

Assessing the Socio-Economic Benefits of Meteorological and Hydrological Services

Glen Anderson, Chief of Party
Climate Change Resilient Development Project
Montego Bay, Jamaica
December 4, 2013

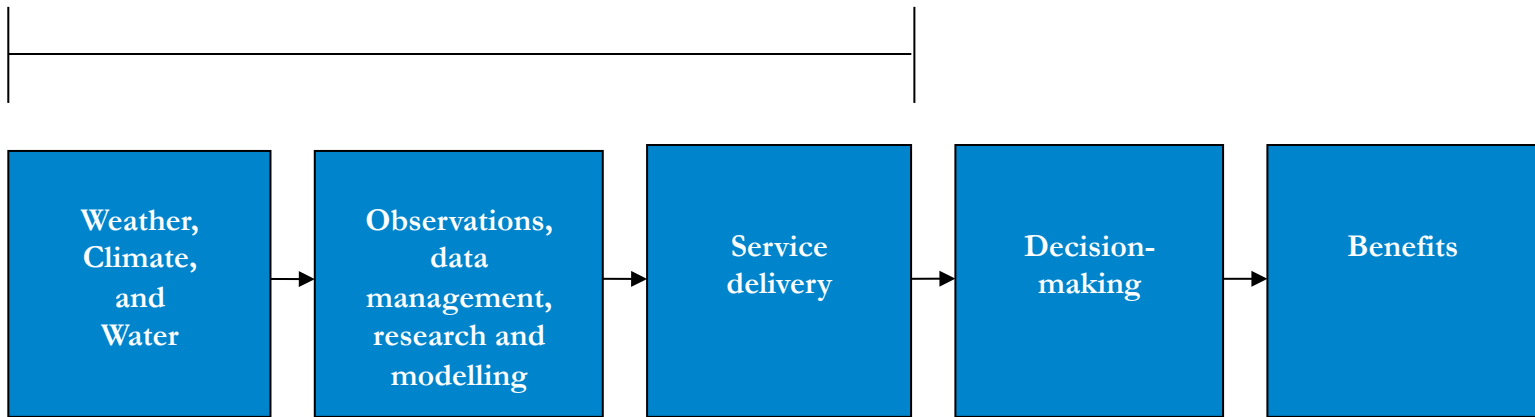


Weather, climate, and hydrological (WCH) services

- WCH services can be categorized in terms of the following:
 - Type of service provided
 - Meteorological and hydrological variables provided
 - Phenomena involved
 - Method of service delivery
 - User communities served
- Organization of services:
 - National Meteorological Services (NMSs)
 - National Hydrological Services (NHSs)
 - National Meteorological and Hydrological Services (NMHSs)

Delivering WCH service benefits

10 billion USD globally for NMHSs



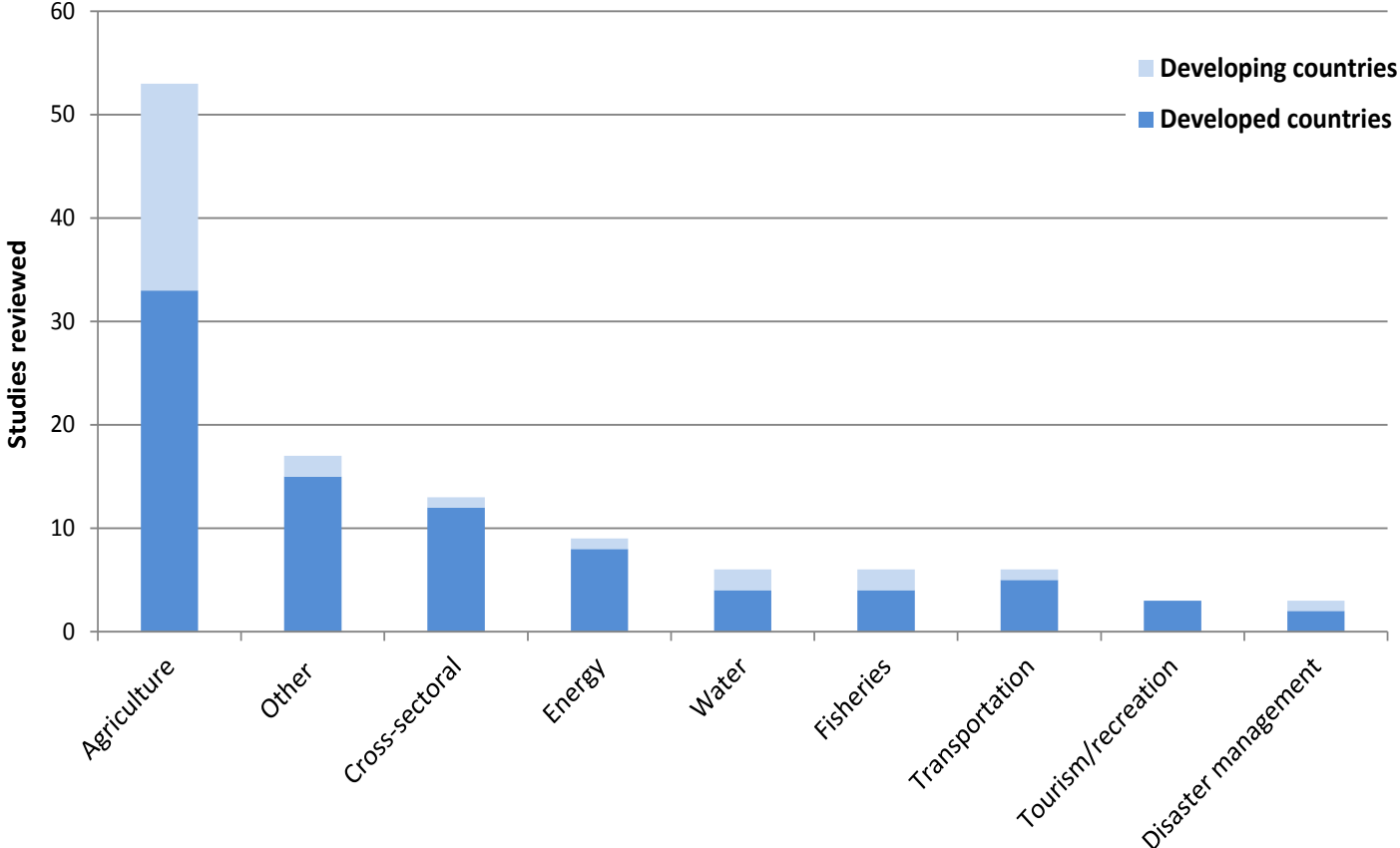
Benefits of WCH services

- Two primary types of benefits:
 - Avoided costs and damages:
 - Physical assets – buildings, infrastructure, vehicles and equipment
 - Harm – injury, illness, mortality
 - Benefits due to decisions informed by information and services
- Benefits accrue to:
 - Individuals and households
 - Businesses and public/private service providers (e.g., schools, hospitals, water, wastewater, energy, transportation, telecommunications)

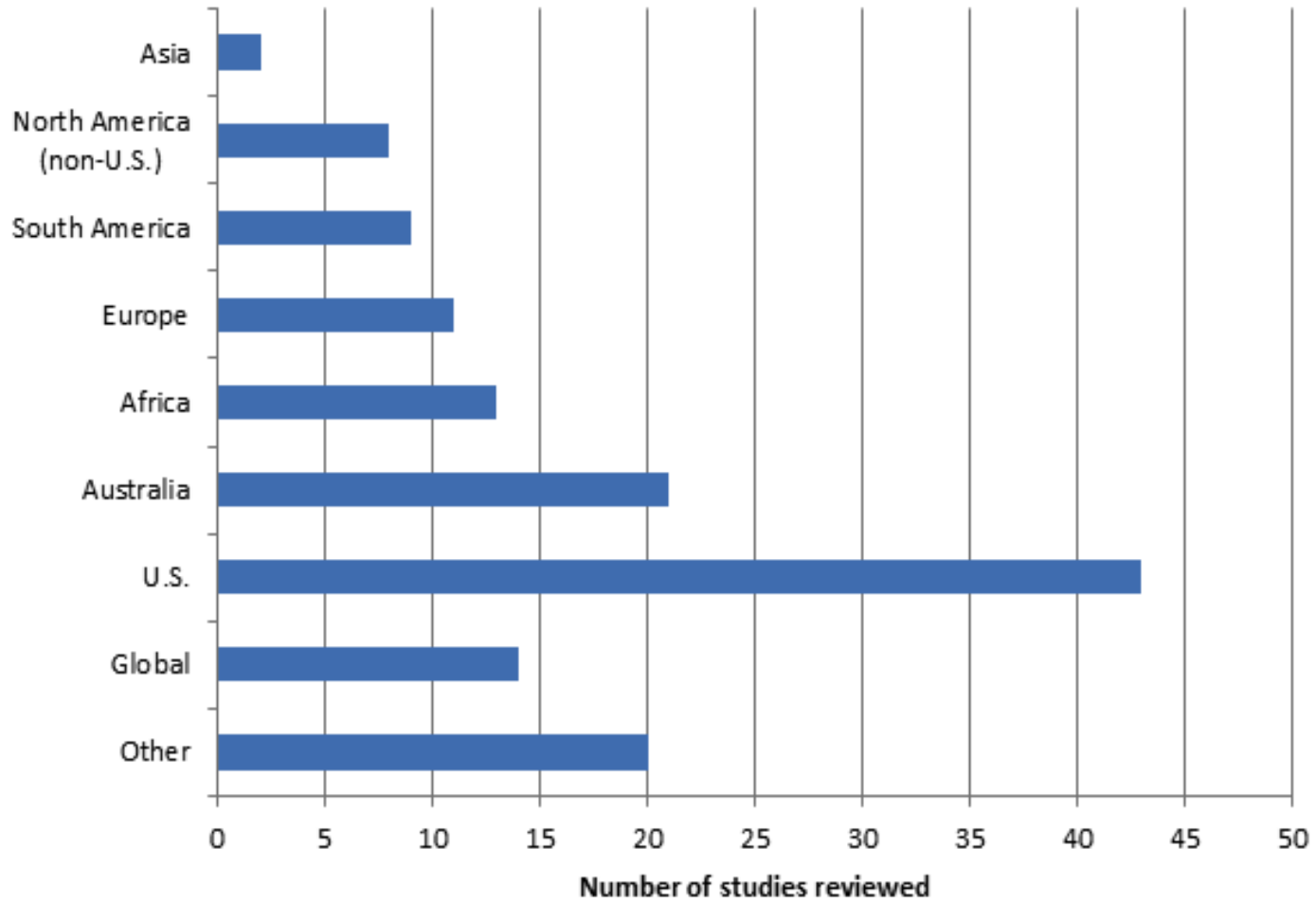
Motivation for SEB Studies

- NMHS Budgeting
 - In the past, WCH services understood to generate benefits greater than costs
 - As costs have increased, NMHSs required to justify expenditures in terms of benefits of their services
- Changes in services
 - Ex ante studies: adding a new service; expanding or improving an existing service
 - Ex post studies: determining if an existing service has yielded benefits greater than the costs of the service
- Diffusion of services
 - Input to inform awareness campaigns and educational programs

Literature Survey: Distribution by Sector



Study Characteristics: Geographic Distribution of Studies



Example Benefit Estimates – Agricultural Studies



Farm level

- \$0.44 – 0.85 in willingness-to-pay by households in Zimbabwe for improved seasonal forecasts
- \$9-35 per acre by adjusting crop mix to ENSO phase in Argentina

Regional/National

- \$1.1 million in annual benefits for Australian farmers in Merredin region with forecasting technology that provides 30% decrease in seasonal uncertainty
- \$10 million annually for Mexico economy with use of ENSO early warning system by farmers

Sector-level

- \$36 million in benefits to Canadian hay production with daily precipitation forecast
- \$1.1 billion in losses to U.S. agriculture from incorrect 2000 drought

Global/National

- Global annual value of ENSO phase information in agriculture ranges from \$399 million to \$556 million to \$1,390 million.
- Global value of climate prediction approximately \$900 million



Example Benefit Estimates – Other Sectors

Energy

100% increase in net weekly income for wind energy producers in Europe with medium-range forecasts

\$1 to \$6.5 billion in decadal hydropower benefits for Ethiopia with perfect ENSO-based precipitation forecast

Fisheries

\$902,000 in average annual total welfare benefits related to Pacific Coho salmon fishery with use of perfect ENSO forecast.

Transportation

\$11 million in avoided costs of carrying extra fuel for Qantas Airlines in Australia due to improvements in terminal aerodrome forecast information

\$56.1–60.1 million in avoided costs to Swiss economy with use of weather services in the transportation sector

Other

Households willing to pay \$25–41 per year for tropical cyclone service in Australia

\$468 million in avoided fatalities from Philadelphia's heat watch/warning system from 1995 - 1998

Water

Up to \$11.6 million in annual welfare benefits with perfect ENSO forecasts in the Northern Taiwan regional water market

\$100-350 million in annual benefits to Georgia in drought years with use of water management strategies based on precipitation index forecast.

SEB Book

- Working title: “Assessing the Socio-Economic Benefits of Meteorological and hydrological Services”
- Objectives:
 - Increase awareness of SEB
 - Provide a rigorous foundation and practical guidance for assessing SEB for individual services and service-providing organizations
 - Provide guidance in communicating results of SEB studies
- Audience:
 - Meteorologists and Hydrologists
 - Economists and other social scientists
 - Policy-makers, researchers, and practitioners in these disciplines
- Schedule – Final draft for production by Summer 2014

Structure of the SEB Book

- Motivation for the book, importance of SEB studies – Chapters 1 and 2
- Understanding how to design a SEB study – Chapter 3
- Contributions of social sciences – Chapter 4
- Basics of conducting SEB studies – Chapters 5 through 8
- Interpreting and communicating the results of SEB studies – Chapter 9
- Case studies and reference material – Chapter 10 and Appendices 1 through 3

Audiences for the SEB Book

Chapter/ Annex	Title	Primary Audience(s)	Secondary Audience(s)
Chapter 1	Introduction	All Audiences	
Chapter 2	Use and Limitations of SEB Analysis: What Studies Have Been Done	NMHS-MGMT; NMHS-TECH; ECON	GOVT; USER
Chapter 3	Designing an SEB Study	NMHS-TECH; ECON	NMHS-MGMT; NMHS-COMM; GOVT
Chapter 4	Contextual and Analytical Contributions from the Social Sciences	NMHS-TECH; ECON	NMHS-MGMT; NMHS-COMM; GOVT
Chapter 5	Economic Essentials	ECON; NMHS-TECH	NMHS-MGMT; NMHS-COMM
Chapter 6	Defining and Measuring Benefits	ECON; NMHS-TECH	NMHS-MGMT; NMHS-COMM
Chapter 7	Defining and Measuring Costs	ECON; NMHS-TECH	NMHS-MGMT; NMHS-COMM
Chapter 8	Benefit Cost Analysis	ECON; NMHS-TECH	NMHS-MGMT; NMHS-COMM
Chapter 9	Communicating SEB Study Results	NMHS-COMM; NMHS-MGMT; NMHS-TECH	GOVT; USER; PUBLIC
Chapter 10	Case Studies	NMHS-TECH; ECON	NMHS-MGMT; NMHS-COMM; GOVT
Appendix 1	Glossary of Key Meteorological, Hydrological and Economic Terms	All Audiences	
Appendix 2	Meteorological and Hydrological Services	ECON; USER; PUBLIC	GOVT
Appendix 3	A Short History of Studies of Socio-Economic Benefits of Meteorological and Hydrological Services	NMHS-TECH; ECON	NMHS-MGMT; NMHS-COMM

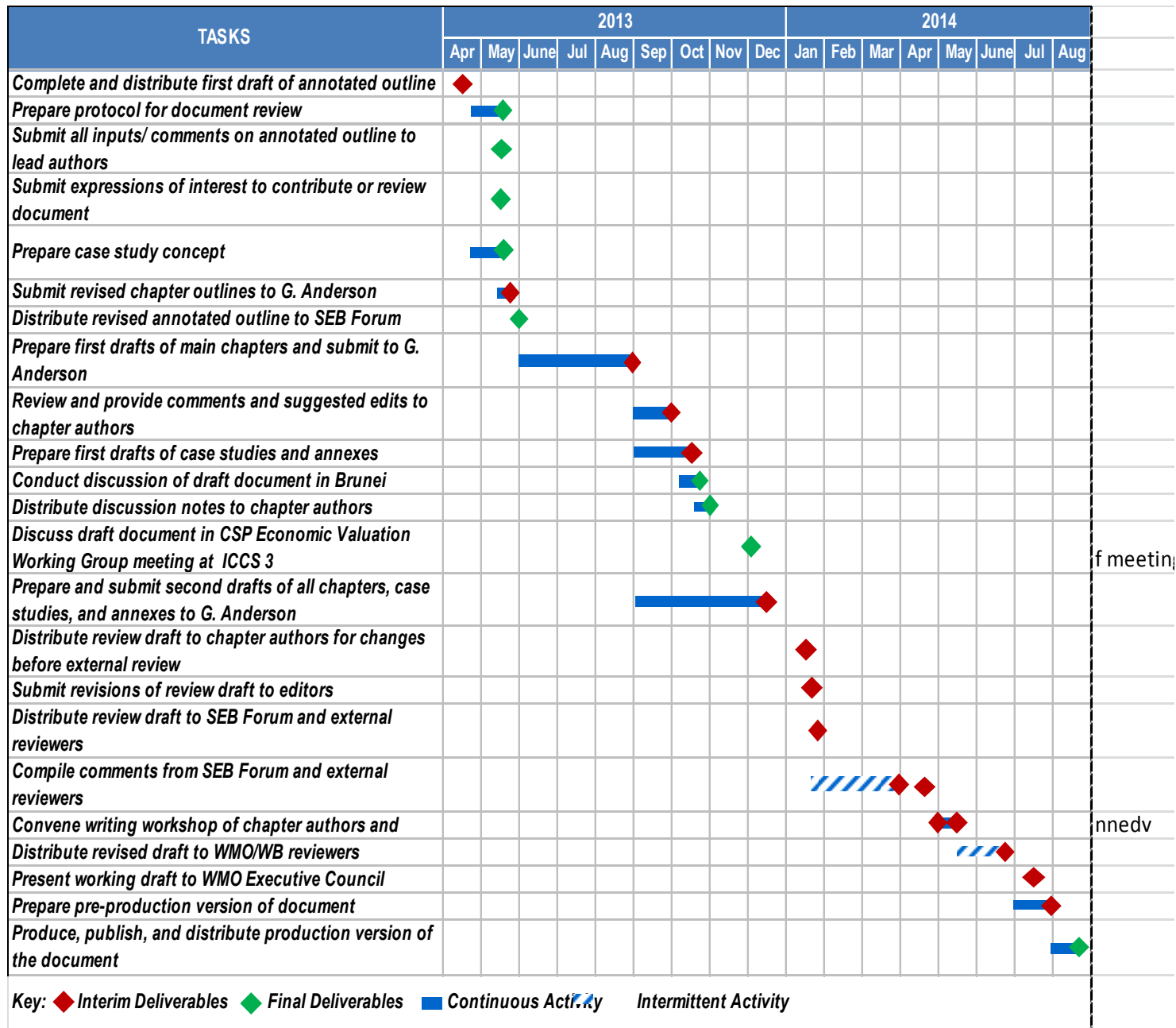
Audiences: NMHS Senior Management (NMHS-MGMT); NMHS Technical Staff (NMHS-TECH); NMHS Communications Staff (NMHS-COMM); Other Government (GOVT); Economists (ECON); User Groups (USER); General Public (PUBLIC)

Value of the book to different audiences

- NMHS – Senior managers
 - Basic understanding of SEB studies
 - What to expect from SEB studies
 - Suggestions for communicating results
- NMHS – SEB study managers
 - Basic understanding of SEB studies
 - Organizing SEB studies
 - Preparing terms of reference
- NMHS – Service producers
 - Familiarity with the value chain
 - Increased awareness of user needs
- NMHS – Communications/PR specialists
 - Role of communications strategies in SEB studies

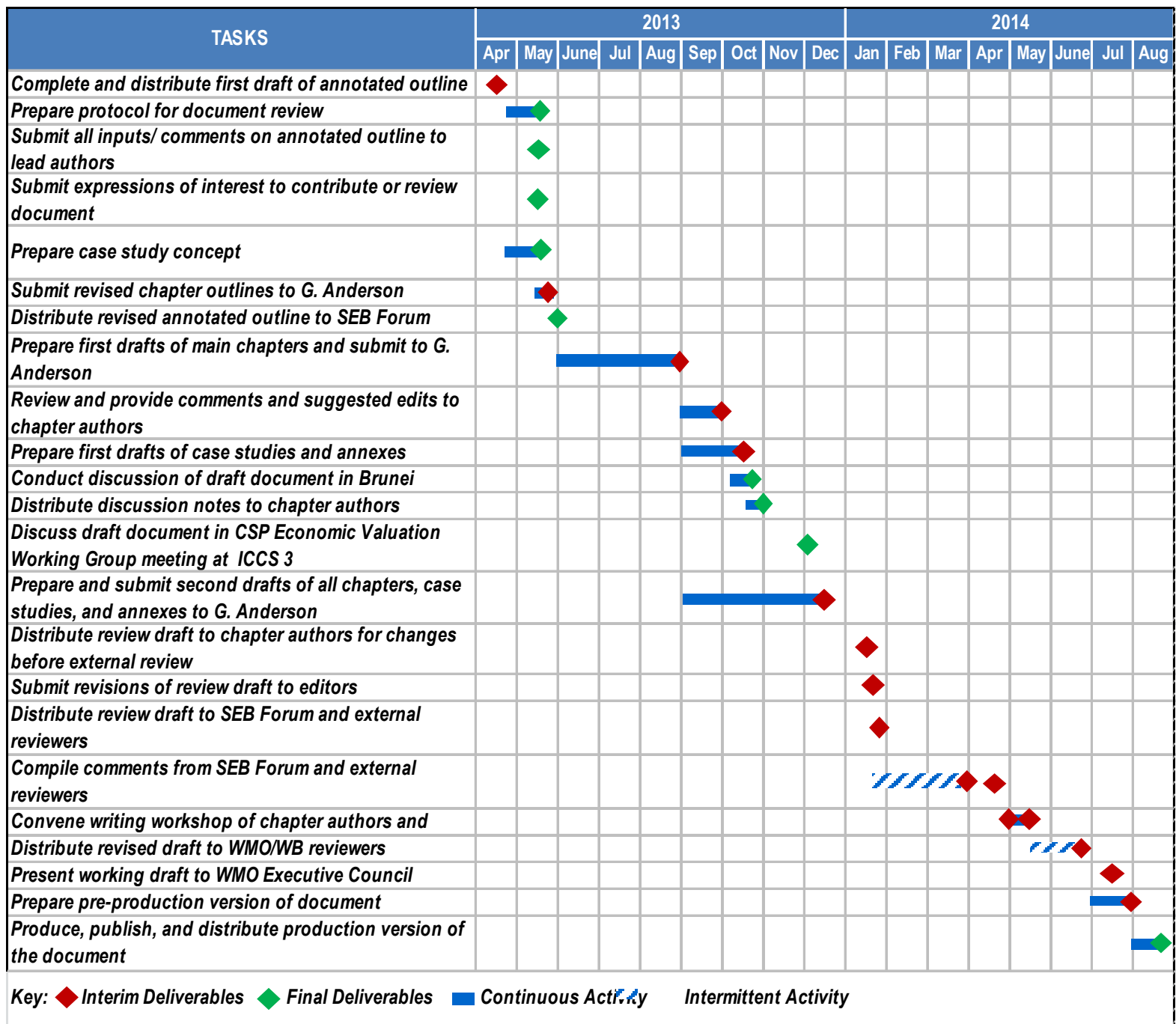
Value of the book to different audiences

- Other government
 - Basic understanding of met and hydromet services
 - Basic understanding of SEB studies
- Economists and social scientists
 - Basic understanding of met and hydromet services
 - Familiarity with the value chain
 - Economic BCA fundamentals and applications to met and hydromet services
- User groups
 - Basic understanding of benefits of met and hydromet services
- General public
 - Basic understanding of met and hydromet services
 - Basic understanding of the benefits of services



f meeting

nnedv



Key: ◆ Interim Deliverables ◆ Final Deliverables ■ Continuous Activity ▨ Intermittent Activity