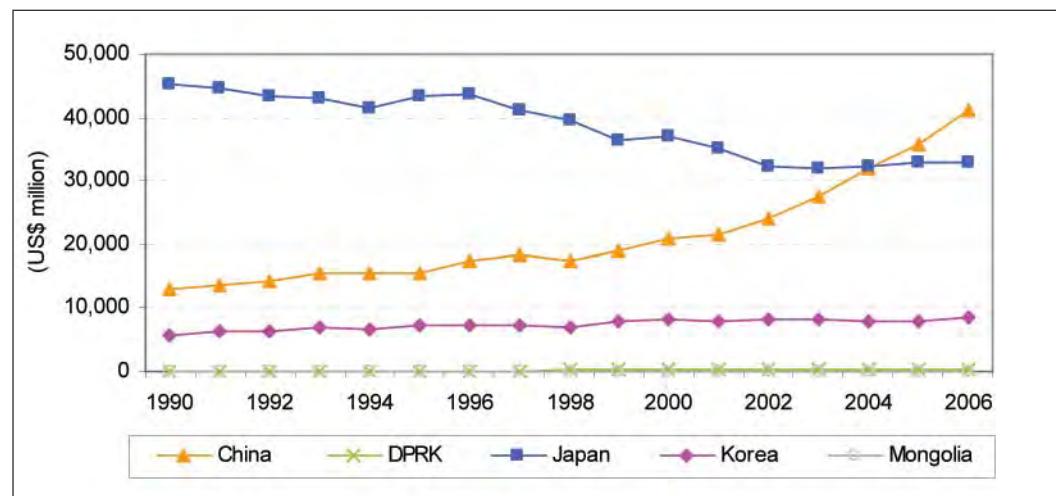


Figure 3.10: Trends of forestry sector gross value added (US\$ million 2006)

Source: FAO (2008).

Rural development and poverty reduction

The forestry sector can play an important role in poverty reduction. In the subregion, poverty reduction targets have particularly been relevant in the emerging economies and low-income countries where poor rural communities depend on forest lands and resources for livelihoods.

In China, the Conversion of Cropland for Forests and Grassland Programme (Grain for Green Programme) implemented as one of the six major forestry programmes is one of the largest forestry projects to have addressed rural poverty reduction by involving millions of rural households across China; it employs incentives mechanisms for rural farmer households that engage in converting croplands on steep slopes into grasslands or forests (**Box 3.5**).

Referred to as the 'Three Agriculture Challenges' in China, striking the right balance between agricultural production, ecological conservation and welfare of the rural population is proving a difficult task. Resource management practices towards sustainable use of timber and non-timber products hold great potential in improving rural forest resource-based livelihoods.

In the context of industrialized Japan and ROK where population and economic activities are largely concentrated in urban areas, forests play an important role in generating employment and are often one of the key industries in the effort to revitalizewaning rural economies. Out-migration and ageing populations leave rural forest-based villages in these countries with an absolute shortage of labour, which slows economic activities. Governments in both countries are promoting the development of the forestry sector as an integral part of revitalizing rural economies and livelihoods (**Box 3.6**).

Box 3.5. The grain for green programme in China

Under this programme, the government offers farmers in-kind or cash subsidies per area of converted cropland in addition to tax exemption on income derived from the converted lands.

The in-kind and cash subsidies offered include:

Grain:	2 250 kg/ha in upper Yangtze river basin
	1 500 kg/ha in upper and middle Yellow river basin
	(or cash equivalent at 1.4 yuan per kg of grain)
Miscellaneous:	300 yuan/ha/year
Cost of seeds:	750 yuan/ha (one time)
or seedlings:	

The duration of subsidies depends on the objective of cropland conversion; two years if the cropland is converted into grassland, five years if converted into economic forests by using fruit trees, or eight years if converted to ecological forests by using tree species such as pine and black locust.

By the end of 2005, over US\$12 billion had been invested in the programme. So far, the programme has benefited more than 100 counties under the poverty line. The programme is said to have been successful in relieving immediate poverty constraints through the provision of in-kind and monetary compensation, but sustaining effects of poverty reduction have been limited so far, with little effect on shifting to off-farm income generation (Zhiyong, 2004). The programme claims also to have improved the ecology of surrounding areas where croplands have been converted, translating into increased opportunities and outcomes in activities such as ecotourism and grazing (*ibid.*)

Box 3.6. ROK's mountain village development project

In ROK, rural villages in mountainous areas expand across approximately 45 percent of the land area, but house under 4 percent of the population – many of whom are senior citizens thus not active participants in the labour force. In view of revitalizing rural economies through generation of industry and jobs, the Korea Forestry Service (KFS) initiated the Mountain Village Development Project in 1995.

The project has involved promotion of local specialized products such as wild ginseng and mushrooms, as well as developing foundations for forest industries and recreation facilities which in turn has further triggered the construction of other rural infrastructure.

By 2006, 138 mountain villages were involved in the project, with another 450 to be engaged during the next period of the Mountain Village Promotion Plan (lasting to 2017). Key tasks identified for the next plan period include increasing the value of forest resources, promotion of mountain village experience tours and workforce training (Kang *et al.* 2008.).

Rural poverty and high dependence on fuelwood use in DPRK and increased incidence of illegal forest activities in both countries suggest that the link between the forestry sector and rural poverty is strong. Donor-funded activities targeting participatory approaches in natural resource management and mainstreaming sustainable forest management are beginning to change the roles of rural populations, but overall information and data on impact on poverty reduction are limited.

3.4 Environmental and social services/functions of forests

Recognition of forests' provision of environmental services has grown considerably in the subregion, both through regulation as well as in public opinion. Conservation of biodiversity, protection against land degradation – particularly desertification in China and Mongolia, watershed management and other social roles of recreational forests – is one of the core functions gaining recognition. In ROK, there is emerging recognition that forest ecosystem services including air purification, water conservation, soil erosion and landslide prevention and wildlife habitat provision outweigh economic benefits from forest products. The climate change agenda and forests' roles in mitigating negative impacts play an important role in advancing forestry in international dialogue and generating public and private sector interest in the sector. In the context of diverse socio-economic conditions, types of forests and conditions of resources, countries are taking varied approaches in adopting measures to account for environmental and social services of forests, with China focused more on regulatory measures, and non-regulatory initiatives gaining more momentum in Japan and to some degree ROK.

Biodiversity and conservation

According to the Global Environment Facility's (GEF) Benefit Index for biodiversity,¹ countries in this subregion range widely in biodiversity wealth, with China ranked among the highest (GEF index 130.4, ranked 4 among 150 countries), followed by Mongolia (29.5 ranked 50), ROK (12.2 ranked 84) and DPRK (4.7 ranked 113).

All countries are signatories to the Convention on Biological Diversity (CBD) and have submitted National Biodiversity Strategy and Action Plans (NBSPs) to the CBD Secretariat. Implementation of activities towards improving national institutions on forest biodiversity include China's development of the Forestry Action Plan for Biodiversity Conservation (1992), the Forestry Action Plan for China's Agenda 21 (1995), the Plan for Natural Forest Resources Conservation Project (2000-2010) and other related plans and programmes. Other countries (Japan, ROK and Mongolia) have also revised forestry laws and protected area regulations to better serve the biodiversity conservation agenda.

Expansion of protected areas and natural reserves has been a central approach in China under its CBD NBSP. By the end of 2007, China (excluding Hong Kong S.A.R.) had established 2 531 nature reserves covering a total land area of approximately 152

¹ A measure for the potential global benefits that can be realized from biodiversity-related activities among GEF-eligible countries. It reflects the complex, highly uneven distribution of species and threats to them across the ecosystems of the world, both within and across countries. The GEF Benefit Index for biodiversity recognizes the richness of available data in some areas of biodiversity through the inclusion of detailed indicators and acknowledges the data gaps in other areas through the inclusion of broad indicators (GEF).

million hectares, or 15 percent of the land area. In Mongolia, expansion of protected areas was particularly vibrant during the 1990s. As of 2007, special protected areas of Mongolia cover 21.9 million hectares (MNE 2009).

Figure 3.11 illustrates general trends in area of terrestrial protected areas in the subregion.

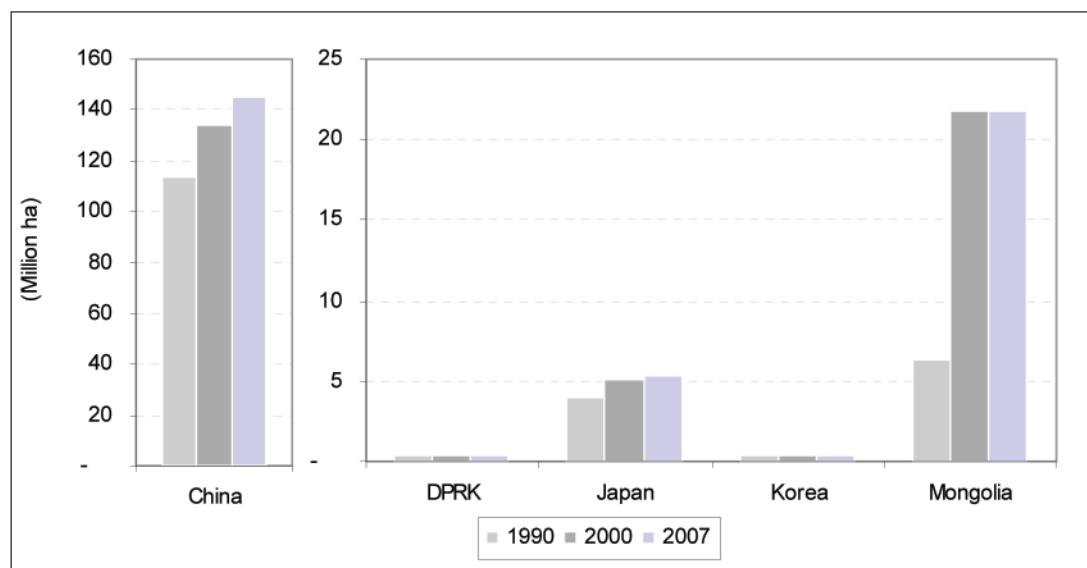


Figure 3.11: Trends in area of terrestrial protected areas

Source: UN ESCAP (2008).

Threats of forest degradation and loss

Forest fires are one of the most prevalent causes of forest disturbance throughout the world. In the subregion, the extent of damage caused by forest fires is most significant in countries with extensive areas of arid climate, namely Mongolia and parts of China. In Mongolia, forest fires annually damage an average of 400 000 hectares, amounting to close to 6.5 million hectares since 1990 (FAO 2009e). Damage from forest fires in other countries in the subregion is considerably lower (**Table 3.3**). Another major source of forest disturbance is insect infestation. China, Mongolia and to a lesser degree ROK and Japan experience this phenomenon (FAO 2010).

Table 3.3: Causes of forest disturbance 2000 (unit: 1 000 ha)

	Fire	Insects	Diseases	Other	Total
China	51	6,191	883	820	177 001
DPRK	46	-	-	-	6 821
Japan	2	0	0	27	24 876
Mongolia	418	2 798	-	-	10 665
ROK	7	340	-	-	6 300
Total East Asia					225 663

Source: FAO (2005).

Other country-specific agents of disturbance include overgrazing in Mongolia, increase in arid conditions in Mongolia and parts of China and poor silvicultural management or abandonment of forests for economic reasons in Japan and ROK.

Desertification is a major threat facing forests and rural livelihoods in the subregion, particularly in China and Mongolia. Close to an estimated one-fourth of China's land mass is desert and that area is further advancing with a desertification rate of approximately 2 460 square kilometres per year (considerably lower than the rate experienced in the late 1990s). However, programmes capitalizing on forests' functions in controlling desertification have resulted in major breakthroughs in the last decade, as China implemented its national action plan against desertification. China is establishing vast areas of plantation each year through government led programmes such as the Beijing-Tianjin Rim Plantation Programme which alone has planted more than 1.8 million hectares in the area. Other government initiatives to combat desertification include encouraging farmers to convert farmland on steep slopes or marginal lands back to forests (UNCCD 2009).

Mongolia also faces severe threats of advancing desertification. It has been reported that occurrences of sand and dust storms in the steppes and desert zones have nearly quadrupled in the last half century, and in the last ten years, Mongolia's arid area extended by 3.4 percent and land affected by desertification extended 5.4 times. Mongolia has also implemented tree-planting activities for protection against desertification and land degradation, but the extent of activities was limited to an average of 7 400 hectares per year during the years up to 2005 (FAO 2005). Actions being taken by the Mongolian Government include implementation of the Green Belt Programme since 2005 in areas between the Mongolian Gobi Desert and the steppe regions, to prevent further encroaching of desertification (**Box 3.7**).

Box 3.7. The green belt programme of Mongolia

In 2005 the Mongolian Government launched an ambitious programme to establish a 'Green Belt' by planting a 2 500-kilometre strip of trees and vegetation over 30 years. The green strip to be planted between the Mongolian Gobi Desert and steppe regions will help prevent the spread of desertification and sand movement, at the same time increasing Mongolia's forest area by 7.3 percent. Social goals are also embedded in the programme. For example, developing agroforestry has been a way of reducing poverty incidence. In the first two years, planting took place in more than 800 hectares in 20 provinces (MNE 2007.)

Watershed functions of forests

Forests play a major role in watershed and water resource conservation. Forest policies of subregional countries recognize forest watershed management as one of the main goals of sustainable forest management.

In China, where securing water resources is a growing and serious concern, the Ministry of Water Resources is working with various agencies including the State Forestry Administration (SFA). The National Water Resource Utilization Plan (2000-2010) was established; it integrates watershed forests into national water resource management planning and maps watershed protection areas. China's Grain for Green Programme (see **Box 3.5**) was implemented with over US\$12 billion (by the end of 2005); it was

designed against the backdrop of major erosion occurring in watershed forests, resulting considerable river siltation. Two to 4 billion tonnes of silt are estimated to have been released each year into the Yangtze River and the middle and upper reaches of the Yellow River, more than half coming from soil erosion resulting from cultivation in sloping areas (Benett and Xu 2005).

Forest functions for watershed management have been deeply rooted in forest management policies and practices in both Japan and ROK. Forest land set aside for watershed protection purposes comprises the largest share of protected areas in both countries, and continues to increase for Japan. In ROK, the 'Green Dam' initiative is being implemented for conservation of forest for water resources near major (conventional) dams (**Box 3.8**).

Box 3.8. The Green Dam initiative in ROK

The KFS in collaboration with the ROK Water Resources Corporation is implementing this initiative to effectively manage upstream forests surrounding large-scale dams. The green dam project was carried out in dams in four forest regions by 2006 and preparation for expanding the activities in 16 other forest regions nationwide are underway (FAO 2009d).

Recreational functions of forests

Regionally, tourism activities have expanded vibrantly, led by countries such as China whose increasing per capita expendable income encourages spending in leisure activities, where spending was previously limited. Ecotourism is one of the strongest growth sectors within tourism, which has become increasingly popular in several subregional countries, both through international and domestic tourists.

In Japan and ROK, where public awareness of forests' ecological and social roles is rising, there is a strong rising trend in domestic visitors to forests for recreational purposes. In Japan, the number of visitors to forest-related recreational facilities reached 130 million in 2007. In 2008, a law was passed on the promotion of ecotourism. In ROK, the number of visitors to forest recreational facilities reached 30 million in 2007. For ROK, this translates into an increase of approximately 5 million visitors in a decade since 1995. Factors contributing to the growth in ROK's forest recreational facilities include the introduction of the five-day work week, increased per capita expendable income as well as supply-side incentives such as government subsidies offered to forest owners for development of forest recreational facilities.

While increased exposure to human activity raises risks for sustainable forest conservation, studies indicate that in many countries, ecotourists tend to be well-educated, interested in learning about the natural environment and concerned about environmental issues. Forest recreation and ecotourism activities provide opportunities which promote further understanding of the multifunctions of forest to this growing segment of the population.

Forests and climate change

Governments in the subregion are taking a serious position in maximizing the role of forests in mitigating and adapting to climate change.

Forests are a central part of China's climate change strategy and are identified as one of the key areas in both mitigation and adaptation measures for climate change according to the national climate change programme. Under mitigation measures, policies and programmes will be enhanced to promote further afforestation activities to increase carbon sinks and also to offer ecological services and functions vital for adaptation strategies. So far, the government has launched campaigns and programmes nationwide to promote tree-planting and enhance forest ecology restoration and protection. These efforts have led to one of the fastest rates of forest cover expansion in the world and the resulting area of plantations in China is unmatched. The first, and for a long time, the only Clean Development Mechanism (CDM) forestry project in the world was in China, through assistance from the World Bank. According the National Climate Change Programme 2007, from 1980 to 2005, 3.06 billion tonnes of carbon were absorbed through afforestation activities, another 1.62 million tonnes through forest management and 430 million tonnes through avoided deforestation.

In Japan and ROK, forests have also been incorporated as a central part of the climate change agenda, through the governments' strategies for enhancing carbon sinks, in order to meet the Kyoto Protocol commitments (**Box 3.9**). Both countries are focusing primarily on forest-tending activities such as thinning to enhance the carbon sequestration capacity of existing planted forests. Other initiatives being taken in both countries include promotion of urban tree planting, prevention of forest degradation and use of forest biomass as an alternative energy source.

Box 3.9. Japan's forestry sector contributions to the Kyoto Protocol commitment

In 2007, the Japanese Forestry Agency launched a campaign to fulfill Kyoto Protocol commitments. At the core of the campaign is a long-term vision in forest stewardship - for cultivating an ecologically sound and aesthetically beautiful forest for the next generations, 100 years ahead. The campaign aims to identify and foster entrepreneurship in forest resources management and industry. More specifically, the government is promoting a major nationwide thinning operation covering over 3.3 million hectares by 2013. Work focusses on forests where appropriate management was abandoned in the past, largely due to lack of economic viability. Outcomes should include the advancement of ecologically-sound mixed-species, multiple-storey forests and replacement of unmanaged monoculture plantation forests, which are less effective as carbon sinks.

4

CHAPTER 4 KEY DRIVERS OF CHANGE TO THE YEAR 2020

Part I visited the current state of forests and forestry sectors in the subregion to identify the shifts in various dimensions in respective subregional countries.

The recurring message for all economies is the increasing and diversifying demands on forests. China's growing demands for forest products are likely to place increasingly severe pressures on forests. In the case of Japan and ROK, the growing awareness of social and environmental issues is carving out new trends in ecotourism and urban forests. The drivers of these shifts are reflective of the socio-economic trends and contexts of countries.

The mounting demands for the forestry sector will continue to be determined by trends which take place in sectors outside forestry, and forestry sector proponents will need to be able to respond. Thus, forecasting the outlook for forests and the forestry sector should benefit from a review of changes in society, exogenous to the forestry sector.

This chapter visits certain drivers of change that are considered key factors in characterizing the outlook of countries in the subregion, based on the identification done by authors of country papers. Factors which determine societal change differ based on the context of respective societies. Also, the same factors may affect different dimensions of different countries in their ways forward.

4.1 Overview of the changing characteristics in the subregion

According to country papers¹, all subregional countries identified demographic trends as a major contributor to societal change. All countries with the exception of Japan also identified the economy and economic factors as key drivers of change in the decade ahead. The key exogenous drivers of change identified for the next decade are listed in **Table 4.1**.

¹ DPRK is not included, as a country paper was not commissioned.

Table 4.1: Key exogenous drivers of change by country

	Demographic trends	Economy	Energy demand	Institutional capacity	Social & environmental awareness
China	X	X	X		
Japan	X				X
ROK	X	X			
Mongolia	X	X		X	
China	National economic development; Urbanization; Energy security; Economic globalization.				
Japan	Rapidly declining birth rate and an ageing population; People's awareness of quality of life including safety and health concerns.				
ROK	Changes in population; Changes in income; Expansion of markets as a result of the World Trade Organization's (WTO) Doha Round and Free Trade Agreement negotiations; Investment in forests, competitiveness and technology.				
Mongolia	Institutional, legal and structural changes; Impacts of climate change and desertification; Economic development; Population growth; Community-based forest resources management				

Source: APFSOS II country papers.

4.2 Demographic drivers

Demographic conditions vary widely among countries in the subregion. Mongolia is one of the world's most sparsely populated countries, whereas ROK is one of the densest. The size and median ages of the population also differ widely, but common to all countries, while overall size of population will stabilize in the next ten years, significant shifts will take place in age structure of population, preferred lifestyles and resulting social values.

Population growth

By 2020, populations of subregional countries will stabilize, with an annual population growth of 0.34 percent for the subregion as a whole (UN DESA 2007). Mongolia will exhibit growth over 1 percent, whereas Japan's population will continue to shrink as has been the trend since it entered a negative growth phase in 2006. China's annual population growth has been at less than 2 percent since the late 1970s, due to the strictly enforced government population control policy. Nevertheless, China's overall population will continue to increase in the next decade and reach 1.45 billion with total fertility rate at 0.18 percent by 2020. ROK's growth rate will continue to be below 1 percent (UN DESA 2007) and peak in 2018 after which negative growth will set in.

Urbanization and pressures on land

The subregion's share of urban population was at 46 percent, as of 2007, a little over the Asia-Pacific region's average of 41 percent (UN ESCAP 2008). This rate is mostly reflective of China's relatively low (though growing) urbanization rate at 42 percent as of 2007. Other subregional countries all had urban populations exceeding 50 percent, with Mongolia at 56 percent, DPRK 62 percent, Japan 66 percent and ROK the highest at 81 percent.

Box 4.1. Urbanization and its implications for ROK

ROK is among the world's most urbanized countries and also one of the most densely populated. Further population increase in urban areas and ageing of populations in rural areas will have significant implications for rural industries and land use.

Implications may include an increase in rural wages owing to the shortage of an active labour force. With higher wages, industries such as forestry may suffer from lack of economic viability and in ROK the vast area of forests will be in need of tending in the coming years.

In urban areas, larger populations will increase demand for land for housing, industrial facilities and infrastructure. Increased urbanization will diversify demands on forests, particularly for services. This may result in conflict of interest between the urban proponents of the ecological and social functions of forests and proponents of maintaining the productive functions of forests.

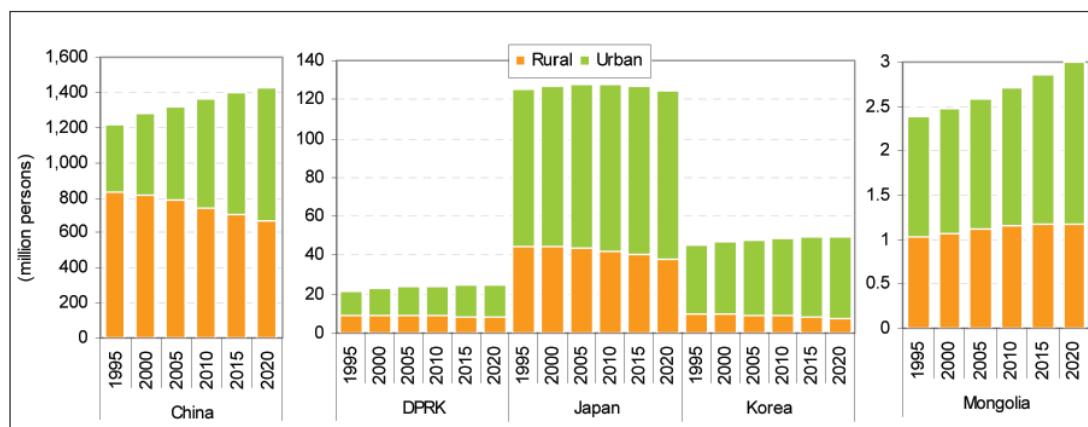


Figure 4.1: Urban-rural population growth trends (2010-2020 are projections)

Source: FAOSTAT.

In all subregional countries, urban population growth is outpacing rural population growth (**Figure 4.1**). ROK expects more urbanization, despite its already extremely high rate of urban residents. In ROK, urbanization, increased expendable income, exposure to increased opportunities for education and generational shifts are expected to further trigger differences in lifestyles, preferences in consumption trends and changing demands in areas such as leisure activities, which may have significant implications on forests.

In China, urbanization and resulting development of housing and other urban facilities have expanded urban areas at a rate of 340 percent in the last 25 years and 145 percent in the five years leading up to 2005. China is projected to continue rapid urbanization with rural populations migrating out to urban towns for better work opportunities. Urbanization rates in China will increase by 5 to 8 percent per year bringing the urban population to 54.6 percent by 2020 (FAOSTAT). The Government of China has set future quotas for area of farmland, against a backdrop of an expanding urban population, and increasing concern for food security. According to the agriculture ministry, China will need at least 123.3 million hectares by 2030 to attain the minimum food self-sufficiency rate set at 95 percent (Yan undated). In China, forests are expanding owing to massive plantation efforts led by the government.

The impacts of increasing demand and land constraints are not confined within national boundaries. In fact, the large import dependence of Japan, China and ROK threaten land and resources in other parts of the world. Major Chinese and Korean investments buying up tracts of land for bioenergy and food crops in Africa are being reported as 'land grabs' and 'neo-colonialism'. Investors are not limited to private companies with financial interest, but also government and its affiliated companies (The Economist, May 2009). With growing population, economies and resulting resource constraints, the next decade may meet further appetite for investing in foreign lands and resources. What could be at stake in these foreign countries where the 'land grabs' occur is conversion of land use such as natural forests and important ecosystems, access to farmland among the rural poor without legal land titles, as well as access to food among local populations when crops produced on these lands are exported.

Changes in age structure: increasing median age

The median age – the age at which half the population is older and half is younger than that age – is increasing for all subregional countries and this trend is projected to continue throughout the next decade (**Figure 4.2**). In China, Mongolia and DPRK, the median age will shift from 30 to 35 by 2020. This indicates the advance of a sizeable work force, which may generate diverse types of demands including for forest products and services.

Japan and ROK, whose median age already surpasses 35 (as of 2009), will have populations with more than 20 percent belonging to the elderly age group by 2020 (34.3 percent for Japan and 23.1 percent for ROK). Japan and ROK are on a trajectory to become two of the leading high-age societies of the world, and their median ages will reach over 50 by 2050, based on a medium variant projection (UN DESA 2007).

The long-term challenges for the Japanese economy are ingrained within the demographic structure. The implications of a growing share of elderly population will be a shortage of labour and therefore reduced industry output, but on the other hand, increased share of consumer spending in the GDP structure – particularly for services and a corresponding shift to a services-oriented industry structure.

China's population of 60 years and over is projected to grow at 3.2 percent per year reaching over 16 percent by 2020 (FAO 2009b). Average life expectancy in China is expected to be 76 years in 2020 (from 72 years in 2006).

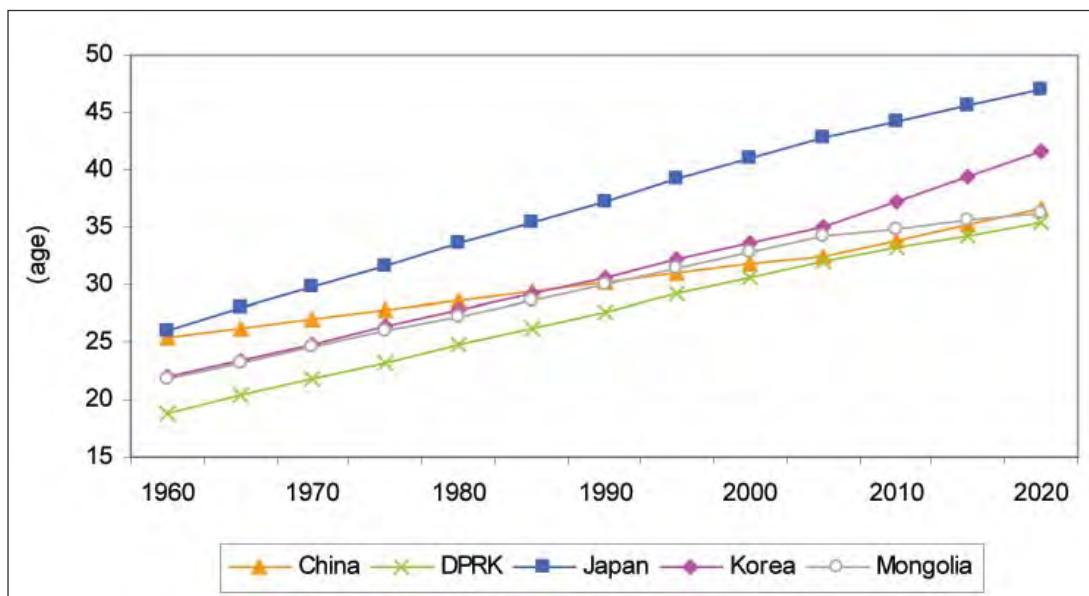


Figure 4.2: Median age (2005-2020 are medium variant projections)

Source: UN DESA (2007).

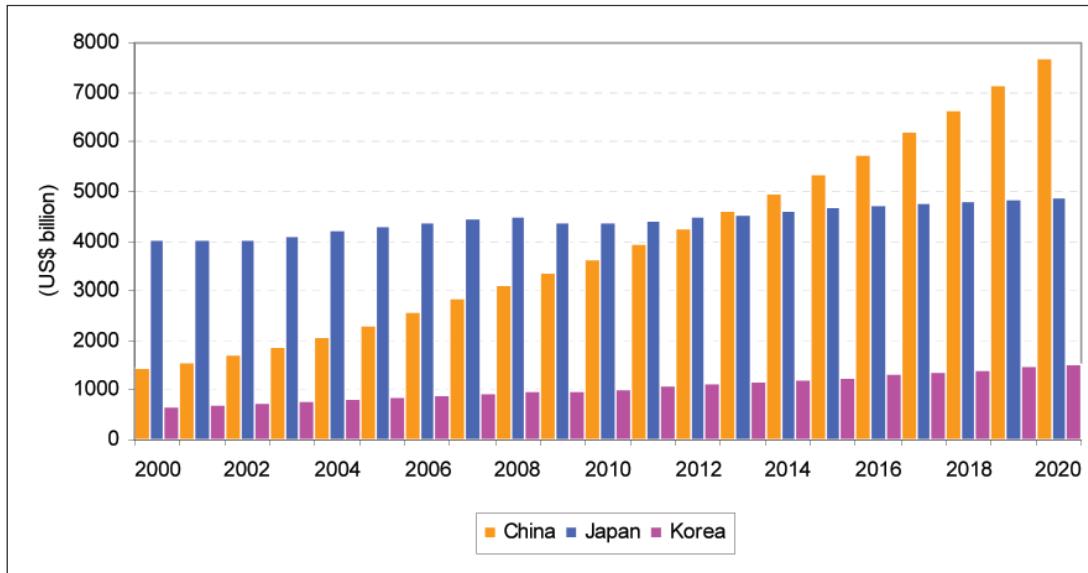
4.3 Economic drivers

The implications of macroeconomic development are enormous for any industry, including forestry. Particularly for countries experiencing major growth (such as China) and countries whose economies are closely linked to these growth centres (such as Mongolia and DPRK), decelerated or staggering growth in the economy will have major implications on industrial output, on employment, consumer spending and ultimately may also affect political stability. The forestry sector will also not be spared under such scenarios.

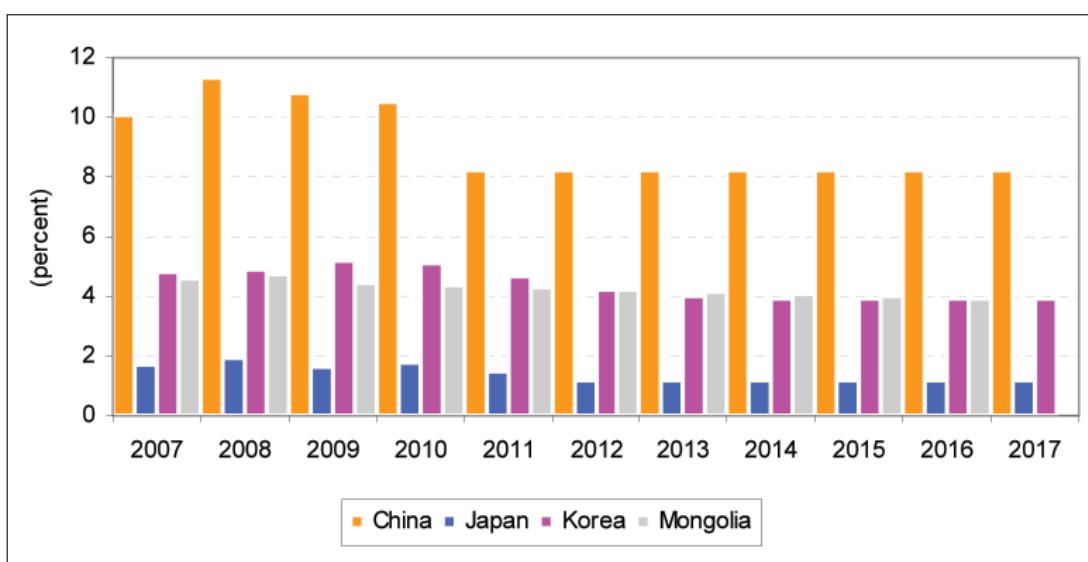
Long-term projections in GDP and macroeconomic conditions

Since the mid-1990s, China has emerged from the lower income country group into the lower-middle-income country bracket. In 2007, per capita GDP (PPP adjusted) exceeded US\$5 000. Strong macroeconomic performance and structural changes in China's economy provide good grounds for development aid donors to pull out. The only country in the subregion that remains classified in the lower income country bracket is DPRK (World Bank 2009).

The long-term economic outlooks for countries in the subregion are mixed. Though there is little doubt of China's growth and Japan's economy eventually leveling off, how these economic trajectories may unfold in terms of the temporal span is unclear, and has huge implications. How and when countries and the world will pull out of the downturn will significantly affect forestry for all countries, compared to the strong performance experienced in the past decade. According to projections made by the Organisation for Economic Co-operation and Development (OECD) and the US Economic Research Service, real GDP growth up to 2020 is forecast to slow, averaging 5 percent for the subregion (Figure 4.3). Countries will range widely in real GDP growth, with emerging economies performing as high as 8 percent annual growth, and maturing economies performing at less than 1 percent (Figure 4.4).

**Figure 4.3: Real GDP growth trends and projections (2005 constant price)**

Source: Economic Research Service (2009).

**Figure 4.4: Annual GDP growth projections**

Sources: OECD/FAO 2008; Economic Research Service (2009).

Box 4.2. Short-term projections and the impacts of the global economic downturn

The long-term economic outlook for the subregion remains unclear, as impacts of the recent global economic downturn have hit countries hard. China, despite its rapidly expanding domestic economy has shown signs of vulnerability. Real GDP growth is expected to slow to 6.5 percent for 2009, recovering to 7.3 percent in 2010 (EIU 2009b). The primary cause for the slowdown is shrinking global demand for the export-oriented sectors along with reduced investments. The government

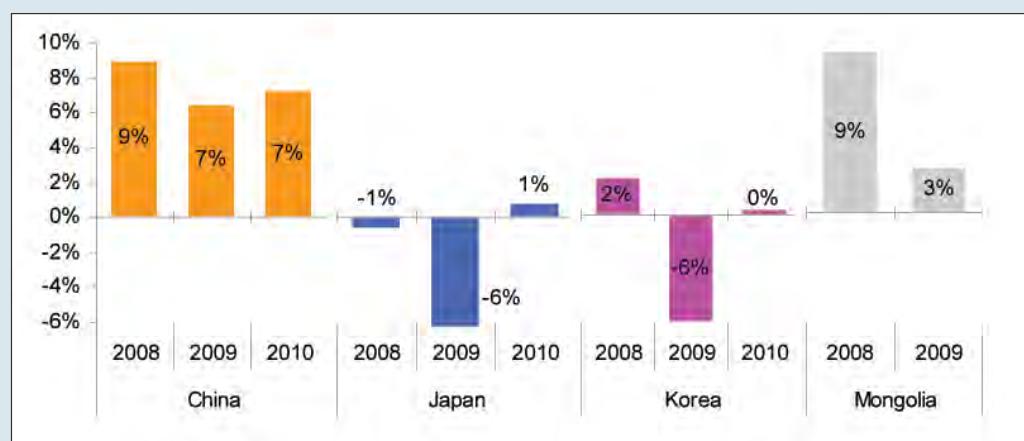
has responded with fiscal stimulus and a loosening of monetary policy. Despite reductions in demand from construction since the 2008 Beijing Olympics, domestic demand is expected to be regained through private consumption growth and increases in government spending.

The global economic recession is also taking a toll on Mongolia's economy. In particular, the slowdown in China's economy, which was the destination for over 70 percent of Mongolia's exports in 2007, has had major implications. A number of interventions, including a bailout for commercial banks, stimulus packages and an emergency loan from the International Monetary Fund (IMF) and other donors in early 2009 have been taken. GDP growth is, however, expected to drop significantly with recovery expected in 2010 (EIU 2009c; EIU 2009f).

The global downturn has had major implication on ROK where recent economic growth has been closely related to exports of goods and services. Real GDP is expected to contract by 6 percent and recover by 2010 (EIU 2009e). Though information on DPRK is limited, it is projected that the economy may also be subject to downturn as demand in China, its main export market, declines.

Japan entered recession in 2009 and the outlook for the economy for the next few years is poor (DIR 2009). According to the Economist Intelligence Unit (EIU) forecast, real GDP growth for financial year (FY) 2009 will be as low as a negative 6.4 percent, with a marginal recovery expected in FY 2010 (EIU 2009d). The 2008 Annual Report on Japanese Economy and Public Finance (Cabinet Office, Japan 2008) suggests that there is a need to modernize corporate governance mechanisms to become more responsive to stockholders, particularly among more traditional, small- and medium-size enterprises.

Real GDP growth rates trends (2009 and 2010 figures are forecasts)



Sources: EIU (2009b,c,d,f).

Income and per capita spending

Macroeconomic growth brings greater per capita incomes and spending. GDP per capita is expected to grow by an average 7 percent annually in China and double the current level by 2020. Annual average growth rates will be approximately 5 percent for Mongolia, 4 percent for ROK and 1.4 percent for Japan during the years up to 2020 (**Figure 4.5**).

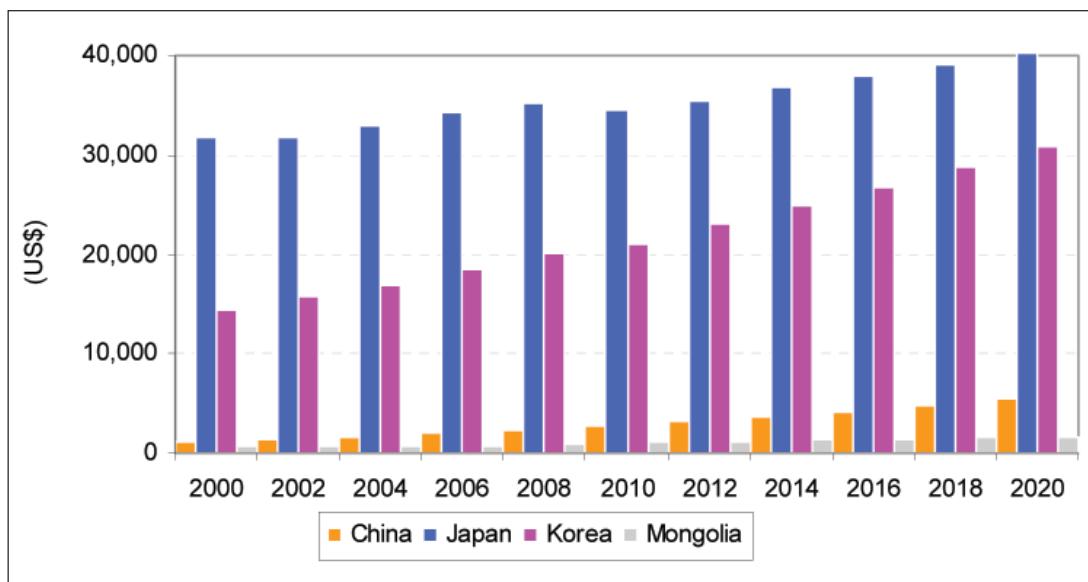


Figure 4.5: Real GDP per capita growth projections (US\$ 2005)

Source: Economic Research Service (2009).

Poverty and socio-economic disparity

The Asia-Pacific region in general, and East Asia in particular, have experienced major achievements in poverty reduction during recent decades. In the subregion, the proportion of the population living on less than US\$1.25 a day declined from 60.1 to 15.9 percent between 1990 and 2005 (UN ESCAP 2008). This was led by strong poverty reduction performance in China, which effectively outweighed the reverse trend in countries such as Mongolia where poverty incidence increased. Income inequality between urban and rural settings and between regions is increasing even in China where overall poverty reduction performance has been outstanding. The government's figures for annual household income per head were more than three times the equivalent figure for rural households (EIU 2009g).

In both emerging economies of China and Mongolia, disparity between the urban and rural populations will grow as urbanization trends set in more strongly. In China, disparity of per capita income between the urban and rural residents is projected to be more than double by 2020 (FAO 2009b.) Disparity between the urban and rural residents will not only be economic, but also filter into socio-cultural differences as the emerging (often younger) upper class cultivate new urban cultures and lifestyles influenced through globalization.

Structural changes in the economy

In recent years, the share of the agriculture sectors in national economies has shrunk in most countries of the subregion, largely owing to industrialization.

The agricultural populations of these countries has also decreased. The biggest share of agricultural population is still in China, where 67 percent of the labour force belonged to the agricultural sector as of 2000, but it is projected to decrease to 61 percent by 2010. However, this rate does not account for the inflating unregistered migration taking place from rural to urban settings, against the backdrop of an expanding industry and manufacturing sector capitalizing on low wages. In Mongolia, the agricultural population is decreasing as well, from 25 percent in 2000 to a projected 18 percent by 2010 (**Figure 4.6**).

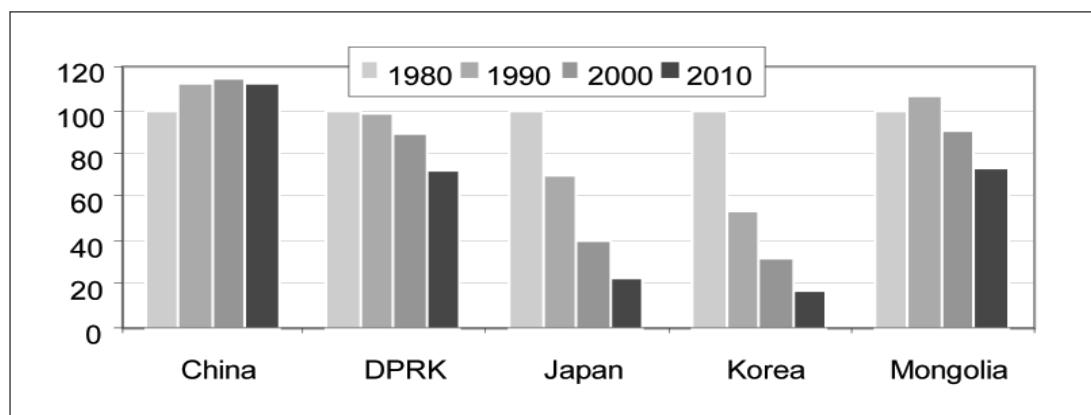
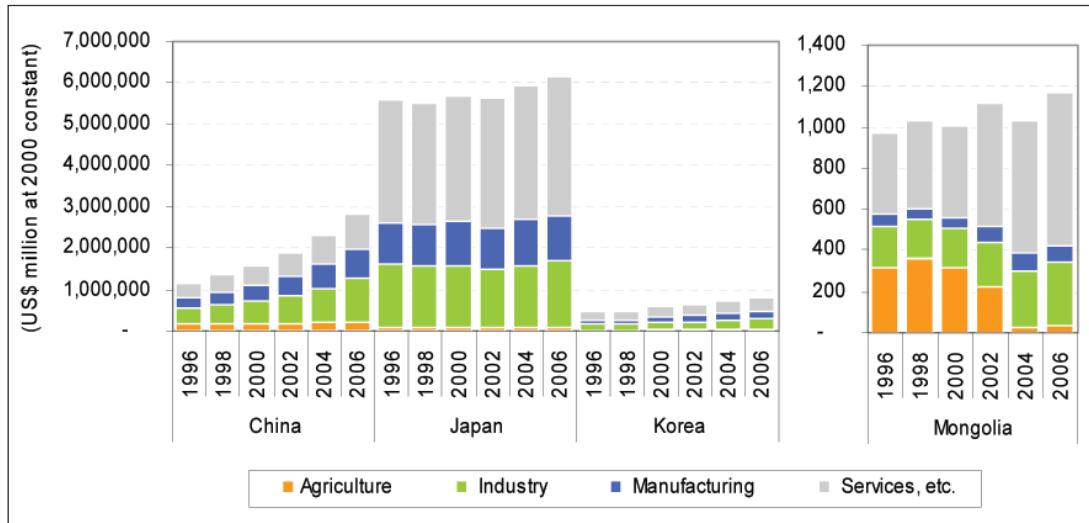


Figure 4.6: Trend of total agricultural population (Index 1980=100)

Source: FAOSTAT.

Shares in contributions to the economy by sectors will also shift. China, despite its relatively large official agricultural population, will have growing contributions in the industry, manufacturing and services sectors, while the economic contributions of the agricultural sector will remain more or less constant in the coming decade. Other countries will also experience growing contributions in the services sector and a relative decline in the agriculture sector (**Figure 4.7**).

Following this trend, the predominantly agrarian economies are expected to gradually shift to industrialized economies in the coming years.

**Figure 4.7: Trends in value-added contribution to GDP by sector**

Source: (World Bank 2008).

International trade, globalization and its impacts

In this age of globalization, market movements offshore have significant implications at home. As the world has learned through the recent experiences of the global economic crisis, some countries are more prone to such cross-border repercussions than others, nevertheless, very few countries, if any, are completely spared. Globalization obviously has positive impacts as well, with increased ease in flow of information, financial, human, natural and other types of capital.

For the subregion's forestry sector, globalization's main impacts are manifested in timber and NWFP trade; foreign investments, including Timber Investment Management Organizations (TIMOs); carbon financing and international aid for forestry sector projects; flow of international ecotourists; and the influence of international civil society organizations on the forestry dialogue. But the impacts of globalization in sharing of information and ideas cannot be underestimated.

The extent and nature of globalization of countries in the subregion vary. Trade climates of an economy generally reflect the extent of economic globalization of the country (Inoguchi and Nair 2009). For the subregion, economies can be clustered by the degree of globalization and conducive trade climates. Highly globalized economies include the industrialized countries of Japan and ROK as well as the regional economies of Hong Kong S.A.R. and Taiwan P.O.C.. Hong Kong S.A.R. has a particularly enabling environment for trade which is strategically open to international trade and investment. China, an emerging powerful player in global economics and trade in recent years is increasingly globalized in certain aspects – its quality and availability of transport services is ranked 17 in the world – but overall, China lags behind the industrialized economies. Some of the major challenge areas for China are tariff and non-tariff barriers, transparency in border administration and improvement in the regulatory and security environment. Mongolia and DPRK have various trade constraints; consequently they lag in the degree of globalization (**Table 4.2**).

Table 4.2: Enabling trade climate indices (2007)

	Overall		Market access		Prevalence of foreign ownership		Transport and communication infrastructure		Business environment	
	Ranking	Score	Ranking	Score	Ranking	Score	Ranking	Score	Ranking	Score
HongKong	1	6.04	1	6.66	3	6.4	4	5.66	2	5.84
Japan	13	5.43	4	5.86	82	4.7	13	5.42	35	4.9
Taiwan	21	5.15	38	4.83	39	5.4	15	5.37	22	5.13
ROK	24	4.95	72	4.07	55	5.2	19	5.23	30	5.02
China	48	4.25	71	4.07	94	4.4	36	4.15	77	4.28
Mongolia	93	3.38	69	4.08	53	5.2	87	2.89	91	3.98

Note: Economies are ranked among 118 economies; scored on a scale of 1-7.

Source: World Economic Forum (2008).

All countries and economies have gained accession to the World Trade Organization (WTO) except DPRK. Bilateral and regional trade agreements such as Free Trade Agreements (FTAs) involving the subregional economies have proliferated in the past decade, including over ten notified to the WTO. Japan has engaged in bilateral trade agreements with Singapore, Mexico, Malaysia, Chile, Thailand, Brunei Darussalam, Indonesia and the Philippines. ROK's bilateral partners are Chile, Singapore and the United States. Japan, China and ROK have all entered into plurilateral agreements under the Association of Southeast Asian Nations (ASEAN).

Energy demand

China, DPRK and Mongolia have recorded extremely high levels of growth in annual per capita energy consumption, particularly since 2000 (UN ESCAP 2008). Major sources of energy in China, Mongolia and DPRK are peat coal, whereas Japan and ROK are bigger consumers of oil.

Though fuelwood use accounts for less than 1 percent of wood produced in Japan (FAO 2009a), utilization of wood biomass is being promoted as part of the government's initiative in attaining climate change goals as agreed in the Kyoto Protocol. The primary forms of use have been waste-wood boilers in factories, including some that generate electricity and pellet stoves. Wood biomass utilization in Japan was reported at approximately 7 million tonnes in 2005. Over half of this was waste materials from sawmills and the remainder, waste material from construction sites (MAFF 2005).

China's energy demand is projected to grow along with its economy. According to the International Energy Agency (IEA), China's per capita consumption level in 2005 was 1.1 tonnes of oil equivalent (TOE) but this will increase to make the country one of the biggest consumers of energy by 2010 and will expand to double its 2005 consumption level by 2030 (IEA 2007). Primary energy (energy forms that have not been converted) consumption in China is projected to increase at an average annual rate of 2.8 percent and would amount to 2.9 billion TOE, around two times that of 2004 (Komiyama 2008). According to the national mid- and long-term development plan for renewable energy, the government aims to increase biomass power generation from agriculture and forestry by-products six-fold in the next decade up to 2020 (NDRC 2007). Since 2006, 4 million hectares of pilot 'bioenergy forests' – plantations of oil-producing tree species – have been established in several provinces throughout the country. The SFA of China has set further goals to establish 13.33 million hectares of such forests by 2020 towards biofuel production (Ministry of Environment and Protection, China 2008).

Energy demand per capita for Japan is among the lowest in developed countries. The level of household consumption of energy for Japan roughly equals the amount of per capita residential energy consumption of the United States (TOE 7.9; MoE, Japan, 2008). However in Japan, the amount of energy consumption per household is growing, as is the number of households.

Per capita energy consumption in the subregion during the period 1990-2006 is illustrated in **Figure 4.8**.

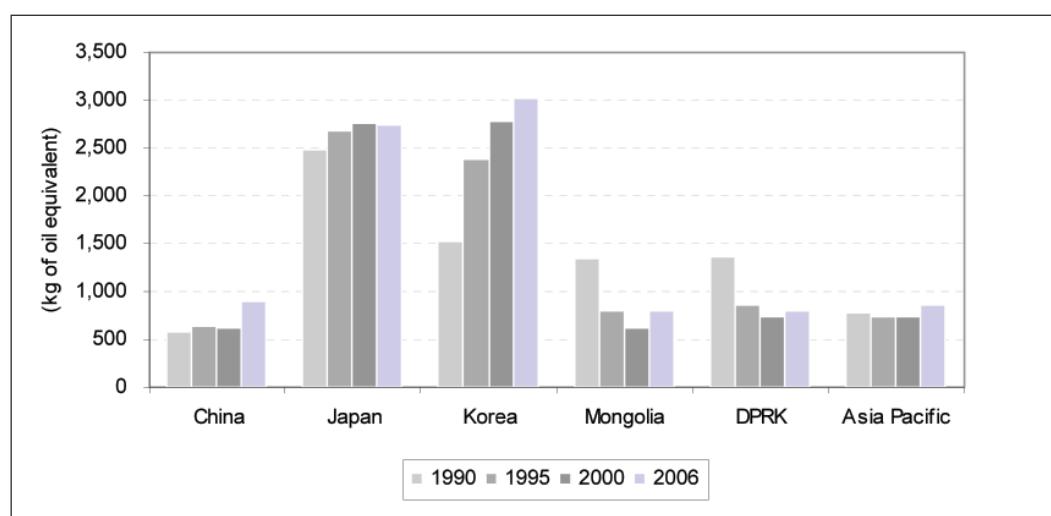


Figure 4.8: Per capita energy consumption in East Asia

Source: UN ESCAP (2008).

4.4 Environmental concerns as drivers

Environmental threats

Imminent threats to forests and other ecosystems in the subregion include a host of biotic and abiotic factors such as forest fires, pests and diseases. The increased threats posed by these factors are closely linked with climate change. The result can be loss or fragmentation of habitat, appearance of invasive species and extinction or migration

of species among others. With negative modifications in ecosystems, some important environmental services will also be at threat.

Climate change threats include expansion of semi-arid dry lands or turning semi-arid into fully arid areas in parts of China and Mongolia. It is estimated that an average temperature rise within one degree can lengthen the wild fire season in the drier ecosystems by 30 percent (World Bank 2007). As drier micro-climates expand, this offers favourable conditions for pests and diseases as well as wild fires to spread. In recent years in Mongolia, large-scale forest disturbance occurred in 1996 and 1998 when Mongolia experienced extremely dry climate conditions, coinciding with a period of weak state management as market reforms were being launched (IFFN 2007).

A critical climate change vulnerability for Mongolia is its pastoral lands, which sustain the livelihoods of its rural population. Adverse impact of climate change on pastoral land availability would threaten forage yield, livestock productivity, food production capacity and livelihoods. Occurrence of extreme hot and cold weather conditions, droughts, floods, sand storms and degradation of permafrost have all already been observed over recent years, indicating signs of climate change. The recent transition to a market-orientated economy also adds to the complexity of issues being faced by the rural livestock sector. Privatization has encouraged intensification of traditional herding practices and overgrazing is becoming more rampant, with impacts on forest fodder.

Forest ecosystems are also vulnerable in the face of climate change. Globally significant forest ecosystems extending in the Mongolian part of the Siberian Taiga are experiencing northerly retreat due to dry climate conditions and moreover, disturbance from human activity including overgrazing by livestock and overharvesting for fuelwood and other uses (World Bank 2003). Shortage of fuelwood supply will also be a major concern for the rural population that relies completely on fuelwood for energy. Increasing capacity to implement adaptation strategies will be critical for sustaining rural Mongolia's livelihoods and natural resources.

In China, some of the monitored long-term impacts from climate change have been the increase in air temperature, decrease in precipitation (particularly severe in northern China), significant increase of precipitation in southern and southwestern China, extreme climate and weather events such as droughts in the northern and northeastern regions, while the middle and lower reaches of the Yangtze River and southeastern China have been hit by major floods. Predictions for the future provide even harsher outlooks with increase in annual mean air temperature by up to 2.1° by 2020, precipitation rise by up to 3 percent in certain regions while in other areas arid areas are likely to increase with the risk of desertification, as well as sea level rise and melting of glaciers.

Loss of environmental services such as in watersheds in China is already evident particularly in the northern provinces. Droughts and floods caused by climate change in China during 1998 and 2004 are estimated to have resulted in economic losses of around 1.2 percent and 0.8 percent of the GDP respectively (World Bank 2007).

Information for DPRK is limited. Nevertheless, resource constraints in DPRK and resulting food insecurity are said to be at extremely severe levels. The problems facing DPRK are unique from other countries in the subregion, due to its limited economic and social integration with the rest of the world. But one of the major contributing factors to the vulnerable situation of the country has also been environmental threats. Natural disasters including severe flooding and drought conditions devastated the country in the late 1990s and continue to put the population at risk of food insecurity in more recent years. Despite improvements in agricultural infrastructure in recent years, the overall food security situation appears to remain vulnerable.

Political commitment to climate change and other international and global agendas

A number of subregional countries are among major greenhouse gas GHG emitters – namely, China, Japan and to a lesser extent, ROK. While China contributes immensely to climate change, it also suffers seriously from its negative impacts. Against mounting national and international pressure (peaking with the 2008 Beijing Olympics), the Chinese Government came out with its first national plan of action against climate change in 2007 and a white paper for addressing climate change in 2008, sending out a clear message of the government's position to address China's responsibilities for climate change challenges. These policies continue to deliver on China's position of adamantly rejecting an emissions cap on the grounds of its developing country status and being under world average levels of per capita emissions.¹ Nevertheless, recent developments regarding its position to possibly accept an emissions target relative to economic growth brings hope for a post-Kyoto climate change regime (Guardian, 19 April 2009).

Box 4.3. Improvements in China's energy efficiency

Some of the most significant efforts by China in addressing climate change and environmental issues have been through clean energy technology and energy efficiency promotion strategies. Often overshadowed by overall increases in energy consumption, China has nonetheless reduced its energy intensity (energy consumption per GDP output) to 38 percent of 1980 levels (World Bank 2007). According to China's National Climate Change Programme, while annual GDP growth of 10.2 percent was achieved between 1991 and 2005, energy consumption increase was only 5.6 percent *per annum* (China's National Climate Change Programme 2007). Improvements in energy efficiency are influenced to a great extent by the introduction of energy-efficient technologies and machinery in the major energy-consuming industries.

Japan projects itself to play a leading role in the global environmental agenda. Despite the recent recession, which may likely dampen the mood for investment into areas such as environmental protection, Japan's international commitment in fighting climate change is expected to remain strong, and translate into various government initiatives which prompt environmental spending. Domestically, the environmental agenda will be addressed through government led initiatives such as: development of low-carbon emission community models; further launching of energy saving campaigns for factories, offices and homes; environment taxation schemes; and establishment of a national carbon emissions market. Japanese energy efficiency technologies already considered to be world-class, can be expected to further advance with government subsidies aimed towards research and development, against the backdrop of increasing levels of energy consumption at least till 2015. Forests will also receive substantial attention in the hope of filling the gap to meet Japan's goals in reducing carbon emissions. Recently, Japan approved its first set of carbon offset projects to innovative schemes designed to help

1 China's per capita annual consumption of energy is 1 131 kilograms of oil equivalent, a little lower than the world average of 1 226 kilograms (UN ESCAP 2008), while for electricity, consumption is still at approximately one megawatt-hour, or approximately half of the world average (World Bank 2007.).

smaller enterprises and entities to cut carbon emissions. The initiative is expected to play an increasing role in engaging more players to meet its Kyoto Protocol commitment.

ROK's emissions have risen almost 100 percent above 1990 levels while national income per capita has more than trebled in the same duration. The government has been implementing its climate change action plans under the United Nations Framework Convention on Climate Change (UNFCCC) and has recently been signalling strengthened commitments.

ROK's position is to proactively engage in the climate change agenda but not to undermine economic growth, as expressed in the government motto 'Low Carbon and Green Growth'. This position is also underpinned through the recent announcement for release of funds between 2009 and 2013 amounting to over US\$85 billion as part of an economic stimulus package; a major share will be earmarked for 'green growth' investments for research and development in energy-efficient technologies, renewable energy technologies, such as solar and wind power, hybrid cars and biofuels, as well as restoration of waterways and forest projects among others (Guardian, 21 April 2009; Business Green, 7 July 2009). The government is stepping up its commitment in the international arena to meet another challenge in playing a role in bridging the gap between developed and developing countries by commencing a voluntary reduction target in the near future.

The CDM of the Kyoto Protocol and other voluntary carbon market mechanisms have played particularly important roles in getting various sectors involved in the climate change dialogue. Though the CDM itself has generated limited impact on the forestry sector, it has spurred significant changes in other sectors. China has also been the biggest CDM project host country with a large margin over any other country (73 percent of all emissions were sold in China in 2007). It has also been home to the first and for a long time the only forestry sector CDM project in the world. The climate change agenda and its market-oriented mechanisms have offered the forestry sector opportunities for financing and renewed political commitment towards sustainable forest management. There is a stronger culture of understanding and support for the forestry sector as a crucial player in the fight against climate change. Reduced Emissions from Deforestation and forest Degradation (REDD) also holds potential for developing countries in the subregion, provided the international negotiations can come to agreement on practical mechanisms that take on lessons from the CDM.

Other international and global environmental agreements such as the Convention on Biological Diversity (CBD) and the Convention to Combat Desertification (CCD) have played important roles in getting national governments aboard, and through various implementation mechanisms have encouraged governments to formulate national policies and action plans. These multilateral environmental agreements (MEAs) will continue to play a role in galvanizing the environmental agenda across the board (**Table 4.3**).

Table 4.3: MEAs and year of ratification for subregional countries

Multilateral environmental agreements and conventions	Countries and year of ratification (unless otherwise specified)
UNFCCC (climate change)	<input checked="" type="checkbox"/> China (1993) <input checked="" type="checkbox"/> DPRK (1994 – approval) <input checked="" type="checkbox"/> Japan (1993 – acceptance) <input checked="" type="checkbox"/> ROK (1993) <input checked="" type="checkbox"/> Mongolia (1993)
UNCCD (desertification treaty)	<input checked="" type="checkbox"/> China (1997) <input checked="" type="checkbox"/> DPRK (2003 – accession) <input checked="" type="checkbox"/> Japan (1998 – accepted) <input checked="" type="checkbox"/> ROK (1999) <input checked="" type="checkbox"/> Mongolia (1996)
Kyoto Protocol (CO ₂ emissions)	<input checked="" type="checkbox"/> China (2002 – approval) <input checked="" type="checkbox"/> DPRK (2005 – accession) <input checked="" type="checkbox"/> Japan (2002 – accepted) <input checked="" type="checkbox"/> ROK (2002) <input checked="" type="checkbox"/> Mongolia (1999 – accession)
Convention on Biodiversity (CBD)	<input checked="" type="checkbox"/> China (2005) <input checked="" type="checkbox"/> DPRK (2003) <input checked="" type="checkbox"/> Japan (2003) <input checked="" type="checkbox"/> ROK (2007) <input checked="" type="checkbox"/> Mongolia (2003)
CITES (species trade treaty)	<input checked="" type="checkbox"/> China (1981) <input type="checkbox"/> DPRK <input checked="" type="checkbox"/> Japan (1980 – accession) <input checked="" type="checkbox"/> ROK (1993) <input checked="" type="checkbox"/> Mongolia (1996)

Increasing levels of environmental awareness and social investments

Various players have contributed to increasing environmental awareness among the public in Japan, not least of them are the media, government (both central and local) initiatives, schools, NGOs, consumer groups and others. Forests have been central in environmental education agendas, as the historical trends from the results of a government survey indicate (**Box 4.4**).

As the public's understanding of forest functions improves, increasing numbers of prefectures are adopting specific purpose taxes for forest management. Similarly, national debates for a nationwide environmental tax regime and other forms of forest financing are taking place. Overall, the rising awareness of the multiple functions of forests among the Japanese public has been a result as well as a means of reengaging the public into forest dialogue and management, against the backdrop of a paradigm shift taking place in the forestry sector and society in general. The increased use of the domestically sourced products discussed above is also part of this process. This comes through renewed support for sustainable forest management in the domestic and local scenes, advocated by government and NGO led campaigns.

Box 4.4. Rising awareness of forest functions in Japan

According to the results of a public survey on expected roles of forests conducted by the government in 2007 (MAFF, Japan 2008) carbon storage and sequestration were ranked the highest. The survey results indicate a general departure from the traditional view of forests as a source of timber and other forest products, and a renewed appreciation for recreational and therapeutic functions. More respondents from urban areas advocated forests' roles in mitigation of climate change and while rural respondents appreciated forests' roles in flood and landslide prevention and mitigation. As exposure to information and opportunities for interaction with forests increases, there is evidently a growing understanding of forests' multiple functions. This in turn is translating into changes in perceptions of, and expectations from, forests.

Another indicator for increased awareness in environmental as well as social issues is the rapid climb in mutual funds for Socially Responsible Investments (SRIs), including funds dedicated to environmental causes. Since 2000, the number of publicly accessible SRI mutual funds in Japan has grown from five to over 60. Net assets have also grown, peaking in 2007 at approximately US\$7.8 billion and taking a sharp dip at approximately US\$4 billion since the economic downturn hit Japan by late 2008 (Social Investment Forum, Japan 2007). For ROK, accessibility of such funds is still lower than in Japan although their growth has been amongst the fastest in the world's emerging economies¹ according to an International Finance Corporation (IFC) survey on social investments. Sustainable investment labelled funds grew from two in 2005 to 45 in 2008 (IFC 2009).

Environmental awareness-raising campaigns led by government and NGOs are increasing in all subregional countries. In some countries environmental education is being adopted in school curricula. Increased awareness, especially among the younger generation, will be the cradle for behavioural change in the future.

4.5 Political direction and institutional capacity

The subregion has a diverse set of political regimes from stable full democracies, emerging hybrid democracies and authoritarian regimes. With the exception of the full democracies which are unlikely to undergo major changes in political ideals in the next decade, the general political direction of the remaining countries will be the principal determining factors for the future of these countries including the forests and the forestry sector. The sector outlooks for DPRK are particularly susceptible to political changes in the regime.

Capacity of the public sector to implement political decisions and commitments also has major implications for change. This will be a particular challenge for Mongolia and China where effectiveness of governance will be put to the test in implementing and enforcing new policies and programmes adopted in recent years.

¹ The status of ROK as a developed or emerging economy is in transition, at the time of writing of this report. ROK was upgraded to developed economy status as of September 2009.

Democracy and political participation

Democratic rule provides ground for delivery of sound and transparent public services that are responsive to the needs of the people. It also optimizes use and allocation of resources through the participation of public, private and non-government sectors that have different strengths in the delivery of services, such as the private sectors' efficient delivery of goods and services, and the public sector's addressing of market failures.

State responses to calls for increased political participation among Chinese civil society organizations and rapidly integrating into the global economy include adoption of direct electoral systems at the local village level. In the special economic zone of Shenzhen, a political reform programme has been put in place since 2008, indicating increasing scope for democratic rule. These recent relatively small trial attempts at democratization will inevitably expand in the coming decade, against the backdrop of a population with increasing exposure to the global socio-economic and political environments, and the overwhelming growth in power in the private sector. Institutionalizing participatory natural resource management including the allocation of land rights has already begun to take place through land reform in China. Democratization of larger political institutions may galvanize such reforms in the coming decade.

Mongolia, an emerging democracy is challenged with sustainably running a state dependent on a few natural assets which comprise the bulk of export earnings – namely, minerals and cashmere. Transition to a democratic state has been relatively smooth, despite various obstacles and conditions such as the lack of a high-performing economy and physical distance from the largely democratic West, which often contribute to stability in democratic transitioning. Socio-economic stability of the country for the next decade will depend on the ability of leaders to answer to the diversifying needs of a population in transition – the population is rapidly urbanizing with nearly 40 percent living in the capital city of Ulaanbaatar. A third of the population remains in the rural sector associated with animal husbandry and nomadic lifestyles, for which resource constraints and degradation are major threats to livelihoods. How the democratic administration will be able to deliver on handling of its largest economic and natural asset – minerals – will also have substantial impact on the state of the economy and democracy (**Box 4.5**).

Japan is undergoing a major reform for increased decentralization and devolution of powers, towards autonomous local administration, fiscal policy and legislature. The reform comes against the backdrop of a maturing economy and ageing society, when social needs are becoming increasingly diverse and economic growth will depend heavily on the delivery of diversified services by the corporate sector. Functions to be devolved are largely divided into areas associated with every day living such as schooling and education, health care and social security; and other areas associated with rural community development such as land use, river management and environmental issues. Designation of protection forests currently under central government authority will be devolved to the provincial level and forest management plans developed by the provincial government will no longer undergo review and approval at the central level. Organizational changes for decentralization will involve mergers and abolition of various outposted central agencies, and reducing functions and transforming of some public agencies such as the forest management bureau to independent entities (Cabinet Office, Japan – Web site).

Box 4.5. Strengthening democracy in Mongolia

Efforts at strengthening democratic institutions and the practice of democracy are underway. Opportunities for public participation have been steadily increasing and many of the 4 900 registered NGOs are beginning to play an active role in development. The press also enjoys a relatively high degree of freedom. On the other hand, there has been limited progress in promoting transparency and accountability, and in deepening the penetration of democratic values into society.

Five areas need immediate attention. The first relates to enhancing people's participation by improving the electoral process and enhancing the capacity of civil society organizations to play a more active role, particularly in the areas of the Millennium Development Goals. The second relates to strengthening decentralization, empowering local communities and local governments through proper devolution of authority, funds and personnel. The third aspect has to do with promoting greater transparency and accountability. This will require a holistic reform of public administration and a revamping of the country's civil service. The fourth has to do with strengthening the rule of law to instill greater confidence in both the private sector and citizens to invest in the country's development. Finally, steps are needed to improve people's access to justice.

Source: UN Country Team Mongolia (2005).

Governance

Governance, according the World Bank definition is "the way public officials and institutions acquire and exercise authority to provide public goods and services, including education, health care, infrastructure, and a sound investment climate". Poor governance often results in corruption and the abuse of public office for private gain, which reflects the breakdown of accountability. Good governance is important for development and often has a strong impact on economic growth (World Bank 2008). Corruption undermines the rule of law and sustainability in all aspects of engagements – economic, social and environmental.

There are various measures and indices of governance and corruption. Transparency International in its 2008 Corruption Perception Index, ranked Japan 18, ROK 40, China 72 and Mongolia 102 among 180 countries.

According to the World Bank Worldwide Governance Indicators, China's governance indicators have not necessarily been improving in the past decade (as percentile ranking among 212 countries). Ranking is lowest for the voice and accountability indicator.¹ On the other hand, for the government effectiveness indicator² ranking was relatively high and showed improvement in recent years. The climate of doing business in China, another indicator of rules and governance from a business point of view, was

1 The voice and accountability indicator measures the extent of participation in selecting government, as well as freedom of expression, freedom of association, and a free media (Worldwide Governance Indicator.)

2 The government effectiveness indicator measures the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation and the credibility of the government's commitment to such policies (Worldwide Governance Indicator.)

reported to have ranked 83, which is surprisingly low considering China is one of the fastest expanding economies in the world.

Mongolia's ranking performance has deteriorated overall in the last decade, scoring significantly lower than previous years in government effectiveness and control of corruption¹ indicators. The country is still in a transition period from the former central planning to a market economy, which is resulting in increased graft and corruption especially among the lower ranks of public office (EIU 2009c) The challenges ahead will certainly include improved accountability and governance in public office.

1 The control of corruption indicator measures the extent to which public power is exercised for private gain, including petty and grand forms of corruption, as well as 'capture' of the state by elites and private interests (Worldwide Governance Indicator).

5

CHAPTER 5 PROBABLE SCENARIOS

Outlook scenarios offer a narrative view of the future. Different from an econometric forecast defined by quantitative measures, scenarios are based on a number of determining factors which may or may not be quantitative in nature. Scenarios are helpful for portraying general future directions and can be particularly useful at preliminary planning stages for decision makers to outline their future visions of a sector.

This chapter will explore what future trends in society will unfold through three distinct scenarios, and under each of the scenarios, what the implications will be for the forestry sector.

5.1 Varying initial conditions

The initial conditions of countries set important preconditions for determining how other drivers of change will evolve. Some initial conditions such as the size and stage of development of the economy and stability in governance are particularly important defining factors.

If economies exist along a continuum from developing to developed economies, and maturity in democratic governance is closely associated with levels of economic development, countries in the subregion can be clustered into the categories of: developed economies with stable democracies; emerging economies; and low-income developing economies (**Figure 5.1**).

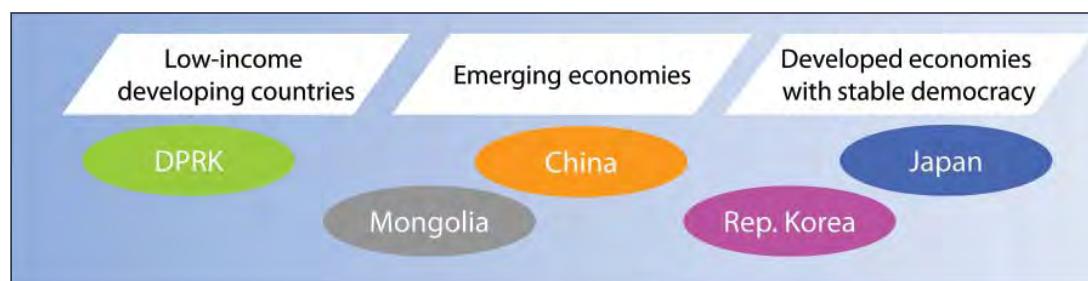


Figure 5.1: Stratification of countries by socio-economic characteristics

High-income and stable democracies

Countries in this cluster are characterized by high levels of per capita income; industrialized information-based societies; and stable democratic governance. These countries have populations with high levels of education, long life spans and resulting high median ages. Japan and ROK belong to this cluster.

Emerging economies or democracies

These countries are characterized by middle-income levels; robust economic growth; a shift in economic structure from land-based to industrial economies that are becoming integrated into the global economy; and resulting social and physical mobility and disparity in income levels. The democratic foundations of countries may be fragile.

In this cluster, China is a robust emerging economy and Mongolia is also indicating signs of growth. However, the two countries differ significantly in size and scale of population and economy, thus demonstrating considerable variability in development scenarios, including that of the forestry sector.

Low-income developing economies

Low-income developing economies are characterized by low levels of per capita income; largely agrarian economies; and a large informal sector.

DPRK belongs to this cluster. Its administrative regime and isolation from the global economy make it a unique case.

As this report intends to draw out subregional trends and how different scenarios of change will take place in the coming decade, the following sections are based on these economic clusters, rather than on individual countries.

5.2 Major determining factors and possible scenarios

Against the backdrop of the countries' initial conditions, 'drivers of change' will define how the scenario evolves. Of the numerous drivers, the implications of the economic driver are some of the strongest in defining not only consumption and trade trends, but also public and private spending as well as government strategies and priorities. Thus two divergent scenarios can be drawn out:

- The high-growth scenario; and
- The low-growth scenario.

Other critical factors that will further define the scenarios include civil society's social and environmental awareness levels (referred to as 'Awareness' in **Tables 5.1, 5.2 and 5.3**) and ability to check and balance public and private sector activities, as well as governments' role in navigating the future. Government ability in striking a sustainable balance between the various priorities will depend fundamentally on its political commitment and governance capacity to develop and implement policies and institutional changes. Provided government commitment towards environmental agendas is balanced with economic goals and performance, government capacity to implement strategies is strong and civil society is able to function as a mechanism for checks and balances and engage meaningfully in governance, another possible scenario emerges: the 'green-economy' scenario.

The key variables for each scenario and economic cluster are political commitment in balancing the environmental agenda, governance capacity of the government and civil society awareness of socio-environmental issues.

High-growth scenario

This scenario is defined by quick recovery from the global economic downturn by early 2010. Under this scenario, emerging economies will experience recovery and growth with more vigour; they exhibit overall growth surpassing prerecession levels and act as the growth engine of the region, compared to the industrialized countries with developed economies which will no more than stabilize at prerecession levels.

In the developed economies with declining populations, securing labour to sustain growth will become a challenge, triggering debate for opening borders to immigrants; this can result in wide economic disparity among the population. Overall economic improvement will encourage investment in corporate social responsibility (CSR) activities and willingness-to-pay for environmental services among individual consumers.

In emerging economies, economic growth will continue to be the primary agenda. Industry will play an ever-greater role in determining social trends. The results may be increased social and economic disparity leading to diversification of demands and increased conflict of interest, particularly among the rural and urban residents. Environmental hazards in urban and industrial areas may also be rampant, leading to health issues for workers and residents. While urban residents with more exposure to media and information will be better informed of social and environmental issues, rural residents will need to take the burden as the primary caretakers of the environment. High-growth and resulting high demand may drive so-called ‘land grabbing’ in resource acquisition in developing countries. In the international arena, commitment to the global environmental agenda will be a critical point of contention as overall GHG emissions continue to rise.

The outlook for low-income countries will be determined by large emerging economy-trade partners. If political conditions remain unchanged, major economic growth is not anticipated.

Table 5.1: The high-growth scenario

	Variables	Governance	Resulting trends
Developed economies:	Economy: quick recovery Awareness: med-high	Env commitment: strong Governace: med-high	<ul style="list-style-type: none"> • CSR promoted • Strong willingness-to-pay
Emerging economies:	Economy: quick recovery Awareness: low	Env commitment: med Governace: med-weak	<ul style="list-style-type: none"> • Focus on energy saving • “Land grabbing” in other countries • Increase in Carbon emissions
Low-income economies:	Economy: quick recovery Awareness: med-high	Env commitment: strong Governace: med-high	<ul style="list-style-type: none"> • CSR promoted • Willingness-to-pay for environment limited by economy

Low-growth scenario

This scenario hypothesizes that economic recovery will be slower and more painstaking than expected under the high-growth scenario. Governments will be inclined to adopt protectionist strategies that will limit growth potential through globalization.

Economic growth will not reach prerecession levels till well into the next decade and in the meantime countries will experience wide unemployment.

Among developed economies, unemployment levels will reach record highs. Insecurity and lack of consumer confidence will dampen spending particularly on social and environmental goods and services. Weak economic growth will also discourage governments of emerging economies to make firm commitments to addressing environmental needs; instead they will concentrate on spending on large economic recovery projects. This may, in turn, open up opportunities in rural natural resources management through government-subsidized economic boosting and employment creation initiatives. In developed as well as emerging economies, industry may choose investment options with short-term projections, without taking into account the full externalities. Domestically, particularly among emerging economies, natural resources will be leased or concessioned to domestic and foreign investments even when appropriate environmental assessment processes are absent. In resource-rich developing countries where institutions are weak, land-grabbing for resource acquisition will take place, leading to resource degradation.

In low-income countries, ecological sustainability and local livelihoods will be compromised as natural resources are sold off to players from emerging and stable economies. Severe natural calamities may be triggered.

Table 5.2: The low-growth scenario

	Variables	Governance	Resulting trends
Developed economies:	Economy: quick recovery Awareness: med	Env commitment: strong Governace: med-high	<ul style="list-style-type: none"> “Land grabbing” in resource acquistion
Emerging economies:	Economy: quick recovery Awareness: low	Env commitment: weak Governace: med-weak	<ul style="list-style-type: none"> Limited spending on technology development Severe resource degradation Neo-colonialism approach to resource acquisition Foreign concessions on natural resources offered
Low-income economies:	Economy: weak Awareness: low	Env commitment: weak Governace: med-strong	<ul style="list-style-type: none"> Exploitation of natural Natural disasters are frequent

The green-economy scenario

As with the high-growth scenario, the green-economy scenario hypothesizes early recovery of the economy. The major point of distinction between the two scenarios is in the way public and private sectors adopt lessons from the economic downturn to develop sustainable strategies for the future. Developed and emerging economies will pull out from the economic downturn adopting various ‘green-deals’, creating ‘green’ jobs and ‘green’ economic opportunities. The green economy is an economy that

balances social, economic and environmental priorities through the participation of all segments of society.

For developed economies with sound governance mechanisms in place, innovative collaboration mechanisms between the public and private sectors as well as civil society organizations will play an important role in balancing economic and environmental priorities. An increasingly well-informed and responsible civil society is behind this economy, navigating the future through defining clear consumer preferences. To cater to diversified needs within societies, increased localized decision-making will take place. Strengthening governance capacity at local levels will be a precondition for this scenario to unfold. Internationally, the developed economies will play an important role in development and dissemination of sustainable technologies.

Among emerging economies, recovery and growth of the economy will encourage government to take a proactive position in the global environmental agenda. Commitment towards energy shifts and increased energy efficiency will be firmly laid down for a post-Kyoto climate regime. The major struggle will be to develop capacity, especially among the public sector in delivery of transparent services at all levels. In order to sustain themselves in global competition, industries will choose to conform to international standards and codes of practice. Civil society will play an increasing role in performing the checks and balances of the government and industry's services and operations.

For the low-income countries, the prospect of a positive turnout is highly dependent on political decisions taken by the government. Increased engagement of local populations in decision-making as well as greater integration with the international community will lead to opening up more scope for sustainable forest management with application of relevant approaches and technologies.

Table 5.3: The green-economy scenario

	Variables	Governance	Resulting trends
Developed economies:	Economy: quick recovery Awareness: high	Env commitment: strong Governace: high	<ul style="list-style-type: none"> • Leads world in environmental technologies • Innovative PPP schemes promoted • Local administration increases governance capacity • Green new-deals flourish
Emerging economies:	Economy: quick recovery Awareness: med	Env commitment: med-strong Governace: med-strong	<ul style="list-style-type: none"> • Global post-Kyoto climate regime • Shift to alternative energy sources • Industry adopts international standards and CSR policies • Civil society demands better public services

	Variables	Governance	Resulting trends
Low-income economies:	Economy: weak Awareness: low-med	Env commitment: weak Governace: med-strong	<ul style="list-style-type: none"> • Social unrest mounts from natural disasters and difficult conditions • Greater participation in international affairs including seeking technological assistance for environmental rehabilitation

6

CHAPTER 6

FORESTRY IMPLICATIONS

UNDER VARIOUS SCENARIOS

The forestry sector in the coming decade will be shaped by various factors, many being external to the sector. Forests and forestry in countries with more exposure to globalization and international trade such as China, ROK and Japan are more likely to be substantially impacted through exogenous factors emanating from across borders. Decisions taken by non-forestry government agencies, politicians and private sector actors from within and outside the forestry sector will all have implications on the development of the forestry sector.

6.1 Forestry implications under a high-growth scenario

The high-growth scenario assumes a quick recovery from the economic recession and greater social and economic mobility translating into diversifying demands, while other aspects of society remain constant. Government commitment to balancing economic and environmental priorities remains at current levels, as will civil society's awareness of environmental and social issues. As a result of robust growth concentrated in urban areas and industries without sufficient focus on integrating rural economies, there is bound to be greater economic and social disparity between urban and rural segments.

Forest extent and change under a high-growth scenario

For developed economies with stable democratic governance in place, the state of forests will remain largely unchanged in the coming decade, under the high-growth scenario. With limited economic viability of post-war plantations, growing stock will continue to increase in spite of government-promoted thinning programmes and use of thinning materials. Forests earlier established for production purposes will gradually be modified into mixed forests providing multiple functions. Modified forests will decrease marginally, giving way to improvement in rural infrastructure. Recognition of the multiple functions of forests will be enhanced and urban forests will expand. Forests will increasingly be shifted to public sector management, as their economic viability will remain low. The situation will demand the development or reinforcement of public (or semi-public) forest management entities. Nevertheless, forestry sector public spending will not grow significantly.

The implications for change are greatest among emerging economies. With economic recovery and prospects for growth in sight, governments will continue to promote reforestation and forest conservation through various initiatives. Reforestation activities will nevertheless be primarily focused on production and income generation, with conservation objectives given secondary importance. Competition for land will arise particularly with increased demand in agriculture, as well as expanding mining operations.

In low-income countries, new plantings may increase, primarily for production forests. Otherwise, public interest and spending on forests will remain low. On the other hand,

resource access through exploitative methods by developed and emerging economies may unfold, resulting in an overall loss of forest resources.

Overall, the subregion's forest area will follow the trends of the past decade, increasing forest cover overall. The overall forest cover trend will be pulled largely by China. More emphasis on management for conservation and improving forest quality will be observed in developed economies, whereas emerging economies will continue to focus on volume (**Figure 6.1**).

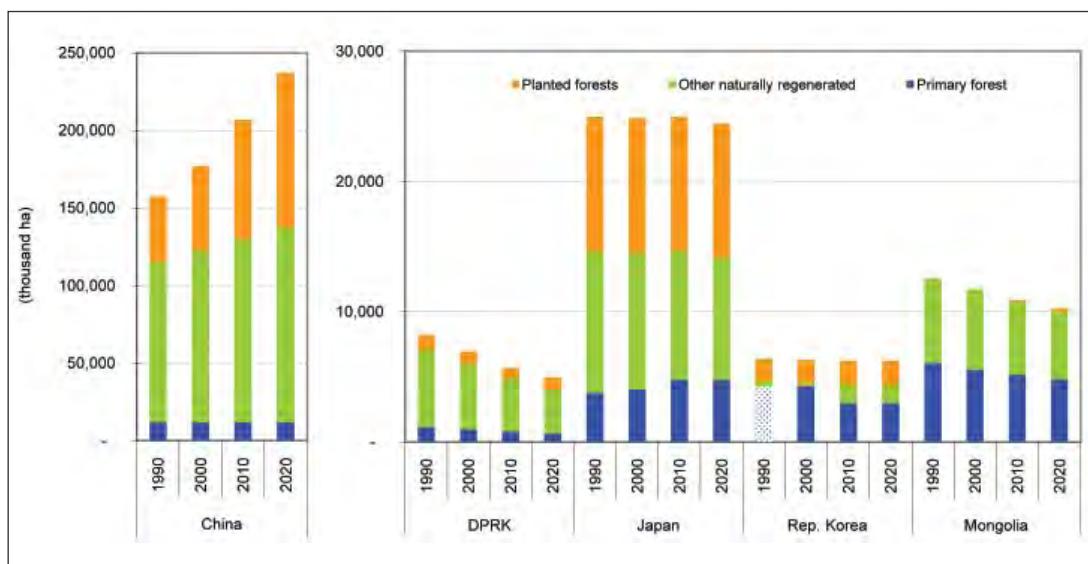


Figure 6.1: Forest cover trends and projections (projections for 2020)

Source: FAO (2010) and author's projections for 2020.¹

Note: The 1990 figure for Korea's primary forests is unknown; hence 2000 figures have been adopted.

Production and consumption of forest products under a high-growth scenario

For developed economies, housing starts suppressed during the recession will start to recover modestly as well as demand for furniture and other forest products. Demand for renovation and remodelling may rise with handicapped-accessible or 'barrier-free' designs for the elderly. Also preferences for single-occupancy households (including those occupied by the elderly) and homes occupied by smaller family units will increase

¹ 2020 figures were generated according to the following assumptions: High growth will enable China's planted forest area to increase at the same rate as between 2000 and 2010; while loss of other naturally regenerated forest area will be at the same rate as the preceding decade; primary forest area will remain stable. In DPRK, planted forests will increase moderately from 2010 levels, replacing primary forest loss; other naturally regenerated forests will continue to decline at the same rate as the previous decade. In Japan and ROK, changes in forest dynamics will be marginal. In Mongolia, competing land uses will reduce the area of other naturally regenerated and primary forests, while planted forest area will increase marginally.

the overall demand for houses.¹ Despite overall increase in demand, the market will continue to be price-sensitive, driving sales for cheaper materials.

Among emerging economies, economic recovery will drive demand, particularly for housing starts and other infrastructure in rapidly expanding urban areas, as well as pulp and paper products. Increased appetite for wood products will be more visible in China. The export sector will also see increased demand from other economies. Important products will be wood-based panels. In order to fill in the gaps, imports from major producer countries will continue to rise as will imports from smaller resource-rich developing economies. Resource acquisition methods may be exploitative in such cases, undermining the social and environmental sustainability of the producer communities and sites. Industries such as furniture where export orientation is high will face severe competition with lower wage countries.

In low-income countries, domestic demand will not be considerably affected by the recovery of the global economy. On the other hand, demand from foreign markets will rise, driving demand for industrial roundwood and NWFPs. The opportunity for export earnings may result in undermining the sustainability of forest ecosystems in these countries.

Overall, the high-growth scenario will see significant increases in consumption and trade for key wood products (particularly roundwood, wood-based panels and paper and paper board), pulled by China's demand (**Figures 6.2, 6.3 and 6.4**).

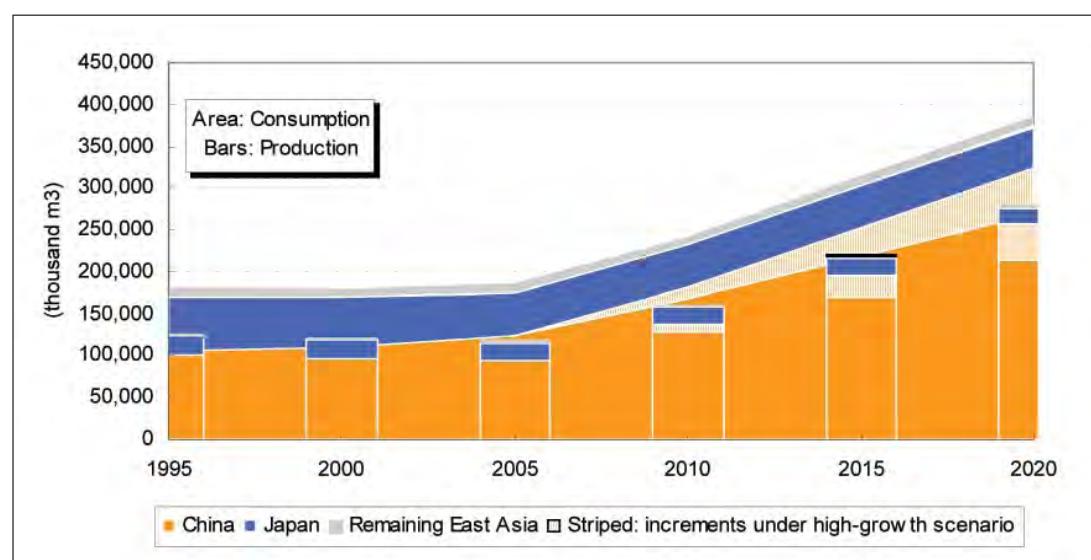


Figure 6.2: Trends and projections for industrial roundwood consumption and production levels (projections for 2010-2020)

Source: Jonsson and Whiteman (2009).

¹ The average number of persons in a household is expected to decrease from 2.6 in 2005 to 2.3 in 2030 in Japan (National Institute for Population and Social Security Research 2008).

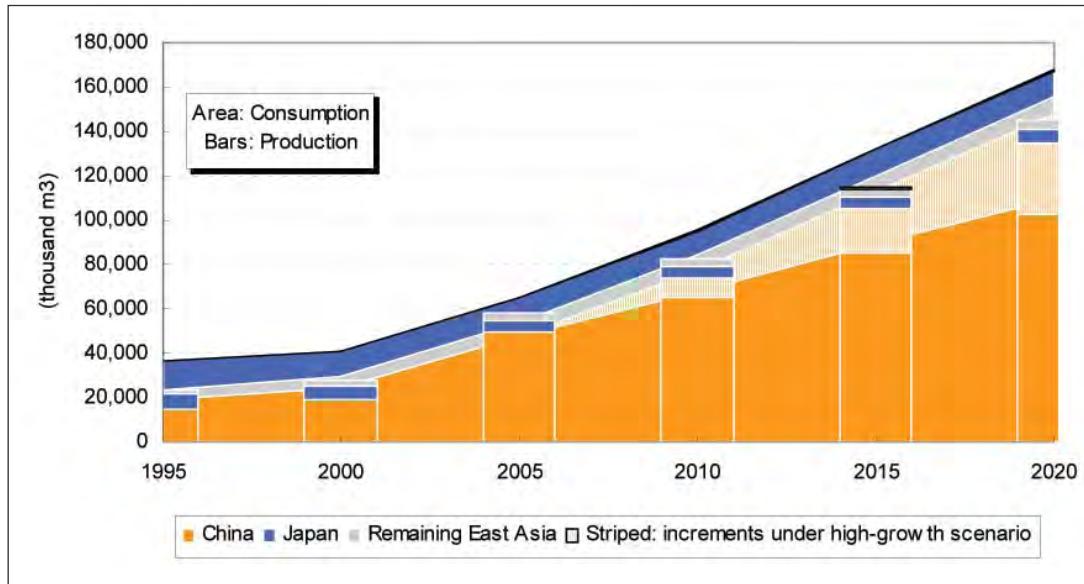


Figure 6.3: Trends and projections for wood-based panel consumption and production levels (projections for 2010-2020)

Source: Jonsson and Whiteman (2009).

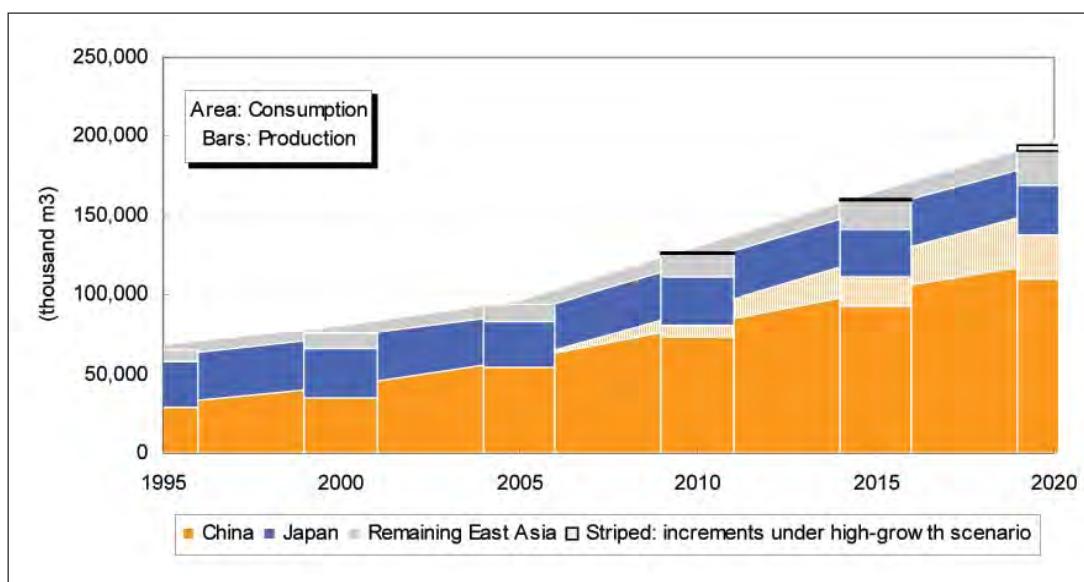


Figure 6.4: Trends and projections for paper and paper board products consumption and production levels (projections for 2010-2020)

Source: Jonsson and Whiteman (2009).

Among emerging economies, increased market activity and economic growth will drive a departure from subsistence use of NWFPs. Major consumers of NWFPs will shift from local forest-based communities to urban and export markets. Growing demand, particularly for some medicinal plants and food items, will drive exploitation and unsustainable harvesting practices, resulting in the near extinction of some species. On the other hand, intensified domestication will evolve for some major species.

However, for low-income countries, NWFPs will continue to play an important role for subsistence and for niche export markets pursuing species which may have been overharvested in other countries.

With a quick recovery from the economic recession, overall energy consumption in the subregion is forecast to expand over 30 percent during the next decade. The increase is largely reflective of the increase in China's consumption, whereas developed economies will exhibit marginal increases. Among emerging and low-income economies, the share of biomass energy used will be reduced considerably as other energy sources become more accessible. On the other hand, developed economies will continue to increase demand for bioenergy, including imports.

Environmental and social services of forests under a high-growth scenario

Among developed economies, economic recovery and growth can mean either increased spending on environmental and social services of forests, or exploitative growth without responsible consumerism. If the former is to unfold, CSR activities in forest areas will expand both at home and abroad. Increased pressure from civil society towards conservation efforts and maintaining quality of forests will also drive public spending on forests. Overall decline in pressure on forest resources will gradually give way to conservation of, and return to, modified natural forests (**Table 6.1**).

Developed economies in the subregion have experienced an era of exploitative growth with little restraint. If the lessons of the past have been learned, there is little likelihood that the trend will repeat itself.

For emerging economies, economic growth will drive more investments and spending in both responsible and unsustainable operations. In order to fill the gap for the growing demand for forest products, unsustainable harvesting and cutting may take place. Improvement in environmental governance will be demonstrated more at the policy level and forest protection efforts will continue to be one of the major drivers of reforestation programmes. However, implementation of new mechanisms including payment for environmental services may not be as robust if capacity at the local government level is not significantly improved. For society at large, but particularly for the business sector, conservation goals in forestry will be secondary to economic and production goals. The expanding middle class will be a source of diverse demands, including for ecotourism and increased appreciation for urban forests. There is bound to be conflict of interest between urban and rural residents who have different stakes in forests.

Pressures will mount from the international community for all countries to take strong commitments towards mitigation and adaptation to the effects of climate change. Developing countries of the subregion will take proactive roles regionally and globally. Within borders, forests will receive attention through programmes designed to enhance their capacity for carbon sequestration.

In tandem with the global agenda on climate change, protection against desertification and land degradation will be an important focus of government programmes particularly among the emerging economies.

Table 6.1: Forestry trends under the high-growth scenario (changes from current levels)

	Developed	Emerging	Developing
Forest cover	-	↑	↓↓
Forest quality	↑	↓	↓↓
Wood-self-sufficiency	↑	↓	-
Forest products demand	-	↑↑	-
Forest-based livelihoods	-	↓	-
Woodfuel dependence	-	↓	-
NWFP demand	-	↑	↑
Foreign direct investments in forestry	-	↑	-
Forestry contribution to GDP	-	↑	-
Public spending in forestry	-	↑	-
Forestry governance capacity	-	-	-
P-PPs in forestry	↑	↑	-
Flourishing of PES schemes	↑↑	↑	-
Willingness-to-pay for the environment	↑	↑	-
CSR and corporate governance	↑	↑	-

Legend: ↑↑ strong increase; ↑ increase; - no change; ↓ decrease ↓↓ strong decrease.

Note: P-PP = public-private partnership.

6.2 Forestry implications under a low-growth scenario

This scenario is characterized by a slower-than-expected recovery from the economic recession and stagnating growth towards the later half of the decade. The immediate social repercussions of the slow-recovery will be cuts in environmental and social spending by both the public and private sectors.

Forest extent and change under a low-growth scenario

For developed economies, slow economic recovery will mean less direct spending on forests and fewer tending practices, leading to increased vulnerability to outbreak of pests, diseases and forest fires particularly in forest plantations. In rural areas, local governments will face severe revenue loss and budget cuts making it increasingly difficult to finance forest management, resulting in inferior quality of plantations compared to earlier decades. On the other hand, governments may look into the forestry sector for employment generation and economic stimulus for rural areas.

Private smallholders of forests may feel the economic burden of forest lands and increasingly opt for subcontracting management or selling of land to the public sector. Increasing cases of abandoning forest lands will be witnessed as forests lose economic viability.

Among emerging economies, a slow recovery of the economy will translate into weaker environmental commitment and spending by governments. Reforestation activities will not be promoted with the vigour of the past, and where they do happen, conservation

goals may be undermined. Increased rural poverty and need for quick-cash will prompt unsustainable harvests, resulting in some deforestation. The demand for jobs and sources of income in rural areas will increase with the decline in the urban industrial sectors. Increased pressure on alternative uses of land, particularly for agriculture for immediate income will rise. On the other hand, less pressure from industry will reduce logging and conversion to alternative commercial land use. As a result, overall, forest cover may increase.

The impacts on the forestry sector of low-income countries may appear to be insignificant. However, reduced demand for forest products from other economies may ease unsustainable exploitation of forests, as well as conversion of forest land to other uses (**Table 6.2**).

Production and consumption of forest products under a low-growth scenario

A slow recovery from the global economic recession will have considerable impact on the consumption patterns of the subregion, largely reflective of declining demand for new housing starts in developed and emerging economies, and forest product exports from emerging economies to other developed economies.

Further decline in demand from developed economies will affect industry constituents at home and abroad. The domestic processing sector will see restructuring and consolidation as smaller businesses are forced to fold. This will have significant impact on rural areas with few alternative industries.

Faltering demand among developed and emerging economies in the subregion will have major implications for other countries. Exporting countries will be forced to shift their production and processing orientation to other buyers. The implications will be particularly painful for economies heavily dependent on forest exports to the subregion.

Among emerging economies, slow recovery and low economic growth will spell out increased incidence of redundancies and a temporary or prolonged return of people to rural areas. If the return is prolonged, the effect may increase pressure on forests through both conversion to other land uses, as well as unsustainable and illegal harvesting practices to make ends meet.

For the forest industry in emerging economies, the slowing economy will mean stagnating housing markets at home and slowing demand from foreign markets. The latter will have implications on export-oriented industries such as furniture and wood-based panels. Investments in industrial plants and facilities will also slow, resulting in lower production efficiency and reduced global competitiveness.

Among low-income countries, a fall in demand from neighbouring emerging economies will have significant implications.

As more people return to rural areas from the faltering urban economies, collection of subsistence NWFPs will gain more importance in both emerging and low-income countries.

Growth in energy demand from emerging economies will dampen towards the end of the next decade compared to the conditions of a quick economic recovery. Woodfuel contributions will be higher than in alternative scenarios as redundant workers from industries will tend to return to rural livelihoods, increasing demand for woodfuel. Woodfuel consumption will remain high in low-income countries. If alternative sources of domestic fuel are not developed, serious fuel wood shortages will occur.

Environmental and social services of forests under a low-growth scenario

The mood for investing in environmental and social services of forests will be significantly negative under this scenario. Spending in leisure activities such as ecotourism as well as in timber investments will decline. In developed economies, public spending to boost the economy through ‘green investments’ may reach the forestry sector, but developing innovative partnership with the private sector may take time. Less public spending on forests will prolong the current predominance in single age-class stands, which is less favourable to enhancing biodiversity and sustainability.

In the emerging and low-income countries, maintaining the balance between economic and environmental objectives will be a challenge for governments, especially if opportunities for lucrative but potentially environmentally costly international investments emerge.

On the other hand, the prolonged recession may also stall conversion of forest lands to other uses such as mining in emerging and low-income countries with rich natural resources. Similarly, the repercussions of the reduced demand from forest industries in subregional developed and emerging economies may be positive for the conservation efforts of major exporting countries of raw materials.

With lack of government commitment and public funds for climate change mitigation and adaptation goals, vulnerable ecosystems particularly in developing countries may experience increased natural disasters, expansion of desertification and resulting land degradation.

Table 6.2: Forestry trends under the low-growth scenario (changes from current levels)

	Developed	Emerging	Developing
Forest cover	-	↑	↑
Forest quality	↓	-	-
Wood-self-sufficiency	-	↑	-
Forest products demand	↓	↓	↓
Forest-based livelihoods	-	↑	↑↑
Woodfuel dependence	-	↑	↑
NWFP demand	-	↑	↑
Foreign direct investments in forestry	-	-	-
Forestry contribution to GDP	-	-	-
Public spending in forestry	↓	↓	↓
Forestry governance capacity	↑	↓	-
P-PPPs in forestry	↑	-	-
Flourishing of PES schemes	↑	-	-
Willingness-to-pay for environment	↓	↓	↓
CSR and corporate governance	↓	-	-

Legend: ↑↑strong increase; ↑ increase; - no change; ↓ decrease ↓↓strong decrease.

6.3 Forestry implications under the green-economy scenario

The green economy is a positive scenario that assumes a quick recovery from the economic recession, similar to the high-growth scenario, while social and environmental awareness of civil society organizations is more robust, leading to more dynamic social participation and partnerships.

Forest extent and change under a green-economy

For developed economies, developing healthy and sustainable lifestyles with nature and forests as an integral feature will become increasingly important along with increased popularity in ecotourism and related activities. As a result, understanding of forest functions and management responsibilities will become more equal between urban and rural residents. As environmental and social values of forests become more widely accepted, payments for environmental services (PES) will be more readily adopted at the local level, providing rural economies with increased sources of income. Forest management investment schemes will develop, as well as other dynamic mechanisms involving the public and private sectors in financing forest management. Forest management plans particularly in plantation forests established under the post-war reconstruction programmes will shift to promote multistorey, semi-natural forests through assisted natural regeneration and gradually shift to multipurpose forests under integrated management. Overall improvement in forest quality will reinforce investments through forests funds and fees collected from recreational activities offered in forests.

Among emerging economies, public spending on forests will increase or be maintained at the high levels experienced during the last decade. Increased government commitment to balancing ecological conservation goals with the economic production goals in forestry will be demonstrated. As a result, forest cover will be maintained or increase and improvement in the quality of forests, including vulnerable ecosystems, pursued. As more and more of the younger generation migrate to cities in search of better job opportunities, there will be less pressure on forests for subsistence use. On the other hand, the median age among rural populations dealing with forest management will rise. Strong institutional arrangements dealing with conservation, land zoning and international environmental commitments will mediate competition for land arising from increased demand by agriculture and expanding mining operations, among other uses.

In the low-income countries, political changes and renewed institutions for democratic governance will be preconditions for a positive development scenario to unfold.

Overall, the subregion will experience positive growth in forest cover and improved quality of forests (**Table 6.3**). The underlying condition is government commitment in balancing conservation and production goals in forest management and particularly in improving local government capacity for implementation of innovative mechanisms in financing forests.

Production and consumption of forest products under a green-economy

In developed economies, demand for forest products will grow modestly. Moreover, responsible consumerism will drive demand for sustainably sourced materials, including support for domestic or locally harvested products. While overall demand will remain

more or less stable, the share of domestically sourced materials will indicate small and gradual growth. The implications for export markets will be greater momentum for sustainability certification and other means to maintain market share.

Among emerging economies, economic recovery will spur growth in domestic demand for forest products, particularly in the housing sector, as well as the paper and pulp industry. Growth in foreign demand is also projected to have implications particularly for the wood-based panels industry and furniture. But as minimum wages increase in these countries, foreign investments may gradually pull out, being replaced by emerging viable domestic industries with capacity to compete globally. The alternative may be for foreign investments to shift to longer term contracts for higher value production which do not capitalize on low wages, but rather on the high skills of the labour force relative to its wage levels. In order to secure resources and raw material, more investments will emerge from the private sector both domestically and abroad. In both cases, partnership mechanisms such as contract-growing schemes will be employed creating more incentive for sustainable forest management involving local communities.

Among emerging economies, outmigration from rural areas will relieve substantial pressure on land and resources in rural areas. Subsistence use of NWFPs will decrease significantly. As in the case of the high-growth scenario, the major NWFP consumer markets will shift to urban and export markets.

While large-scale industries expand in the emerging economies, low-income countries may gain a position in niche forest products, such as NWFPs. As demand for sustainably harvested timber (including certified timber) grows around the world, whether low-income countries will be able to respond to these demands will determine their likelihood of maintaining their share of exports in industrial roundwood and other forest products.

Overall energy consumption in the subregion is forecast to expand, particularly in emerging economies. Government strategies will fund development of energy-efficient and energy-saving technologies as well as promote energy shift from fossil fuels to increased share of biomass and other renewable sources. On the other hand, demand for woodfuel for domestic use will be reduced significantly in emerging economies.

Environmental and social services of forests under a green-economy

Among developed economies, the environmental and social services of forests will be the main focus in the development of forestry sectors. Global commitment to climate change and other environmental agendas will be translated into action for improved management in domestic forests. Nationally, pressure from the well-informed and progressive segments of civil society will demand participatory governance in natural resource management, opening up more scope for innovative mechanisms between the public and private sectors. Local direct taxation schemes for environmental services of forests including watershed and biodiversity conservation will be supported with high willingness-to-pay among the public to finance sustainable forest management. The government strategy for forest management will be to promote multifunctionality of forests to respond to diverse demands. As a result, integrated forest management for biodiversity conservation, recreational services, carbon sinks, landscaping and green infrastructure will expand.

With strong political commitment towards climate change and other global and domestic environmental agendas as well as improved capacity for governance, emerging economies will significantly improve management of forests to enhance

environmental services. Reforestation programmes will be sustained with increased focus on enhancing environmental services, particularly watershed management, and developing associated mechanisms for PES. Forests primarily for biodiversity and ecosystem conservation objectives will be further identified and zoned with management plans developed for long-term conservation.

The effects on environmental services of forests among low-income countries are questionable. With increased international awareness of certification schemes, indicators and codes of practice for sustainable management, forestry trade with low-income countries may decelerate, relieving pressure on forests. As a result, the conservation agenda may advance, but with a cost to local livelihoods.

Table 6.3: Forestry trends under the green-economy scenario (changes from current levels)

	Developed	Emerging	Developing
Forest cover	-	↑↑	-
Forest quality	↑↑	↑	-
Wood-self sufficiency	↑	↑	-
Forest products demand	↑	↑↑	-
Forest-based livelihoods	-	↓	-
Woodfuel dependence	-	-	-
NWFP demand	-	↑	↑
Foreign direct investments in forestry	-	↑	-
Forestry contribution to GDP	-	-	-
Public spending in forestry	↑	↑	↑
Forestry governance capacity	↑	↑↑	-
P-PPPs in forestry	↑↑	↑	-
Flourishing of PES schemes	↑↑	↑	-
Willingness-to-pay for environment	↑↑	↑	-
CSR and corporate governance	↑↑	↑	-

Legend: ↑↑ strong increase; ↑ increase; - no change; ↓ decrease ↓↓ strong decrease.

6.4 Overview of forestry implications by scenarios

For developed economies, a relatively consistent future for forest is projected. Net forest cover will remain stable even among the variation in scenarios that unfold (**Figure 6-5**). In other words economies in these countries are matured (or maturing) and more or less stable demand will unfold in the future. In these countries, future direction is determined fundamentally through democratic governance where civil society organizations, government and the private sector mutually agree checks and balances. Provided that balance is maintained and society continues to function in these ways, values such as sustainability in natural resource management will not be easily undermined.

Variability of outlooks by scenarios is greatest for emerging economies. Whether governments will show and demonstrate strong commitment for the forestry sector will be determined firstly by macroeconomics; government ability to allocate financial

resources to forest resource development will significantly change outcomes in net forest cover. But reflection in the quality dimension of forest resources will depend on other factors including government commitment to balance economic and environmental goals (**Figure 6.5**). The role of civil society organizations will have major implications in determining the balance between priorities. Another challenge will be reforming institutions and developing capacity for implementation at the various levels.

Scenario development regarding implications for forests in low-income countries with authoritarian regimes is based primarily on stability of regimes. As long as regimes remain fairly stable, domestic implications for forestry will not significantly differ. Otherwise, forest products demand from emerging economies will determine production.

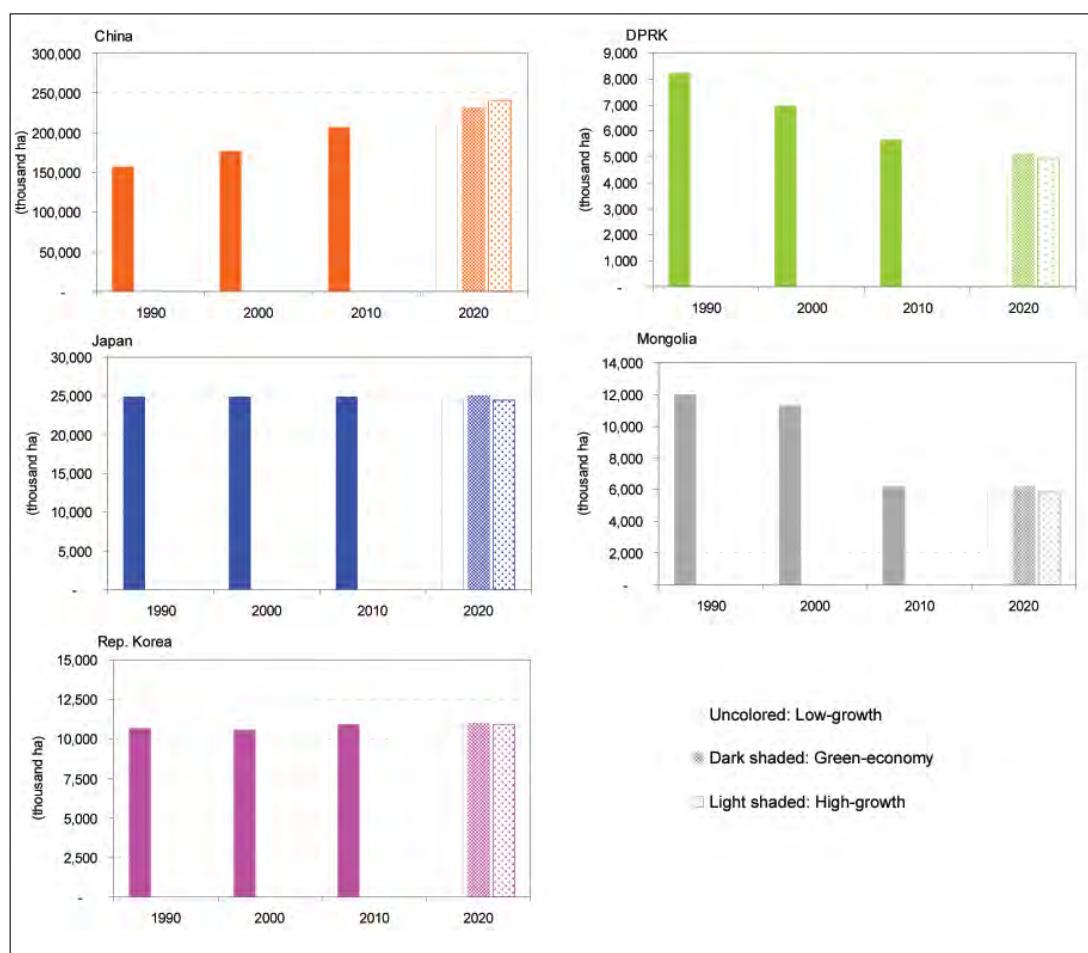


Figure 6.5: Net forest cover trends by scenarios (projections for 2020)

Sources: FAO (2010) and author's projections for 2010.

7

CHAPTER 7

PREPARING FOR

A GREENER ECONOMY

The scenarios in the previous chapter were developed to portray the extremes of what can be realistically forecasted. What will most likely unfold will be a combination of them. But what remains clear is that the green-economy scenario is the most sustainable scenario for which countries need to prepare.

7.1 Priorities

Public forestry sector agencies can facilitate the unfolding of a green-economy scenario, via strengthening of political commitment to address the balance between socio-economic and environmental goals in forest management. Political commitment reflected as policies, funds and policy instruments including programmes and legislation needs to be delivered at various layers of national and subnational government agencies. Forestry agencies will need to work with non-forestry sectors and establish partnerships with the private sector, communities and other relevant stakeholders to strengthen their role in the larger macroeconomic contexts.

The role of civil society organizations in performing checks and balances will also be crucial.

As already indicated, the initial contexts of subregional countries are considerably varied and thus require different priorities.

For developed economies, the priority agenda for the coming decade will be in promoting forests to become viable economically and ecologically. The main constraint in forestry for these countries has been in maintaining competitiveness among countries with lower labour costs and more conducive environments for timber production. However, as public recognition of the multiple functions of forests improves, there will be increased willingness-to-pay for environmental services and other non-traditional forests products and services. The priority agenda for these countries will be to create a positive feedback cycle of appropriate forest management which will enhance provision of multiple forest functions, which will then finance further forest management.

Effective PES mechanisms will require innovative approaches to link forests and rural development with urban consumer centres. The key will be in strengthening mutual awareness and understanding between the urban and rural sectors in managing environmental externalities and which forest services attract stronger willingness-to-pay.

For emerging economies that have focused on forest cover expansion over the last decade, a major priority area will be addressing the quality dimension of forests. Countries where afforestation programmes so far have been successful in expanding forest cover are on course to attaining a major objective, but in order to fully meet the demands of the next decade, the sustainability and environmental services dimensions need to be addressed.

For developing economies, a major priority area will be in addressing rural poverty through greater participation in natural resource management. Institutionalizing tenurial rights to engage rural populations as productive agents of change will be a major challenge and priority area.

An expanding economy can offer opportunities to all sectors and segments of society, provided they are integrated into the larger expanding economy. Across the board, in subregional countries, rural areas containing most of the forest area struggle to be integrated fully into the growth sector for various reasons, including lack of secure physical capital (including land), infrastructure, marketing networks and capacity of the population to capitalize on opportunities through which further integration is possible.

For developing and emerging countries, this will have implications for the role of forestry in poverty reduction. For developed economies, this will have implications in revitalizing rural forest-based economies and job creation in rural areas.

Participatory approaches to forest management and provision of tenurial instruments for land and forest resources offer opportunities for forest-based communities to legitimately gain access to land and make long-term investments to practise sustainable natural resource management. The results may be poverty reduction and income generation with sustainable land management. The mid- to long-term effects of ongoing programmes need to be monitored to determine the viability of these programmes and whether the concomitant incentives are relevant in the face of other developments in other competing sectors such as agriculture. In order to secure long-term viability, communities and households involved will need to be equipped with skills, networks and support systems, including sufficient market information to respond to the changing preferences of the urban markets for forest products and services which become the source of financing.

Causes of land and resource degradation in developing countries are usually, at least partially, linked to unsustainable use of resources by rural populations. Developing economies can learn from other regional experiences of the effectiveness of participatory programmes and tenurial instruments to tailor to the situation in their countries.

7.2 Strategies

Institutional changes

As discussed earlier, in forest management, the role of the private sector is expanding in emerging economies and the private sector, including foreign investment, will continue to be the engine behind the growth of the forest industry for many of the forestry subsectors. In emerging and developing economies, land management and industry development will be increasingly shifted to the private sector and where relevant, communities and households.

On the other hand the roles of local governments are expected to expand, particularly if the economic viability of forests cannot be regained in developed economies and collaboration between the private and public sectors is becoming increasingly relevant. Reforms are taking place towards devolution of power to locally manage natural resources in order to better meet diversifying localized demands, including emerging demands such as ecotourism or carbon sequestration by forests.

In developing economies and in large parts of rural emerging economies, forest management and trade are largely associated with the informal sector, at least in some linkages along the supply chain. As foreign demand grows, rural communities and other participants in the informal sector will need to be able to respond.

This implies dynamic changes in institutional arrangements involving the forestry sector. Overall, stakeholders in the sector are expanding and the potential for collaborative partnerships is increasing. In order to best address the emerging needs and optimize delivery of services, roles and responsibilities among forestry stakeholders will need to be revisited and optimized. Reforms in public forestry institutions, research institutions and state-owned-enterprises will be inevitable.

The direction of the reform should be towards flexible partnership mechanisms that allow innovative financing mechanisms to evolve with optimal participation among stakeholders; at the same time, strengthening capacity for resolution and prevention of conflicts particularly between the emerging urban proponents of environmental services of forests and rural forest managers.

Building capacity at all levels

Most countries in the subregion have forest policies that prioritize these aspects. Yet implementation of these priorities has not been successful, being largely associated with the policy instruments applied and capacity in governance for translating policies and strategies into practice.

In developed economies, the challenge is in developing capacity at the local level for addressing localized diversified needs and increased autonomous governance.

For emerging economies, preparing a new generation of forestry professionals in both the public and private sectors will be critical. The new generation of forestry agents will not only be cognizant of the traditional aspects of silvicultural practices, but also act as promoters of other multiple forest functions and work with the various stakeholder groups to facilitate effective delivery of services through a collaborative approach.

Improving the quality of forestry data through improved capacity in monitoring and reporting will also be a critical challenge as more innovative schemes of forest financing are developed, including the hotly debated REDD.

Governance and controlling corruption will require sufficient attention in delivery of these services.

Advancing technology

For a growing economy with a large population and expanding demand, securing resources without undermining a sustainable balance in resources will be a major challenge. One that is already being explored in various ways, but will need to be continuously pursued is advancement in technology for increased efficiency in productivity during growing, harvesting and processing. Technology improvements can have significant impact on resource use as well as resulting trade patterns and industry growth, as countries in the subregion have witnessed through recent developments in application of softwoods for manufacturing of plywood, laminated veneer lumber and similar products.

Investing more in research and development for efficient wood-material use (including increasing energy efficiency of woodfuels) will be an important strategy for countries of the subregion where the forest industry is heavily dependent on imports to maintain competitiveness. For developed economies where labour costs are high, economic viability of utilizing domestic material including small-diameter thinnings and various other ‘waste wood’ will need to be part of the technological breakthrough equation for achieving the priorities of balancing forest conservation and production goals.

Exporting technologies applicable to the forestry sector such as GIS-based monitoring for land-use planning and inventory, including application for projections of climate change adaptation scenarios is also an area where subregional countries are expected to play an important role.

Regional and international collaboration and corporate governance

As a major import hub for forest products, demands from the subregion will have tremendous implications on resource-rich developing countries within and outside the region, led by the expanding demand from emerging economies.

The subregion will continue to play a role in setting international standards in forest products trade. For example, in recent years, standards for formaldehyde emissions in plywood significantly impacted the export markets; a ‘sick building syndrome’ scare occurred in developed import markets that resisted the import of high emission products and compelled changes in plywood production in emerging plywood markets. Standard setting is not limited to industrial standards, but also includes sustainability standards, social responsibility standards, or codes of practice. The developed economies of the subregion in particular will lead regional market trends; thus sending out a clear message on procurement policies will be an important responsibility. Regional cooperation can promote and monitor responsible investment and procurement practices via both public and private sector initiatives.

Strengthening corporate governance will also have positive implications in investment activities such as cross-border resource acquisition. The increasing role and power of private sector actors with cross-border activities calls for regional voluntary and mandatory mechanisms through which corporate governance is monitored.

Awareness raising

The green-economy scenario hypothesizes a vibrant civil society, which can perform the checks and balances for the public and corporate sector activities. Raising awareness levels on the various functions of forests among the public is a fundamental approach for participatory governance. The process can be significantly facilitated through communication technologies.

7.3 Overview of priority areas and strategies

East Asia countries are highly diverse socio-economically. The unfolding of scenarios and their implications on forests will be considerably different among countries.

While forests in developed countries will not be significantly impacted by larger societal trends, forest in emerging economies will be prone to more variability according to macroeconomic conditions. Also important is the impact of the subregion as a major

import hub for forest resource-exporting countries in the region and around the world.

Advancing technology to improve resource use and output efficiency will be an important strategy. While at the same time, raising awareness in energy and resource-saving among consumers will have major implications for future resource use. The public and private sectors both have responsibilities and great potential for investing in technology as well as conducting awareness raising. The role of industry and private sector companies will also be important. Strengthening corporate governance will facilitate the ensuring of resource sustainability and payment for external environmental costs.

On the production side, subregional countries will need to deliver on mounting and diversifying demands through participation and collaboration among various stakeholders, particularly engagement of the private sector and local communities. Enhancing the role of the community and private sector to optimize service delivery will be a key approach. But this will mean a considerable shift in the roles and responsibilities of respective players, requiring investment in building the capacity of public sector agents and private sector players to fulfil the new roles.

REFERENCES

- Benett, M.T. & Xu, J.** 2005. *China's sloping land conversion program: institutional innovation or business as usual?* Paper presented at the workshop on Payments for Environmental Services (PES) – Methods and Design in Developed and Developing Countries, Titisee, Germany, 15-18 June 2005. Organized by the Center for Development Research (ZEF), University of Bonn and CIFOR. Available at: http://www.cifor.cgiar.org/pes/publications/pdf_files/China_paper.pdf (accessed on 15/04/2010).
- BusinessGreen.com.** *South Korea commits \$85bn to develop eco-friendly industries* 7 July 2009. Available at: <http://www.businessgreen.com> (accessed 21/07/2009).
- Cabinet Office, Japan.** 2008. *2008 annual report on Japanese economy and public finance*. July 2008 (in Japanese). Available at: <http://www5.cao.go.jp/j-j/wp/index.html> (accessed 10/04/2009).
- Cabinet Office, Japan.** Web site of the local decentralization promotion committee Available at: <http://www.cao.go.jp/bunken-kaikaku/iinkai/torimatome/torimatome-index.html> (accessed 10/04/2009).
- China's National Climate Change Programme.** 2007. Prepared under the auspices of National Development and Reform Commission, People's Republic of China. Available at: <http://www.ccchina.gov.cn/WebSite/CCChina/UpFile/File188.pdf> (accessed April 2010).
- Daiwa Institute for Research (DIR).** 2009. *Japan economic outlook - 160th revision*. 12 March 2009 (in Japanese). Available at: <http://www.dir.co.jp/souken/research/report/economic/outlook/09031201outlook.pdf> (accessed 07/04/2009).
- Economic Research Service of the US Department of Agriculture.** Available at: <http://www.ers.usda.gov/Data/Macroeconomics/Data/ProjectedRealGDPValues.xls> (accessed 21/05/2009).
- Economist.** 21 May 2009. *Buying farmland abroad - outsourcing's third wave*. Available at: http://www.economist.com/world/international/displaystory.cfm?story_id=13692889 [accessed 23/05/2009].
- EconomistIntelligenceUnit(EIU).** 2009a. *Country report Japan-main report: April 01, 2009*. Available at: http://www.eiu.com/report_dl.asp?issue_id=1664393551&mode=pdf (accessed 10/04/2009).
- EIU.** 2009b. *Country report, China*. Economist Intelligence Unit. May 2009. Available at: www.eiu.com (accessed 26/05/2009).
- EIU.** 2009c. *Country report, Mongolia*. Economist Intelligence Unit. May 2009. Available at: www.eiu.com (accessed 26/05/2009).
- EIU.** 2009d. *Country report, Japan*. Economist Intelligence Unit. May 2009. Available at: www.eiu.com (accessed 26/05/2009).
- EIU.** 2009e. *Country report, South Rep. Korea*. Economist Intelligence Unit. May 2009. Available at: www.eiu.com (accessed 26/05/2009).
- EIU.** 2009f. *Mongolia politics: Poll preview*. ViewsWire May 22nd 2009. Available at: http://www.eiu.com/index.asp?layout=displayVw&article_id=954530880&geography_id=320000032®ion_id= (accessed 26/05/2009).

- EIU.** 2009g. *Country profile, China, Economist Intelligence Unit*. 2009. Available at: www.eiu.com (accessed 25/04/2010).
- Food and Agriculture Organization of the United Nations (FAO).** 2000. Asia and the Pacific National Forestry Programmes: Update 34. Available at: <http://www.fao.org/docrep/003/x6900e/x6900e00.htm> (accessed 13/04/2010).
- FAO.** 2001. *Global ecological zoning for the global forest resources assessment 2000; final report*. Available at: <http://www.fao.org/docrep/006/ad652e/ad652e00.htm#TopOfPage> (accessed 26/06/2009).
- FAO.** 2005. *Global forest resources assessment: progress towards sustainable forest management*. Rome, FAO.
- FAO.** 2007. *State of the world's forest 2007*. Rome, FAO, 2007.
- FAO.** 2008. *Contribution of the forestry sector to national economies, 1990-2006*, by A. Lebedys. Forest Finance Working Paper FFSM/ACC/08. Rome, FAO.
- FAO.** 2009a. *State of the world's forest 2009*. Rome, 2009.
- FAO.** 2009b. *People's Republic of China forestry outlook study*. APFSOS II. Bangkok, FAO Regional Office for Asia and the Pacific, 2009. Available at: <http://www.fao.org/world/regional/rap/APFSOS/2009-11China.pdf> (accessed April 2010).
- FAO.** 2009c. Draft country report for Japan, 2008. APFSOS II. Bangkok, FAO Regional Office for Asia and the Pacific, 2009.
- FAO.** 2009d. Draft country report for Rep. Korea, 2008. APFSOS II. Bangkok, FAO Regional Office for Asia and the Pacific, 2009.
- FAO.** 2009e. Draft country report for Mongolia, 2008. APFSOS II. Bangkok, FAO Regional Office for Asia and the Pacific, Bangkok, 2009.
- FAO.** 2010. *Global forest resources assessment 2010*. Rome, FAO.
- Forestry Agency, Japan.** 2008. *Summary of wood material self-sufficiency rates in 2007*. Press release, June 2008 (in Japanese). Available at: <http://www.rinya.maff.go.jp/j/press/kikaku/080630.html> (accessed April 2009).
- Forestry Agency, Japan.** Web site (in Japanese). Available at: <http://www.rinya.maff.go.jp/roudou/top2/index.htm> (accessed 10/04/2009).
- Forestry Agency, Japan.** Web site a. Protection forest area according to function - 2007 (in Japanese). Available at: <http://www.rinya.maff.go.jp/toukei/toukei.html> (accessed 12/04/2009).
- Forestry Agency, Japan.** Web site b. Forest area by ownership - 2002 (in Japanese). Available at: <http://www.rinya.maff.go.jp/toukei/18toukei/19-syoyusyamenseki.html> (accessed 12/04/2009).
- Global Environment Facility (GEF).** *GEF benefits index for biodiversity*. Available at: http://www.gefweb.org/Operational_Policies/raf/documents/GBI_Biodiversity.pdf (accessed 15/05/2009).
- Global Land Cover.** 2000. Database. European Commission, Joint Research Center, 2003/Globalis. Available at: <http://globalis.gvu.unu.edu/> (accessed 08/06/2009).
- Guardian, The.** 21 April 2009. *South Rep. Korea lights the way on carbon emissions with its £23 billion green deal*. Available at: <http://www.guardian.co.uk/environment/2009/apr/21/south-Korea-environment-carbon-emissions> (accessed 22/05/2009).

- Guardian, The.** 19 April 2009. *China considers setting targets for carbon emissions*. Article by J. Watts. Available at: <http://www.guardian.co.uk/world/2009/apr/19/china-environment-kyoto/print> (accessed 22/05/2009).
- Hayes, P.** 2009. Unbearable legacies: The politics of environmental degradation in North Korea. *Global Asia*, 4(2). Available at: http://www.globalasia.org/Current_Issues/V4N2_2009/Peter_Hayes.html (accessed 21/04/2010).
- Inoguchi, A. & Nair, C..T.S.** 2009. *Outlook of globalization in the Asia-Pacific forestry sector*. FAO, 2009.
- International Energy Agency (IEA).** 2009. *World energy outlook 2009*. Available at: <http://www.eia.doe.gov/oiaf/ieo/world.html> (accessed 10/07/2009).
- IEA.** 2007. *World energy outlook 2007*.
- International Finance Corporation (IFC).** 2009. *Gaining ground: integrating environmental, social and governance (ESG) factors into investment processes in emerging markets*. Available at: http://www.ifc.org/ifcext/sustainability.nsf/ContentPageDesignPreview/Publications_SustFinance (accessed 21/07/2009).
- International Forest Fire News (IFFN).** *The forest fires situation in Mongolia*. No. 36, (January to July 2007). Available at: http://www.fire.uni-freiburg.de/iffn/iffn_36/15-IFFN-36-Mongolia-1.pdf (accessed 23/05/2009).
- International Tropical Timber Organization (ITTO).** 2010. *Data snapshot: turning point for Japan's timber sector*. Market Information Service. Available at: http://www.itto.int/mis_detail/& lang=en (accessed 16/04/2010).
- ITTO.** 2009. *Tropical Timber Market Report*, 14(4), 16-28 February 2009.
- Japan Paper Association,** 2009. Statistical information on supply and demand. Statistical data table for 2000 to 2008 (in Japanese). Available at: <http://www.jpa.gr.jp/docs/stats/inventory.php> (accessed 06/04/2009).
- Japan Wood-Products Information and Research Center.** *Japan wood market monthly summary report - January 2008*. Available at: <http://www.jawic.or.jp/info/siky/siky0801.html>
- Jonsson, R. & Whiteman, A.** 2009. *Global forest product projections*. Rome, FAO.
- Kang, Hag Mo & Kohroki, Katsuhisa.** 2008. *A study on the mountain village income increase project – focused on the mountain village development projects of Gyeonggi Province in Rep. Korea*. Available at: <https://qir.kyushu-u.ac.jp/dspace/bitstream/2324/12874/1/p563.pdf> (accessed 03/07/2009).
- Komiyama, Ryoichi.** 2008. *Asia energy outlook to 2030: impacts of energy outlook in China and India on the world*. Japan, Energy Data and Modeling Center, Institute of Energy Economics, Japan (IEEJ).
- Korea Forest Service (KFS).** 2008. *Forest ownership*. Available at: http://english.forest.go.kr/foahome/user.tdf?a=common.HtmlApp&c=1006&page=/html/eng/Rep_Korea/facts/facts_040_010.html&mc=ENG REP_KOREA_FACTS_040 (accessed 12/04/2009).
- Ministry of Agriculture, Forestry and Fisheries (MAFF), Japan.** 2010. *Timber import in 2009* (in Japanese). Press release. Available at: http://www.rinya.maff.go.jp/j/press/boutai/pdf/100323_1-01.pdf (accessed 16/04/2010).

- MAFF.** 2008. *Forest and forestry white paper - fiscal year 2007* (in Japanese). Available at: http://www.maff.go.jp/j/wpaper/w_rinya/h19/zenbun.html (accessed April 2009).
- MAFF.** 2005. *Trends in generation and utilization of biomass materials* (in Japanese). Available at: http://www.maff.go.jp/j/biomass/pdf/riyou_jyokyou.pdf (accessed 14/04/2009).
- Ministry of Environment, Japan.** 2008. *Establishing a sound material-cycle society white paper - fiscal year 2008* (in Japanese). Available at: <http://www.env.go.jp/policy/hakusyo/h20/> (accessed November 2010).
- Ministry of Land and Transport (MLIT), Japan,** 2008. *New housing starts in 2008 (summary). Statistical data on housing and constructions Web site.* Available at: <http://www.mlit.go.jp/common/000032032.xls>
- Ministry of Land Transport and Maritime Affairs (MLTM), ROK.** *Statistical yearbook 2008.* Available at: http://www.mltm.go.kr/DataCenter/StatisticData/08sta/04/04_46.html (accessed 21/04/2009).
- Ministry of Nature, Environment and Tourism (MNE), Training and Research Centre for Sustainable Development.** 2007. *National sustainable development strategy of Mongolia - Strategic assessment report.* Available at: <http://www.rrcap.unep.org/nsds/uploadedfiles/file/nea/mo/reference/NSDS-MO-Strategic%20Assesment%20Report%20of%20NSDS.doc> (accessed 16/07/2009).
- MNE, Mongolia.** 2009. *Fourth national report on conservation of biodiversity of Mongolia.* 2009. Available at: <http://www.cbd.int/doc/world/mn/mn-nr-04-en.pdf> (accessed 15/04/2010).
- National Development and Reform Commission (NDRC), People's Republic of China.** 2007. National mid- and long-term development plan for renewable energy (draft English version). September 2007. Available at: <http://www.chinaenvironmentallaw.com/wp-content/uploads/2008/04/medium-and-long-term-development-plan-for-renewable-energy.pdf> (accessed May 4, 2010).
- National Institute for Population and Social Security Research.** 2008. *Nippon no setaisu shourai suikei.* March 2008. Available at: <http://www.ipss.go.jp/pp-ajsetai/j/HPRJ2008/gaiyo20080314.pdf> (accessed 10/04/2009).
- OECD/FAO.** 2008. OECD – FAO Agricultural Outlook 2008-2017. Available at: <http://www.fao.org/es/esc/common/ecg/550/en/AgOut2017E.pdf>.
- Social Investment Forum, Japan.** 2007. *Trends in net asset worth and number of public access SRI mutual funds, as of December 31, 2008* (in Japanese). Available at: <http://www.sifjapan.org/document/asset.pdf>
- State Forestry Administration (SFA) of China.** Website. Available at: <http://english.forestry.gov.cn/web/index.do>
- UNCOMTRADE.** Website. Available at: <http://comtrade.un.org/>
- United Nations Convention to Combat Desertification (UNCCD).** Web site. Available at: <http://www.unccd.int/regional/menu.php> (accessed 12/05/2009).
- United Nations Department of Economic and Social Affairs (UN DESA) Population Division.** 2007. *World population prospects: the 2006 revision, highlights.* Working Paper No. ESA/P/WP.202. Available at: http://www.un.org/esa/population/publications/wpp2006/WPP2006_Highlights_rev.pdf

- United Nations Economic and Social Commission for Asia and the Pacific (UN ESCAP).** 2008. *Statistical yearbook for Asia and the Pacific 2008*. Available at: <http://www.UN ESCAP.org/stat/data/syb2008> (accessed 11/05/2009).
- United States Department of Agriculture Foreign Agriculture Service (USDA, FAS).** 2007. *Gain report – Taiwan P.o.C solid wood products annual 2007*. Available at: <http://www.fas.usda.gov/gainfiles/200708/146292154.pdf> (accessed 26/06/2009).
- World Bank.** 2009. *List of economies (as of April 2009)*. Available at: <http://siteresources.worldbank.org/DATASTATISTICS/Resources/CLASS.XLS> (accessed 22/05/2009).
- World Bank. 2008. World development indicators 2008. Available at: <http://web.worldbank.org/WBSITE/EXTERNAL/DATASTATISTICS/0,,contentMDK:21725423~pagePK:64133150~piPK:64133175~theSitePK:239419,00.html> (accessed 09/09/2009).
- World Bank.** 2007. *East Asia environmental monitor, 2007: adaptation to climate change*. Available at: <http://www.worldbank.org/monitor> (accessed 25/05/2009).
- World Bank,** 2003. Mongolia environmental monitor 2003: land resources and their management. Available at: <http://www.worldbank.org/monitor> (accessed 25/05/2009).
- World Economic Forum.** 2008. The global enabling trade report 2008. Available at: <http://www.weforum.org/en/initiatives/gcp/GlobalEnablingTradeReport/index.htm> (accessed 01/07/2009).
- Yan, Zhan.** Undated. *China seeks a balance between food security and the urbanization*. Article posted in the Chinese Embassy of the USA. Available at: <http://www.china-embassy.org/eng/zt/t516240.htm> (accessed 23/05/2009).
- Zaohua, Zhu,** 2001. *Sustainable development of the bamboo and rattan sectors in tropical China*. China Forestry Publishing House. Available at: http://www.inbar.int/publication/txt/INBAR PR_06.htm (accessed on 16/04/2010).
- Ziyong, Le.** 2004. A policy review on watershed protection and poverty alleviation by the Grain for Green Programme in China. In *Proceedings of the workshop Forests for Poverty Reduction: Opportunities with Clean Development Mechanism, Environmental Services and Biodiversity*. FAO. Available at: <http://www.fao.org/docrep/008/ae537e/ae537e0j.htm#bm19> (accessed 02/06/2009).

In the 12 years since the first Asia-Pacific Forestry Sector Outlook Study was completed in 1998, the region has experienced tremendous changes in nearly every aspect. These changes have been particularly profound in the forestry sector, where society has dramatically increased its demands and expanded its expectations of forests and forestry. This subregional report for East Asia summarizes the key findings and results collated under the second Asia-Pacific Forestry Sector Outlook Study – a comprehensive effort spanning nearly four years and involving all member countries of Asia-Pacific Forestry Commission. The current report synthesizes observations and findings from four East Asian country reports, numerous thematic reports and a review of current and past publications in providing analyses of the status and trends of forests and forestry in East Asia. The publication analyses key factors driving changes in forestry in the region and sets out three scenarios for 2020: High growth, Low growth and Green economy. The report also outlines priorities and strategies to move the subregion's forestry sector onto a more sustainable footing and to provide continued benefits to future generations.



9 789251 066997