

Applied Agrometeorology

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Editor

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 Springer

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ISBN 978-3-540-74697-3 e-ISBN 978-3-540-74698-0
DOI 10.1007/978-3-540-74698-0
Springer Heidelberg Dordrecht London New York

Library of Congress Control Number: 2010925334

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Cover illustrations: Taking leaf and soil samples in mulching experiments in alley cropping research at the KARI Dryland Research Station, Machakos, eastern Kenya, with agriculture on sloping lands in the background (top over whole page and below that in the centre); Nomads with their animals and sedentary farmers using the same area between shelterbelts in Yambawa, northern Nigeria. Only differentiation between their needs and sustaining complementarity of their lifestyles in a changing climate will prevent resource conflicts (below top, right hand side); Adding shades to protect traditional grain storage bins from moisture influx due to solar radiation on previously wetted bin walls at the Uyole Experiment Station, Mbeya, southern Tanzania (below top, left hand side). [Photos Kees Stigter]

Cover design: deblik, Berlin

Printed on acid-free paper

Springer is part of Springer Science+Business Media (www.springer.com)

I recently presented an invited paper “Rural response to climate change in poor countries: ethics, policies and scientific support systems in their agricultural environment” at an International OECD Policy Conference at the University of Wisconsin, Madison (USA), 29 June till 1 July 2009, on “Sustaining soil productivity in response to global climate change: science, policies and ethics”. One of my conclusions was that (external) ethics is these days a (rare but) thoroughly accepted reason to decide to work in and for developing countries in Africa, Asia, Latin America. I took that decision more than 40 years ago. This ethical choice was based on my own suffering from the poverty that I had witnessed during early travels (in the 1960s) in these three continents.

Intuitively applying an interpretation of the Buddhist philosophy of the four Noble Truths (e.g. Brazier 1997), I learned that one can respond to such personal affliction by this rural suffering from physical and socio-economic (environmental) disasters in a practical way. Going the eightfold path of the right view (of ourselves), the right thought (of higher purpose), the right speech (of the vow of aspiration), the right action (of being part of a big story), the right livelihood (lifestyle), the right effort (intensity), the right mindfulness (remembrance and transcendence) and the right (transformative) vision. In doing so, one’s private suffering may be diminished as well.

Kees Stigter

Reference

Brazier D (1997) *The feeling Buddha*. Robinson, London, 207pp

Preface

The contents of this book are meant to assist applied agricultural scientists in learning from case studies and other background material how to apply agrometeorology better to solve problems in the livelihood of farmers and other agricultural producers. It also wants to create a renaissance in the teaching (that is education/training/extension) of applied agrometeorology at all levels, closer to the livelihood of farmers and other agricultural producers.

Agrometeorological services are therefore the ultimate focus of this book and applied agrometeorology is shown in the service of farmers, forest and agroforestry related practitioners, and other stakeholders in using an agricultural environment to get enough and better food, fodder, fibre and other natural products.

Early in the course of 40 years of international research, teaching and consultancy, particularly in the non-industrialized world, and more than 20 years of elected international leadership (WMO, INSAM) in agrometeorology, I had become fully convinced that applied agrometeorology should actually be dealt with along different lines.

A WMO educational meeting in New Delhi early in 2007 (see Part I of this book) gave me the opportunity to test some of my ideas with some also invited colleagues from various parts of the world that would advise on new curricula in agrometeorology. They agreed with my proposal to abandon the entry towards Applied Agrometeorology through Basic Agrometeorology and to find entries for it of its own.

Once we had agreed on this basic dichotomy, that meeting designed and approved “Strategic Use of Climate Information”, “Coping with Climate Variability and Climate Change”, “Coping with Extreme Meteorological Events”, “Tactical Decision Making Based on Weather Information” and “Developing Risk Management Strategies” as the present main entry paths to Applied Agrometeorology.

On my way back from New Delhi to Indonesia, waiting for new visa in Singapore, I finalized among others curricula contents under these headings in the form of postgraduate syllabi in an earlier agreed format. I made use of my own earlier ideas and they were later on generally approved by the other New Delhi participants in e-mail contacts. I have to note that I do not like the terminology of “risk management” for small farmers, that generally try hard to cope with their environmental difficulties more than that they manage them. These syllabi are given

in their original form in Annex I.I of Part I of this book. This shows that much historical material needed for new policies would also be collected in writing these syllabi. This is particularly also fully in line with the Sect. II.D on “Communication approaches in applied agrometeorology”.

As indicated in Part I, for that part of these syllabi in which a link with basic agrometeorology is made, material has been collected in Part III of this book. It must show bedrock material for existing or new agrometeorological services. Within local agrometeorology, so on the scale of agricultural fields, this book wants to follow an approach in which actual problems in the livelihood of farmers are shown to be solvable using purely applied science. The latter should be supported by the methods, as tools and approaches, of Part IV, that belong to the basic science support systems.

It should be noted from the agrometeorological services examples collected in Part II that so far the knowledge input into these services is in many cases relatively simple but the complications are in the communications. In collecting and writing the contents of Part III, this has been taken into account. But it means that the enormous amount of material collected may be expected to be a powerful source of tools and approaches for the design of agrometeorological services in many problem fields for a long time to come, scientifically supported by the directions of the contents of Part IV. The context in which we collected the material as agrometeorologists should stimulate the design of more and better agrometeorological services.

In this Part III, the choice of the various subjects, derived from the proposed subdivision of the syllabi under the five headings mentioned above, is fully mine. Their contents are a first approach to the syllabi and determined by the various authors that have written about these subjects. In all cases these authors had been given an example of the proposed approach in the form of respectively Sects. III.2.3.(A), III.3.3.(A), III.4.3.(A), III.5.3.(A), III.6.A.(i), III.6.B.(i) and III.6.C.(i) with the title: “Problems and solutions in coping with extreme meteorological events in agricultural production and challenges remaining for the use of science to contribute to problem analyses and designing valuable solutions in this context” for the respective fields of (i) monocropping, (ii) multiple cropping, (iii) forestry, (iv) non-forest trees, (v) animal husbandry, (vi) cropping under cover and (vii) fisheries.

I am also stating in Part I that once such courses will materialize, it will appear to be information also needed in designs of further adaptation strategies and policies. Good Ph.D.-, M.Sc.- and B.Sc.-thesis research subjects can be designed for increasing the numbers and improving the contents of documented case studies, because often the available information will need extension, adaptation and updating. This is one way in which research can become more relevant to problem solving and problems related teaching and can help improve them. Local knowledge collection will also help in tying research and teaching to meteorological disaster impact experience and to improved preparedness of farmers in different land use and cropping patterns.

After all, it are these thorough links between practice, education/training/extension, policies, research and science in agricultural production that make

applied agrometeorology relevant and valuable, if and when the right ethical choices have been made.

Bruchem, The Netherlands
August 2009

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Acknowledgments

This book is far from a one man's exercise. There are 113 contributors to Parts II, III and IV, of which 40 in the protocols of Part II, 40 in Part II (outside the protocols) and Part III together, and 36 in Part IV, with little overlap. I consider their participation as indispensable and most valuable. I wrote Part I all alone, was editing all 30 protocol contributions to Part II and was a co-author in 10 of them. I was involved as author, co-author or advisor (as Kees Stigter or C.J. Stigter) in more than 70 of the 120 contributions to Parts II (outside the protocols), III and IV. I edited all contributions together with their (co-)authors.

As to Part II, I developed the protocol and I had the privilege to be able to use material we collected and assessed in this form in the annual INSAM contests. Although the CMA/CAU/APMP project is far from finalized, I am happy that I was able to have here a draft version of ten protocols that I could edit from an early translation by a team headed by Xiao Hongxian within the CMA. This was just sufficient to show and discuss the value of this material, even when not final. I am thankful to CMA and CAU for the support received.

In Part III there were 29 other fine authors, but two stand out in contributing to more than 10 chapters. Dr. H.P. Das and Dr. Kulasekaran Ramesh brought this way into the book an important flavor from Asia and what is important there, for which my particularly deep thanks. From four to six contributions were delivered by Drs. Emmanuel Ofori, Nicholas Kyei-Baffour and Sue Walker, from Africa, to the part on multiple cropping; by Dr. Al Riebau to the part on forest (agro)meteorology; by Drs. Luigi Mariani and Osvaldo Failla to the part on non-forest trees; and by Dr. John Gaughan to the part on animal husbandry. Without these nine multi-chapter authors, this book would also not have its present form and contents. The other 20 authors particularly also contributed to the great variation in material collected for use in the design of all kinds of agrometeorological services thinkable.

In Part IV, 15 lead authors and 21 co-authors took part in bringing scientific contributions as support systems close to applications in agrometeorology, illustrating very important methods, as tools and approaches, in exercises themselves important in the design of agrometeorological services.

I have worked for more than $3\frac{1}{2}$ years to think, get and build these contributions together in one major plan, to show the extent of applied agrometeorology when viewed from the angles of services to be established in the livelihoods of farmers

and other agricultural producers. May through our joint efforts in this book many agrometeorologists now get a better feeling for what is possible in applying agrometeorology this way.

Bruchem, The Netherlands
August 2009

Kees Stigter

Contents

Dedication	v
Preface	vii
Acknowledgments	xi
Contents	xiii
Contributorsxxx
About the Editorxxxvii

PART I INTRODUCTORY PART

I Introductory Part	3
Kees Stigter	
I.1 Introduction to Part I	3
I.2 Agrometeorology, a Broad Definition (and Other Starting Issues)	4
I.3 Agrometeorology, an “End to End” Information Flow Scheme	7
I.4 Agrometeorology, Applications and Use	15
I.5 Agrometeorological Services	19
I.6 Boundary and Initial Conditions for Solving Problems with Agrometeorological Components	31
Annex I.I Postgraduate Syllabi Applied Agrometeorology	34
Annex I.II Conceptual and Diagnostic Framework: Information Flow	44
Annex I.III Syllabi Agrometeorological Extension Intermediaries	45

PART II OPERATIONAL APPLICATIONS OF AGROMETEOROLOGICAL SERVICES

II.A Introduction to Part II (INSAM Examples)	55
Kees Stigter	

II.B Introduction to Part II (CMA/CAU/APMP Examples)	75
Kees Stigter, Zheng Dawei, Wang Shili, and Ma Yuping	
II.C Agrometeorological Services	101
II.1 Design of sand settlement of wind blown sand using local trees and grasses (Sudan)	102
Nawal K. Nasr Al-Amin, C.J. Stigter, Ahmed Eltayeb Mohammed	
II.2 Agrometeorological service for irrigation advice (Cuba)	108
Ismabel María Domínguez Hurtado	
II.3 Frost forecast service for Inner Mongolia in 2007 (China)	114
Wei Yurong	
II.4 Design of protection of sloping land from soil loss and water run off using hedgerow intercropping (Kenya)	118
Josiah M. Kinama, C.J. Stigter, C.K. Ong	
II.5 Design of multiple shelterbelts to protect crops from hot dry air (Nigeria)	123
Lambert O.Z. Onyewotu, C.J. Stigter, J.J. Owonubi	
II.6 Seasonal vegetable growing on riverbeds – a farmers’ innovation (India)	129
Rajendra Prasad, Virendar Singh	
II.7 Agrometeorological information for the prevention of forest and wildland fires (Cuba)	133
Ismabel María Domínguez Hurtado	
II.8 Furrow planting and ridge covering with plastic for drought relief in semi-arid regions (China)	138
Li Chunqiang	
II.9 Design of on-station alley cropping trials on flat land in the semi-arid tropics (Kenya)	142
David N. Mungai, C.J. Stigter, C.L. Coulson, J.K. Ng’ang’a	
II.10 Early snow melting through surface spread of soil material (India) .	147
Rajendra Prasad, Vijay Singh Thakur	

II.11 Water use and water waste under traditional and non-traditional irrigation practices (Sudan)	151
Ahmed A. Ibrahim (dit Kabo), C.J. Stigter, H.S. Adam, A.M. Adeen	
II.12 Shelterbelt design for protection of irrigation canals and agricultural land from blown sand encroachment (Sudan)	157
Ahmed Eltayeb Mohammed, C.J. Stigter, H.S. Adam	
II.13 Design of improved underground storage pits (matmura) for sorghum in cracking clays (Sudan)	162
Ahmed el-Tayeb Abdalla, C.J. Stigter, M.C. Gough, Nageeb Ibrahim Bakheit	
II.14 Improved design of millet based intercropping systems using on-station field research and microclimate manipulation (Nigeria)	168
Tunji Oluwasemire, C.J. Stigter, J.J. Owonubi	
II.15 Design of wind protection agroforestry from experience in a demonstration plot of hedged agroforestry (Kenya)	174
Silvery B.B. Oteng'i, C.J. Stigter, J.K. Ng'ang'a, H.-P. Liniger	
II.16 Applying straw mulch on winter wheat in winter to improve soil moisture conditions (China)	179
Li Chunqiang	
II.17 Using shade trees to ameliorate the microclimate, yields and quality of tea (India)	183
Rajendra Prasad, K.L. Sharma	
II.18 Explaining wind protection of coffee from umbrella shade trees (Tanzania)	187
Reuben M.R. Kainkwa, C.J. Stigter	
II.19 Development and establishment of a drought early warning system (Cuba)	190
Roger E. Rivero Vega	
II.20 Development of a web-based optimal irrigation calendar (Portugal)	195
Jorge Maia, Miguel Castro Neto, Isaurindo Oliveira	
II.C.I Advisory and service system of crop and variety planning in Xing'an	199
Hou Qiong, Tang Hongyan, Niu Baoliang	

II.C.II Sowing advice for spring wheat depending on the frost melting condition in the autumn irrigated top soil in Bayannur	205
Hou Qiong, Yang Song	
II.C.III Improving microclimate for water melon by covering sandy soil with pebbles	210
Liu Jing, Zhang Yulan	
II.C.IV Forecasting fungus disease conditions for wolfberries	217
Liu Jing	
II.C.V Refined agroclimatic zoning used for planning of growing navel oranges, and protection advisory services after planting	224
Li Yingchun	
II.C.VI Demonstration and extension of relay intercropping of late rice into lotus, enhanced by climate change	232
Li Yingchun	
II.C.VII Water saving irrigation determined by soil moisture forecasting for wheat farms in the Huang-Huai-Huai Plane, Henan	238
Yu Weidong	
II.C.VIII Forecasting peony flowering periods for various varieties and places in Luoyang city, Henan	245
Yu Weidong	
II.C.IX Winter straw mulching increasing water use efficiency and yields in winter wheat	251
Li Chunqiang	
II.C.X Early warning of low temperatures and less sunshine for plastic greenhouse crops in winter	256
Li Chunqiang	
II.D Communication Approaches in Applied Agrometeorology	263
R. Gommès, M. Acunzo, S. Baas, M. Bernardi, S. Jost, E. Mukhala, and S. Ramasamy	

PART III FIELDS OF APPLICATION IN AGROMETEOROLOGY

III.1 Introduction to Part III	289
Kees Stigter	

III.2 APPLIED AGROMETEOROLOGY OF MONOCROPPING IN THE OPEN

III.2.1 Strategic Use of Climate Information

III.2.1.(a) Combating Disasters: Monocropping 305
Kees Stigter

**III.2.1.(b) Selection Processes of (Changes in) Land Use and Cropping
Patterns: Monocropping** 309
M.H. Ali and M.S.U. Talukder (with a Box contributed by Nguyen Van Viet)

**III.2.1.(c) The Selection of Actual Preparedness Strategies for Dealing
with Climate as Adopted in Monocropping** 315
H.P. Das

**III.2.1.(d) More Efficient Use of Agricultural Inputs as Part of Adoption
of Preparedness Strategies: Monocropping** 321
Kulasekaran Ramesh

**III.2.1.(e) Selection of (Changes in) Livestock Management Patterns:
Monocropping** 327
Kees Stigter

**III.2.1.(f) The Development of Microclimate Modification Patterns:
Monocropping** 331
Kees Stigter

**III.2.1.(g) Designs of (Changes in) Protection Measures Against Extreme
Climate: Monocropping** 335
Kees Stigter

III.2.2 Coping with Climate Variability and Climate Change

**III.2.2.(i) Improving the Issuing, Absorption and Use of Climate
Forecast Information in Agricultural Production: Monocropping** 341
Ajit Govind and Kees Stigter (with two Boxes contributed by Kees Stigter)

**III.2.2.(ii) The Sustainable Development and use of Agro-Ecosystems:
Monocropping** 347
Ajit Govind and Kees Stigter

III.2.2.(iii) Detection and Awareness of Increasing Climate Variability and the Elevating Climate Risk: Monocropping	355
Kees Stigter	
III.2.2.(iv) (Changes in) Adaptation Strategies to Climate Changes: Monocropping	359
Kees Stigter	
III.2.3. Coping with Extreme Meteorological Events	
III.2.3.(A) Problems and Solutions in Coping with Extreme Meteorological Events in Agricultural Production, and Challenges Remaining for the Use of Science to Contribute to Problem Analyses and Designing Valuable Solutions in this Context: Monocropping	365
Kees Stigter	
III.2.3.(B) Designing and Selecting Efficient Early Warning Strategies and Increasing Their Efficiencies in Monocropping	371
H.P. Das	
III.2.4 Tactical Decision Making Based on Weather Information	
III.2.4.(I) Problems and Solutions in Using of and Coping with Weather Phenomena in Need of Tactical Decision Making and Challenges Remaining for the Use of Science to Contribute to Problem Analyses and Designing Viable Solutions in this Context: Monocropping	379
H.P. Das and C.J. Stigter	
III.2.4.(II) Designing and Selecting Weather Related Tactical Applications for Agricultural Management and Increasing Their Efficiencies: Monocropping	385
H.P. Das and C.J. Stigter	
III.2.5 Developing Risk Management Strategies	
III.2.5.(α) Defining, Managing and Coping with Weather and Climate Related Risks in Agriculture: Monocropping	393
Kees Stigter	
III.2.5.(β) Developing Scales and Tools for Weather and Climate Related Risk Quantifications: Monocropping	397
Kulasekaran Ramesh, Roger E. Rivero Vega, and Kees Stigter	

III.2.5.(γ) Improving Weather and Climate Related Risk Assessments in Agricultural Production: Monocropping	403
Kulasekaran Ramesh and Kees Stigter (with a Box contributed by Roger E. Rivero Vega)	
III.2.5.(δ) Designing and Communicating Improvements in Farm Applications of Risk Information Products: Monocropping	409
Kees Stigter	
III.2.5.(ε) Improving Coping Strategies with Weather and Climate Risks in Agricultural Production, Including the Improved Use of Insurance Approaches: Monocropping	413
Kees Stigter	
 III.3 APPLIED AGROMETEOROLOGY OF MULTIPLE CROPPING	
 III.3.1 Strategic Use of Climate Information	
III.3.1.(a) Combating Disasters: Multiple Cropping	419
Kees Stigter	
III.3.1.(b) Selection Processes of (Changes in) Land Use and Cropping Patterns: Multiple Cropping	423
Emmanuel Ofori and Nicholas Kyei-Baffour (with a Box contributed by Kees Stigter)	
III.3.1.(c) The Selection of Actual Preparedness Strategies for Dealing with Climate as Adopted in Multiple Cropping	429
Emmanuel Ofori, Nicholas Kyei-Baffour, and Kees Stigter	
III.3.1.(d) More Efficient Use of Agricultural Inputs as Part of Adoption of Preparedness Strategies: Multiple Cropping	435
Kulasekaran Ramesh	
III.3.1.(e) Selection of (Changes in) Livestock Management Patterns: Multiple Cropping	441
Kees Stigter	
III.3.1.(f) The Development of Microclimate Modification Patterns: Multiple Cropping	445
Kees Stigter	

III.3.1.(g) Designs of (Changes in) Protection Measures Against Extreme Climate: Multiple Cropping	449
Kees Stigter	
 III.3.2 Coping with Climate Variability and Climate Change	
III.3.2.(i) Improving the Issuing, Absorption and Use of Climate Forecast Information in Agricultural Production: Multiple Cropping ...	455
Kees Stigter and Ajit Govind	
III.3.2.(ii) The Sustainable Development and Use of Agro-Ecosystems: Multiple Cropping	461
Sue Walker, Emmanuel Ofori, Nicholas Kyei-Baffour, and Kees Stigter	
III.3.2.(iii) Detection of and Awareness on Increasing Climate Variability and the Elevating Climate Risk: Multiple Cropping	467
Kees Stigter	
III.3.2.(iv) (Changes in) Adaptation Strategies to Climate Changes: Multiple Cropping	471
Kees Stigter	
 III.3.3 Coping with Extreme Meteorological Events	
III.3.3.(A) Problems and Solutions in Coping with Extreme Meteorological Events in Agricultural Production, and Challenges Remaining for the Use of Science to Contribute to Problem Analyses and Designing Valuable Solutions in This Context: Multiple Cropping ...	477
Kees Stigter	
III.3.3.(B) Designing and Selecting Early Warning Strategies and Increasing Their Efficiencies: Multiple Cropping	485
Sue Walker and Kees Stigter	
 III.3.4 Tactical Decision Making Based on Weather Information	
III.3.4.(I) Problems and Solutions in Using of and Coping with Weather Phenomena in Need of Tactical Decision Making and Challenges Remaining for the Use of Science to Contribute to Problem Analyses and Designing Viable Solutions in This Context: Multiple Cropping	493
Sue Walker, Emmanuel Ofori, Nicholas Kyei-Baffour, and Kees Stigter	

III.3.4.(II) Designing and Selecting Weather Related Tactical Applications for Agricultural Management and Increasing Their Efficiencies: Multiple Cropping 499
 Emmanuel Ofori, Nicholas Kyei-Baffour, and Kees Stigter (with two Boxes contributed by Kees Stigter)

III.3.5 Developing Risk Management Strategies

III.3.5.(α) Defining, Managing and Coping with Weather and Climate Related Risks in Agriculture: Multiple Cropping. 509
 Kees Stigter

III.3.5.(β) Developing Scales and Tools for Weather and Climate Related Risk Quantifications: Multiple Cropping 513
 Sue Walker, Kees Stigter, and Kulasekaran Ramesh (with Boxes contributed by Kulasekaran Ramesh and Sue Walker)

III.3.5.(γ) Improving Weather and Climate Related Risk Assessments in Agricultural Production: Multiple Cropping 519
 Kulasekaran Ramesh, Kees Stigter, and Sue Walker

III.3.5.(δ) Designing and Communicating Improvements in Farm Applications of Risk Information Products: Multiple Cropping 527
 Kees Stigter

III.3.5.(ε) Improving Coping Strategies with Weather and Climate Risks in Agricultural Production, Including the Improved Use of Insurance Approaches: Multiple Cropping. 531
 Kees Stigter

III.4 APPLIED FOREST (AGRO)METEOROLOGY

III.4.1 Strategic Use of Climate Information

III.4.1.(a) Combating Disasters in Forestry and Its Protection Functions . 537
 Dick Felch

III.4.1.(b) Selection Processes of (Changes in) Land Use and Afforestation Patterns. 541
 Ahmad Ainuddin Nuruddin (with a Box contributed by Kees Stigter)

III.4.1.(c) The Selection of Actual Preparedness Strategies for Dealing with Climate as Adopted in Forestry 547
Al Riebau

III.4.1.(d) More Efficient Use of Forestry and Management Inputs 553
Kulasekaran Ramesh and Kees Stigter (with a Box contributed by Kees Stigter)

III.4.1.(e) Selection of (Changes in) Livestock Management Patterns Related to Forests 559
Kees Stigter

III.4.1.(f) Development of Microclimate Modification Patterns in Forestry 563
Kees Stigter (with a Box contributed by Kulasekaran Ramesh and Kees Stigter)

III.4.1.(g) Designs of (Changes in) Protection Measures Against Extreme Climate in Forestry 567
Dick Felch

III.4.2 Coping with Climate Variability and Climate Change

III.4.2.(i) Improving the Issuing, Absorption and Use of Climate Forecast Information in Forestry 573
H.P. Das

III.4.2.(ii) Sustainable Development and Use of Forest Ecosystems 579
Al Riebau

III.4.2.(iii) Detection of and Awareness on Increasing Climate Variability and the Elevated Risk to Forestry 585
Al Riebau

III.4.2.(iv) (Changes in) Adaptation Strategies to Climate Change in Forestry 589
Al Riebau

III.4.3 Coping with Extreme Meteorological Events

III.4.3.(A) Problems and Solutions in Coping with Extreme Meteorological Events in Forestry, and Challenges Remaining for

the Use of Science to Contribute to Problem Analyses and Designing Valuable Solutions in the Context of Forest (Agro) Meteorology	595
Kees Stigter	
III.4.3.(B) Designing and Selecting Efficient Early Warning Strategies and Increasing Their Efficiencies in Forestry	601
Al Riebau	
III.4.4 Tactical Decision Making Based on Weather Information	
III.4.4.(I) Problems and Solutions in Using of and Coping with Weather Phenomena in Need of Tactical Decision Making and Challenges Remaining for the Use of Science to Contribute to Problem Analyses and Designing Viable Solutions in This Context: Forest (Agro)Meteorology	609
Dick Felch and Kees Stigter	
III.4.4.(II) Designing and Selecting Weather Related Tactical Applications for Forest Management and Increasing Their Efficiencies . .	615
H.P. Das	
III.4.5 Developing Risk Management Strategies	
III.4.5.(α) Defining, Managing and Coping with Weather and Climate Related Risks in Forestry	623
Conrado Tobón	
III.4.5.(β) Developing Scales and Tools for Weather and Climate Related Risk Quantifications in Forestry	629
Kulasekaran Ramesh	
III.4.5.(γ) Improving Weather and Climate Related Risk Assessments in Forestry	637
Kulasekaran Ramesh	
III.4.5.(δ) Designing and Communicating Improvements in Forestry Applications of Risk Information Products	643
Kees Stigter	
III.4.5.(ε) Improving Coping Strategies with Weather and Climate Related Risks in Forestry Including the Improved Use of Insurance Approaches	647
Kees Stigter and Kulasekaran Ramesh	

III.5 APPLIED AGROMETEOROLOGY OF NON-FOREST TREES

III.5.1 Strategic Use of Climate Information

III.5.1.(a) Combating Disasters by Using Agroforestry 653
Kees Stigter

III.5.1.(b) Selection Processes of (Changes in) Cropping Patterns Using Non-forest Trees 657
Luigi Mariani, Osvaldo Failla, and Kees Stigter

III.5.1.(c) Selection of Actual Preparedness Strategies for Dealing with Climate, as Adopted in Using Non-forest Trees 667
H.P. Das (with a Box contributed by Luigi Mariani and Osvaldo Failla)

III.5.1.(d) More Efficient Use of Inputs in Cropping Systems Using Trees 675
Kees Stigter

III.5.1.(e) Selection of (Changes in) Management Patterns in Agroforestry 681
Luigi Mariani, Osvaldo Failla, and Kees Stigter

III.5.1.(f) Development of Microclimate Modification Patterns in Agroforestry 685
Kees Stigter

III.5.1.(g) Designs of (Changes in) Protection Measures Against Extreme Climate in Agroforestry 689
Kees Stigter, Luigi Mariani, and Osvaldo Failla

III.5.2 Coping with Climate Variability and Climate Change

III.5.2.(i) Improving the Issuing, Absorption and Use of Climate Forecast Information In Agroforestry 695
Thomas J. Sauer (with a Box contributed by Kees Stigter)

III.5.2.(ii) Sustainable Development and Use of Ecosystems with Non-forest Trees 701
Thomas J. Sauer

III.5.2.(iii) Detection and Awareness of Increasing Climate Variability and the Elevating Climate Risk in Farming Systems with Non-Forest Trees 707
H.P. Das and C.J. Stigter

III.5.2.(iv) (Changes in) Adaptation Strategies to Climate Changes with Farming Systems Using Non-Forest Trees	711
Luigi Mariani and Osvaldo Failla	

III.5.3 Coping with Extreme Meteorological Events

III.5.3.(A) Problems and Solutions in Coping with Extreme Meteorological Events in Agricultural Production, and Challenges Remaining for the Use of Science to Contribute to Problem Analyses and Designing Valuable Solutions in This Context: Non-forest Trees	717
Kees Stigter (with a Box contributed by E. Ofori and N. Kyei-Baffour)	

III.5.3.(B) Designing and Selecting Efficient Early Warning Strategies and Increasing Their Efficiencies for Agroforestry Farming Systems	723
Simone Orlandini and Francesca Natali	

III.5.4 Tactical Decision Making Based on Weather Information

III.5.4.(I) Problems and Solutions in Using of and Coping with Weather Phenomena in Need of Tactical Decision Making and Challenges Remaining for the Use of Science to Contribute to Problem Analyses and Designing Viable Solutions in This Context: Non-forest Trees	733
Luigi Mariani, Osvaldo Failla, and Kees Stigter (with a Box contributed by Kees Stigter)	

III.5.4.(II) Designing and Selecting Weather Related Tactical Applications for Management of Agroforestry and Increasing Their Efficiencies	739
H.P. Das	

III.5.5 Developing Risk Management Strategies

III.5.5.(α) Defining, Managing and Coping with Weather and Climate Related Risks in Agroforestry	747
H.P. Das	

III.5.5.(β) Developing Scales and Tools for Weather and Climate Related Risk Quantifications in Agroforestry	751
Kees Stigter and Kulasekaran Ramesh (with a Box contributed by Kees Stigter)	

III.5.5.(γ) Improving Weather and Climate Related Risk Assessments for Non-Forest Trees	757
C.J. Stigter, H.P. Das and Kulasekaran Ramesh (with a Box contributed by C.J. Stigter)	

III.5.5.(δ) Designing and Communicating Improvements in Farm Applications of Risk Information Products in Agroforestry	763
Kees Stigter	
III.5.5.(ε) Improving Coping Strategies with Weather and Climate Related Risks in Agroforestry Including the Improved Use of Insurance Approaches	767
Kees Stigter	
 III.6 APPLIED AGROMETEOROLOGY OF OTHER FORMS OF AGRICULTURAL PRODUCTION	
 III.6.A Animal Husbandry	
III.6.A.(i) Problems and Solutions in Coping with Extreme Meteorological Events in Agricultural Production, and Challenges Remaining for the Use of Science to Contribute to Problem Analyses and Designing Valuable Solutions in This Context: Animal Husbandry ..	773
Kees Stigter	
III.6.A.(ii) Selection of Actual Preparedness Strategies for Dealing with Climate, as Adopted in Animal Husbandry	779
John Gaughan	
III.6.A.(iii) Designing and Selecting Efficient Early Warning Strategies and Increasing Their Efficiencies for Animal Husbandry	785
John Gaughan and LeRoy Hahn	
III.6.A.(iv) More Efficient Use of Inputs in Animal Husbandry	791
John Gaughan, Silvia Valtorta, and Nicola Lacetera	
III.6.A.(v) Selection Processes of (Changes in) Animal Husbandry	797
Combined with	
III. 6.A.(vi) Combating Disasters in Animal Husbandry	797
Akiyemi Gabriel Omonijo	
III.6.A.(vii) Development of Microclimate Modification Patterns in Animal Husbandry	803
Silvia Valtorta	
III.6.A.(viii) Improving the Issuing, Absorption and Use of Climate Forecast Information in Animal Husbandry	807
John Gaughan and Hesham Khalifa	

III.6.B Cropping Under Cover

III.6.B.(i) Problems and Solutions in Coping with Extreme Meteorological Events in Agricultural Production, and Challenges Remaining for the Use of Science to Contribute to Problem Analyses and Designing Valuable Solutions in This Context: Cropping Under Cover	815
Kees Stigter	

III.6.B.(ii) Combating Disasters in Covered Cropping Systems	821
Zheng Dawei and Kees Stigter (with a Box contributed by Zheng Dawei)	

III.6.B.(iii) Covering Crops to Improve Growth: Some Essential Experience	825
Kees Stigter (mainly choosing and editing material collected by Ernst Van Heurn and Kees Van der Post)	

III.6.B.(iv) Selection Processes of (Changes in) Covered Cropping Patterns	829
Gerard P.A. Bot (with a Box contributed by Kees Stigter)	

III.6.C Other Aspects: Fisheries and Aquaculture, Urban Agriculture, Precision Farming

III.6.C.(i) Problems and Solutions in Coping with Extreme Meteorological Events in Fisheries and Aquaculture, and Challenges Remaining for the Use of Science to Contribute to Problem Analyses and Designing Valuable Solutions in This Context of Fisheries and Aquaculture	837
Kees Stigter and Claude E. Boyd	

III.6.C.(ii) Agrometeorology and Urban Agriculture	843
Kees Stigter	

III.6.C.(iii) “Paleez Khoursheed”: Agrometeorology for Precision Farming in Iran	849
Alireza Sodagari and Kees Stigter	

PART IV METHODS AS TOOLS AND APPROACHES SUCCESSFULLY USED IN APPLICATIONS LEADING TO AGROMETEOROLOGICAL SERVICES

IV.1 Introduction to Part IV	857
Kees Stigter	

IV.2 Ethics and Policies	869
Kees Stigter	
IV.3 A Basic View on Models of Nature and the Concept of “Sustainability”	877
Tor Håkon Sivertsen and Janis Gailis	
IV.4 Expert Systems	885
Andrew Challinor (with a Box contributed by Kees Stigter)	
IV.5 Education, Training and Extension	893
Kees Stigter	
IV.6 Meteorological Data to Support Farming Needs	901
Raymond P. Motha	
IV.7 Agricultural Physics	909
Gerard P.A. Bot (with a Box contributed by Kees Stigter)	
IV.8 Agricultural Chemistry in Agrometeorology: Relations with Groundwater Contamination	919
Tibor Stigter	
IV.9 Field Quantification	929
Kees Stigter (with Boxes contributed by Tomáš Orfánus and Raymond P. Motha)	
IV.10 Statistics and Agrometeorology: Introductory Issues and Cases ...	939
Roger Stern	
IV.11 Agrometeorological Statistics: More Introductory Issues and Cases	949
Olga C. Penalba	
IV.12 Climate Prediction and Weather Forecasting	959
Nathaniel Logar	
IV.13 Examples of Agrometeorological Decision Support Developed and Used in South America	965
Orivaldo Brunini, Mário José Pedro, Jr., Dalziza De Oliveira, Marcelo Bento Paes De Camargo, Glauco De Souza Rolim, and Paulo Henrique Caramori	
IV.14 Global Potentials for Greenhouse Gas Mitigation in Agriculture ...	977
Julian Dumanski, Raymond L. Desjardins, Rattan Lal, Pedro Luiz De Freitas, Pierre Gerber, Henning Steinfeld, Louis Verchot, Gerald E. Schuman, Justin D. Derner, and Mark Rosegrant (with a Box contributed by R. Lal)	

IV.15 Strategies and Economies for Greenhouse Gas Mitigation in Agriculture	983
Julian Dumanski, Raymond L. Desjardins, Rattan Lal, Pedro Luiz De Freitas, Pierre Gerber, Henning Steinfeld, Louis Verchot, Gerald E. Schuman, Justin D. Derner, and Mark Rosegrant (Box by all)	
IV.16 Supporting Evidence for Greenhouse Gas Mitigation in Agriculture	989
Julian Dumanski, Raymond L. Desjardins, Rattan Lal, and Mark Rosegrant (with Boxes contributed by P.L. De Freitas, J.N. Landers, P. Gerber, H. Steinfeld, L. Verchot, G.E. Schuman, J.D. Derner)	
IV.17 Modeling and Simulation	997
Tomáš Orfánus	
IV.18 Monitoring and Early Warning	1005
Andries Rosema, Marjolein De Weirdt, and Steven Foppes	
IV.19 Remote Sensing	1013
Andres C. Ravelo and Ernesto G. Abril	
IV.20 Geoinformatics for Evaluating Erosive Rainfall Hazards in Uplands Crops: Preliminary Decision Making	1025
Nazzareno Diodato, Michele Ceccarelli, and Gianni Bellocchi	
Index	1033

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About the Editor

Kees Stigter is a visiting professor in Africa and Asia, these days for Agromet Vision, the Netherlands and Indonesia. His initials C.J. stand for Cornelis Johan, but Kees is his call name.

Experimental physicist by education (Phys. Drs., Amsterdam, 1966) and agrometeorologist/-climatologist by profession (Ph.D. in agriculture, Wageningen, 1974), he became member of staff (from 2001 to 2005 guest scientist) of Wageningen (Agricultural) University, the Netherlands (1966–1975, 1985–2005 (ret.); from 1974 as an Associate Professor and from 1985 in addition as a Principal Project Supervisor (TTMI-Project) and Visiting Professor in Africa and Asia.

His first mission was to Africa in May–September 1969 as an FAO expert in climatology in Madagascar. He was resident Associate Professor (1975–1978) and Full Professor (1978–1985) at the University of Dar es Salaam (Tanzania) Physics Department, in the fields of agricultural physics and agricultural meteorology.

From 1985, for the Traditional Techniques of Microclimate Improvement (TTMI) Project, he was a Visiting Professor at the University of Gezira, Wad Medani, Sudan (Department of Environmental Sciences and Natural Resources) till 2005; the University of Nairobi, Kenya (Departments of Crop Science and Meteorology) till 1999; the University of Dar es Salaam, Tanzania (Department of Physics) till 1999; and (from 1991) the Ahmadu Bello University, Zaria, Nigeria (Departments of Geography and Soil Science), till 1999. Author of the Picnic model for research education in Africa in a total of more than 40 TTMI missions. Lead author of a book on the TTMI-Project (1995).

Involved in evaluation and other missions in higher education and institutional matters, including invited lectures, in 17 African countries from 1969 till the present: Algeria, Benin, Burkina Faso, Ethiopia, the Gambia, Ghana, Kenya, Madagascar, Morocco, Niger, Nigeria, Senegal, Sudan, Tanzania and Zambia. Most recent visits: to the Sudan in 2005, to South Africa in 2006 and 2008 and Lesotho in 2008.

Subject expert (1988–1991) and project management consultant (1991–1993) for FAO/WMO/UNDP/ICAR in establishing the Centre for Advanced Studies in Agricultural Meteorology (CASAM), Pune, India. Since 1997, twelve missions (on average of more than one month) to China for the Asian Picnic Model Project (APMP), including the China Agricultural University in Beijing, trying to jointly

establish pilot projects on assessing and evaluating (institutionalization of) agrometeorological services with five provincial meteorological administrations. From 1999 onwards, for the same APMP, lectures at 10 Universities and Institutes in Indonesia, with early emphasis in Bogor and presently in Yogyakarta, three missions to Vietnam and one mission each to the Asian Disaster Preparedness Centre, Bangkok and to Fukuoka, Japan.

Three missions for Agromet Vision of respectively 1 month, 5 and 2 weeks to India (2004, 2006, 2007) in which more than twenty lectures at twelve institutes in five cities (of which several times in Hyderabad, Pune, New Delhi and once in Chennai/Madras and Coimbatore). Missions for an Asian Pacific Network Project to Hyderabad (India, 2006) and Dhaka (Bangladesh, 2008).

Former Vice-President (1986–1991) and President (1991–1999) of the World Meteorological Organization (WMO) Technical Commission for Agricultural Meteorology (CAgM). Lead author of two CAgM Reports (Nrs. 25 and 43) on Microclimate Management and Manipulation Techniques in Traditional Low External Input Agriculture. Founding president of the International Society for Agricultural Meteorology (INSAM), since 2001. Writes since 2003 the homepages of the INSAM web site (www.agrometeorology.org).

Author and co-author of more than 700 publications, of which 125 in peer reviewed journals and also close to 200 invited/selected ones in books/monographs/CD-ROMs etc. Co-author of a book on agrometeorology of multiple cropping (1993 (French); 1997 (English)). Leader of the CAgM Expert Team and Editor-in-Chief on writing the third edition of the WMO Guide to Agricultural Meteorological Practices (GAMP, WMO 134), on which he works since 1999. A draft, in which 180 scientists collaborated, was published in 2007 but after more than 2 years the final version is still under in-house editing in Geneva.

Developed from 2000 onwards in many lectures two Roving Seminars on “Agrometeorological services: theory and practice” and on “Agrometeorology and sustainable development”, which he gave in Iran in 2005, in India in 2006, parts in Brazil and Venezuela in 2007 and again fully in South Africa in 2008, and one of them fully in Indonesia in 2009. This is planned to continue.

Works these days particularly on connecting agricultural sciences, environmental sciences, social sciences and extension services, proposing to use new educational commitments such as Climate Field Schools for farmers. To obtain a rural response to climate change through their own innovations and what these applied sciences have to offer through extension.

Bruchem, The Netherlands
August 2009