

NATIONAL METEOROLOGICAL AGENCY

**METEOROLOGICAL RESEARCH AND STUDIES
DIRECTORATE**

**METEOROLOGICAL RESEARCH PROPOSAL, MANUAL AND
WRITING GUIDELINE**

FIRST EDITION

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Meteorological Research Proposal, Manual and Writing Guideline

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Submitted to Research and Studies Directorate

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Addis Ababa, Ethiopia

FOREWORD

National Meteorological Agency

It is my pleasure to write a foreword for this new guideline for meteorological experts at NMA of Ethiopia. There is a real need for this first edition guideline. NMA became a major and comprehensive agency in Ethiopia with many researches and studies, meteorological technicians' trainings and PGD program. This new guideline reflects the agencies growth and research diversity. The guideline brings uniformity and standardization across the agency for formatting and styling of research proposals, manual and final research writing.

Under the direction given by the agency, a team was formed to conduct this writing activity in November 2018. Ato Yosef Tesfaye team leader, Ato Abate Getachew, W/ro Aklile Asefa, Ato Bahiru Maregn, Ato Tofik Redi, Ato Chaka Natae, Ato Gezahegn Bekele, Ato Eliyas Fiseha and Ato Fitsum Bekele members worked on writing the guideline during a month period. The staff experts criticized and suggested new ideas for the draft.

I take this opportunity to thank all members for their honest and dedicated work in the preparation of this new guideline.

I am confident that this guideline will provide the necessary direction and guidance in writing proposals, manual, technical guide and writing at NMA of Ethiopia.

Regards,

Fetene Teshome (Director General)

PREFACE

For the agency to be successful in research and training manual for the future, it must have clear guidelines for doing research and writing activities for experts and trainer. This guideline helps to write research proposals, manual and writing. Rather than considering a number of different formats for the varied intellectual disciplines, now we have a single format to carry out meteorological disciplines. In this guideline all the necessary formats, styles and how cover and last page looks like are included.

The team made an effort to recognize the variety of meteorological disciplines. With the benefit of the internet, we now have a global library at our finger tips as the resources along with our fine academy libraries. Further, experts are strongly encouraged to use this opportunities and enhance current research status.

It is our sincere hope that meteorological experts will carry this guideline and hold in your arms. This guideline will help researcher in preparation of admirable and intellectual research proposals, manual and writing at NMA of Ethiopia.

**Members of Guideline on Meteorological
Research Proposal, Manual and Writing Guideline**

PURPOSE OF WRITING GUIDELINE

The purpose of this research proposal, manual and writing guideline is three fold. Firstly, it has been written to help emerging researchers establish a research profile at the NMA. Secondly, it provides a repository for information, especially for new meteorologist, on the various forms and procedures required when undertaking a research, project, technical manual and guideline. Thirdly, it aims to be a general reference document for all administration and compliance aspects of research undertaken at the Agency (NMA). This research proposal, manual and writing guideline will be an active document and will be updated as new procedures are put in place. As such, we hope it will be a very useful tool for common understanding and guide.

ABBREVIATIONS AND ACRONYMS

MRSD	Meteorological Research and Studies Directorate
NMA	National Meteorological Agency
PGD	Post Graduate Diploma
SOP	Standard Operational Procedure

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CHAPTER 1. STYLE AND FORMATTING

1.1. Introduction

The following guideline serves as an institutional guide for the proper development of research papers, manuals and other similar projects for meteorological experts or instructors of National Meteorological Agency of Ethiopia. NMA technical writing requires consistency in style and format in Meteorological Research Proposal, Manual and Writing Guideline. Definite rules are followed consistently throughout these documents.

1.2. Margins

A margin of 1.0 inch on the left-hand is for binding. A margin of 0.98 inch each on the right, top and bottom of the page is required. The same margins should be applied to all pages including those of the figures and tables.

1.3. Font

Times New Roman font is required throughout the documents. There should be no difference in the type of font used throughout the Meteorological Research Proposal, Manual and Research Writing Guideline. The cover page of the research proposals, manual, guide and final research writing is presented in 16 point font size and upper case. The documents will also have an additional title page where 14 point font size shall be used. The text in the cover page and title page in the Meteorological Research Proposal, Manual and Writing Guideline will be in bold face font. The first level headings in document will be in 14 point font size; the second level headings in document will be in 14 point font size in sentence case and the rest heading under second level heading is in sentence case 12 point font size. Away from this variation in font size, all of the description in the all documents is in 12 point font size.

1.4. Headings and Subheadings

Each headings of the initial sections; such as approval sheet, acknowledgement abbreviations and acronyms, table of contents, list of tables, list of figures, list of appendix and the chapters of the

description should be written in bold upper case letters and be centered. The chapter headings of the description must be numbered with Arabic numerals starting from 1 for the Introduction and ending with Appendix. The Arabic numerals shall be followed by a period, a space and the heading of the chapter. Note that the titles of the initial sections are not numbered before Introduction. The subheadings are numbered consecutively with Arabic numerals in an outline numbering system. **Example:**

ACRONYMS AND ABBREVIATIONS
TABLE OF CONTENTS
LIST OF TABLES
LIST OF FIGURES
ABSTRACT
1. INTRODUCTION
1.1. Background
1.2. Statement of the Problem
1.3. Significance of the Study
1.4. General Objectives
1.5. Scope
2. LITERATURE REVIEW
2.1. Status of Conventional Weather Stations in NMA of Ethiopia
2.1.1. Manual Recording of Meteorological Data
2.1.2. Mechanical Recording Instruments
2.1.3. Distribution of CWS in NMA of Ethiopia
2.2. Status of Automatic Weather Stations in NMA in NMA of Ethiopia
2.2.1. Remote Transmission Unit
2.2.2. A850 Telemetry Gateway
2.2.3. AddVANTAGE Pro
2.3. Distribution of AWS in NMA of Ethiopia
2.4. Calibration Time for CWS and AWS

In general 1.1., 1.2., etc. for subheadings of Chapter 1; 2.1., 2.2., etc. for Chapter 2; similarly, the outline numbering system will be used for lower level headings 2.1.1., 2.1.2., etc. for subheadings. Second level headings are written in bold title case letters. The first letter of each major word of the headings is written in upper case letters. All remaining lower level headings are written in sentence case, unless required by grammatical or nomenclature rules. Example: Background, Statement of the Problem, etc. Furthermore, Second level headings and lower level headings should be level left and length of the subheading not more than fourth level and more than sub title 2.1.1.1. An extra line should separate the headings from the description.

1.5. Paragraph Format and Line Spacing

Additional 1.5 line spacing is kept between paragraphs above and below all headings, subheadings and captions. All paragraphs should be in block paragraph format. The line spacing for all of the text is 1.5 although single (1.0) line spacing is to be applied to captions of tables and figures. Example for paragraph 1.5line spacing:

Though, African countries often have limited capacity to develop, generate, disseminate and effectively use climate data and information in climate risk reduction and management. (Carberry, 2008). Infrastructure in Africa often not as reliable or powerful as more developed regions. For example, it has an inadequate number of meteorological stations for climate data collection, and much of the data that exists has not been digitized (UNFCC, 2007).

As noted by WMO (2003) meteorological station belongs to principal, ordinary, auxiliary and spatial agricultural meteorological station and most countries the majority of meteorological stations belong to categories. Therefore, modernization of observation networks is important for predicting and understanding Africa's unique climate (UNDP, 2011).

Example: Single line spacing for captions of the table and hanging by 0.5.

**Table 1. List of Selected Conventional Weather Station and Automated Weather Station
Geographic location and Meteorological data period**

1.6. Page Numbering and Set up

The initial section, each chapter of the description, the references and the appendix must start on a new page. Except to the latter may be for the Table of Contents, Acronyms and Abbreviations and the List of Tables and List of Figures each component of the initial section should be short and not exceed one page. Except for the cover page, every page of the research proposals, manual, guide and final research writing is assigned a page number. The use of two different types of page numbering is recommended. Small Roman numerals such as ii, iii, etc. are used for the initial section from title page to the page preceding the Introduction. However, a page number should not appear on the cover page and the following page will be numbered with ii. Arabic numerals such as 1, 2, 3, etc. are used from the first page of the Introduction to the last page of

the Appendix. All page numbers are at the top right of the page without any characters (periods or dashes).

1.7. Tables and Figures

Meteorological experts should not use tables and figures for the same data discussed in the description. Tables and figures should be single line spaced and borders are required all the column and row of the table. Tables and figures should be understandably placed in the description of the Meteorological Research Proposal, Manual and Writing Guideline writing and should be as close as possible to the results description where those tables and figures are first cited.

The headings within the Tables and Figures can be bolded; but font size of the text in table is optional. Tables and figures are consistent in format throughout the document and the numerical values cited in the description should match those in the tables. All tables and figures should have a clear and short caption. Table notes may be used to describe the contents of the caption or column headings cross-referenced using super-scripted numbers. Empty space between the tables and figures and the description should auto and 1.5line spaces. Tables and figures should be clearly presented and self-explanatory; so the reader should be able to understand them without reading the narrative of the results.

Example: for Table and Figure

Table 1. List of Selected Conventional Weather Station and Automated Weather Station Geographic location and Meteorological data period

No	Station Name	Elevation in meters	Longitude in Deg. Dec.	Latitude in Deg. Dec.	*Distance from Center
1	Addis Ababa	2330	38.75	9.08	Center
2	Arbaminch	1220	37.53	5.96	505
3	Asossa	1600	34.5	10	633

*Reference: Ethiopia Road Authority and ArcGIS 10.3.

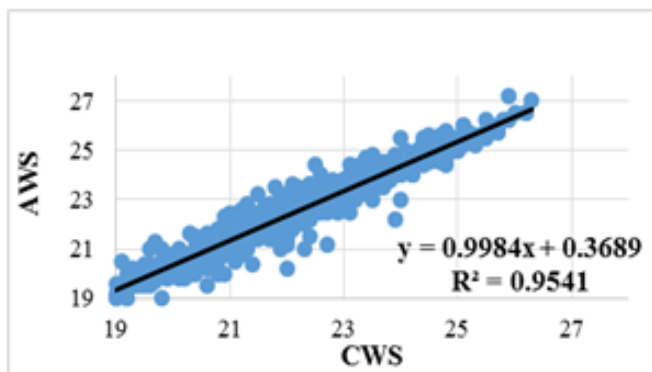


Figure 7. Stations at the same geographic location. Scatter diagram, Regression and R^2 between CWS/AWS over Ethiopia.

1.8. Additional Style and Formatting Concerns

Where required, scientific names in any part of the research proposals, manual, guide and final research writing should be written in italic font with the genus name starting with a capital letter (e.g. *Kiremt*, *Bega*, *Belg...*). The species nickname will appear in a small letter. Similarly, no English language terminology such as words, nouns, or pronouns shall be italicized (e.g. *Teff...*) Moreover, all measurements should be given in metric or Standard International (SI) units and only the Ethiopian Birr (ETB) shall be used for budget currency discussions. Complicated, long or uncooperative sentences and the use of personal pronouns such as I, you and we should be avoided. The structure of a sentence is important in research proposals, manual, guide and final research writing. For example, do not begin a sentence by Study, And etc. In addition, never start a sentence with numerals and with an abbreviation such as scientific name.

CHAPTER2. RESEARCH PROPOSAL WRITING

2.1. Introduction

The length of a proposal often varies somewhat depending on the area of the proposed work and the topic itself. In general, a proposal is normally between 20 and 30 pages, single column, spacing using and font size including figures, tables and references must be as described above. Moreover, the plan and preparation of a research proposal is required of all meteorological experts in all core processes at NMA of Ethiopia. The vital success of a works depends upon the preparation of research proposal. The following sections pronounce the format that climate experts at NMA should follow when writing their research proposals.

2.2. Elements of the Research Proposal

The research proposal submitted by a Meteorological experts for research is expected to have the subsequent sections although there can be some limited difference based on the research discipline and the study in question. Each of these sections should start on a new page and all section titles should be capitalized. Note that any one must be follow the General structure of research proposal from 2.2.1 to 2.2.14.

2.2.1. Cover Page

The cover page would be instructive and consist of the title of the research proposal, the name of the experts and the names of agency and submitted to directorate (Research and Studies Directorate). The month and year followed by the address and location are the last items on the cover page. Title case letters are recommended in the style of writing as indicated in the styles and formatting part of this guideline. Words such as “Abbreviations” or "The Study of" or "An Investigation on" are not essential. The title should accurately reflect the main subject of the proposed study. In addition, the styles and formatting of the title page; that is next to the cover page is capitalize each word and contents as shown in the following example.

Example: Cover page of the Research Document:

NATIONAL METEOROLOGICAL AGENCY

**INTER-COMPARISON OF OBSERVATION BETWEEN
PARALLEL CWS AND AWS WEATHER IN NMA**

Yyyyyyyyyy¹ and Kkkkkkkkkkkkkkkkk²

**¹Meteorological Research and Studies Directorate, Email:
mmm@gmail.com, P. o. Box 1090, Mobile: +251xxxxxxx**

**²Data and Climatology Directorate, Email: hhhh@yahoo.com,
P. o. Box 1090 Mobile: +251xxxxxxx**

**NATIONAL METEOROLOGICAL AGENCY
ADDIS ABABA, ETHIOPIA
JUNE 2018**

Example: Cover page for manual and guideline

NATIONAL METEOROLOGICAL AGENCY

Directorate Name

**METEOROLOGICAL RESEARCH PROPOSAL, MANUAL AND
RESEARCH WRITING GUIDELINE**

FIRST EDITION

**ADDIS ABABA, ETHIOPIA
DECEMBER, 2018**

Example: Title page for Research Document

**Inter-Comparison of Observation between Parallel Conventional and
Automated Weather Observatory in NMA of Ethiopia**

Research submitted to Meteorological Research and Studies Directorate

Copyright © MRSD_NMA of Ethiopia

**National Meteorological Agency
P. o. box 1090, Tel +251116615779, email: nmsa@ethionet.et
Fax: 251-11-662-5292
December 2018
Addis Ababa, Ethiopia**

Example: Title page for Manual and Guideline

Meteorological Research Proposal, Manual and Research Writing Guideline

Lead Author: Yosef Tesfaye

Members:

**Yosef Tesfaye
Abate Getachew
Akillile Asefa
Bahiru Maregn
Tofik Redi**

**Submitted to Research and Studies Directorate
First Edition: December, 2018
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Fax: 251-11-662-5292
December 2018
Addis Ababa, Ethiopia**

2.2.2. Acknowledgements

In this section recognizes the persons or organizations or others the experts is thankful to for guidance or assistance received and those to whom the researcher extends cheers for support in the preparation of the research proposal or manual. Ethical considerations are critical to the completion of research. Examples of ethical issues include known benefits and risks of participant involvement in the research, exact description of the information to be delivered to the subjects of the study, discuss the procedures for informed consent by the study participants where applicable.

2.2.3. Abbreviations and Acronyms

In Abbreviations and Acronyms section researchers list in alphabetical order the abbreviations or acronyms followed by their text body should be defined in full. Standard (S.I.) units do not need to be listed. Abbreviations and symbols (i.e. and etc.) should not be italicized.

Example for Abbreviations and Acronyms

ACRONYMS AND ABBREVIATIONS	
AWS	Automated Weather Station
CWS	Conventional Station
GCOS	Global Climate Observing System
GIS	Geographic Information System
GPRS	General Packet Radio Service
GTS	Global Telecommunication System
IRI	International Research Institute for Climate and Society
LST	Local Standard Time

2.2.4. Table of Contents

All of the headings and entries in the table of contents should correspond exactly in wording, font and case with the headings or entries as they appear in the text of the proposal.

Example for Table of contents:

TABLE OF CONTENTS	
ACRONYMS AND ABBREVIATIONS.....	ii
TABLE OF CONTENTS.....	iii
LIST OF TABLES.....	iii
LIST OF FIGURES.....	iii
1. INTRODUCTION.....	1
1.1. Background.....	1
1.2. Statement of the Problem.....	3
1.3. Significance of the Study.....	4
1.4. General Objectives.....	4
1.5. Scope.....	4
2. LITERATURE REVIEW.....	5
2.1. Status of Conventional Weather Stations in NMA of Ethiopia.....	6
2.1.1. Manual Recording of Meteorological Data.....	7
2.1.2. Mechanical Recording Instruments.....	7
2.1.3. Distribution of CWS in NMA of Ethiopia.....	8
2.2. Status of Automatic Weather Stations in NMA in NMA of Ethiopia.....	9
2.2.1. Remote Transmission Unit.....	10
2.2.2. A850Telemetry Gateway.....	10
2.2.3. AddVANTAGE Pro.....	11
2.3. Distribution of AWS in NMA of Ethiopia.....	11
2.4. Calibration Time for CWS and AWS.....	12
3. DATA AND METHODOLOGY.....	14

Do not use title and page at the top of the page in the table of contents. Also, there should be dotted lines connecting headings and respective pages. Level of Subheadings should exceed optional. A table of contents is shown in the example that illustrates the capitalization, indentation, line spacing between the headings and the numbering of sections.

2.2.5. List of Tables and List of Figures

The sample list of tables and figures from a proposal presented in section 1.7 above of this guideline explains how the list shall be prepared in the research proposal and manual.

Example for List of Tables

LIST OF TABLES	
Table	Page
1. Time table for Weather station instruments Calibration	15
2. List of Selected CWS and AWS Geographic location and Meteorological data period	16
3. Statistical method for Inter-comparison	18

Example for List of Figures

LIST OF FIGURES	
Figure	Page
1. Flow chart for Communication between Conventional stations and head office	9
2. Distribution of Conventional Stations over Ethiopia.....	11
3. AWS RTU and A850 Telemetry Gateway	12
4. Flow chart for Communication between AWS and CLIDATA.....	13

2.2.6. Abstract or Summary

An abstract or summary that, in one or two paragraphs, provides a concise summary of the work you are proposing include statement of the problem that you are trying to solve and how you expect to solve it, background of the research proposal topic, objectives of the study and the methods to be used in the research project. This is one of the most challenging parts of the proposal to write since you must provide some detail without the reader having yet been given the background knowledge. It should be concise and less than one page in length. The summary should be presented in one single block paragraph in 1.5 line spacing without subtitles or any divisions and in italic form. In the body of abstract and summary abbreviation and acronym is not encouraged.

2.2.7. Introduction

The introduction is the first chapter that is numbered for a research proposal and manual. It provides relevant background information on the research, should be as brief as possible and it should not exceed five pages in length. In the introduction you need to say why you are doing the proposed work and what its significance is. It is in the introduction that you typically also define and explain most of the necessary terms and acronyms. You also need to provide a quick sketch

of your proposed solution and briefly explain how it differs from other work. Be sure to build from more general concepts to more specific ones so that the reader will understand everything. You should be able to have someone else read just your introduction and be able to then tell you what you are proposing to do and why it is interesting. That is, the introduction should be understandable by itself without the rest of the proposal. It includes brief background and clear statement of the problem, significance of problem and general research objectives. Objectives that specify the goals of the research, research information to be gathered, research questions to be answered or research hypotheses developed and to be tested. In general introduction must include background, statement of the problem, significance of the study, objectives of the study (general objective and specific objectives), scope and outcomes of the research. In addition to these introduction is explain about the gap and the materials to solve the objective. A concise these that, in one to four sentences, describe specifically what the significance, problem, objectives, scope and an outcome is that you intend to solve. All are statement can be technical in nature. Present a clear statement of your research problem in this section. Formulate your research questions bearing in mind a clear response to the “so-what?” question. This should be followed by a crisp and cogent statement of your research hypothesis posed in the form of a falsifiable proposition.

2.2.8. Literature Review

The literature review is chapter two and should be a critical analysis of relevant existing knowledge on the proposed research topic. It includes the strengths, the limitations and gaps of previous studies. The literature review should be relevant with recent citations on the topic. Citations within the past five years are ideal and generally considered current. Citations ten years and older should be used sparingly and only when necessary. Serious attention must be given to avoid any possible consideration of plagiarism. This is done by the meteorological experts carefully referencing each and every document used. A literature review is a presentation which briefly summaries the essential contents of one or several monographs or scientific articles. In a literature review, the writer is expected to point out the author’s key arguments and also present the results of her analysis in a concise form. It is important to note that a series of direct quotations from the literature under inspection does not as such constitute a literature review. When working on a literature review, one should always keep in mind its function. The purpose

of a literature review is to analyze the essential characteristics of a particular text. This means that the writer should pay attention to the structure and the central themes of the text as well as to the arguments presented by its author. In this sense, a literature review could be thought of as a ‘full figure photograph’ of the text. If a literature review is part of a larger research report, which analyses several sources, the purpose of the review should be assessed in this context; in such a case, it would be sensible to select relevant parts of the texts for detailed examination. This procedure could be thought of as a ‘passport photograph,’ for only a relevant part of the source is analyzed. Reports of this kind constitute an essential part of scientific inquiry; the skill in preparing such reports will develop through practice. The aim of a literature review is to recount the arguments and thoughts presented in the text as accurately as possible. A literature review must treat the author of the text respectfully and impartially, even if the writer of the review does not agree with the views presented in the text. The writer should not underestimate the value of the text and dismiss the text only because it does not reflect the personal views. The author of the review must clearly point out when the arguments and interpretations presented are her own (for example, by stating, “It is, however, my opinion that...”).

2.2.9. Materials and Methods

Chapter three may also be titled “Materials and methods” in meteorological disciplines for which this usage is common and appropriate. It describes precisely what will be done and how it will be done, what data will be recorded, the proposed tools or software or model to be used in data collection and the methods of analyzing the data. In this the researcher should give clear, specific, appropriate and credible procedures that will be followed to attain the proposed objectives of the study. The research methods should be appropriate to the statement of the problem, the objectives and the logistics of implementation should be viewed parallel to the choice of the research methodology. The researchers should consider affordability, time issues, feasibility of the study and availability of equipment and supplies. Further, they should also address the methods of data collection, data quality control and methods of data analysis.

Materials and methods section should include:

- a. Definition of terms and variables (optional)
- b. Description of the study area with geographic location in standard form.

- c. Study period when data will be collected
- d. Data collection. This includes questionnaires use of observation, focus group discussions, in depth interviews, laboratory analyses and similar methods. The description should outline the data to be collected in the study, the methods of measurement and the units of measurement.
- e. Climate of the study area and Soil classification of the study area (optional)
- f. Data analysis. The experts should decide how the data generated will be analyzed. Also, explanations of the data analytical methods, techniques, tools and statistical tests that will be used should be provided. Software planned for use in statistical analysis may also be mentioned. Data quality control and homogeneity test; here required description of how the data collection instruments will be checked and the reliability and validity of model used in the research should be provided.

2.2.10. Work Plan for Major Activities

This section focuses on the planning of time for the implementation of the research project. The experts allocate time frames for the completion of various activities of the proposed research and manual. The plan of activities can be presented in the form of a table. Only major activities for accomplishing the research and corresponding time frames should be included in the table.

Example of plan of activities:

Activities	Nov	Dec	Jan	Feb	Mar	Apr	May
Introduction							
Literature Review							
Data collection and Analysis							
First Report Writing							
Visiting selected AWS and CWS							
Awareness work shop at Branch offices							
Final Report Writing							
Research Submission							

2.2.11. Requests Budget Breakdown

The budget chapter should include both a narrative discussion and rationale for requested funds, followed by a related set of tables. This involves first discussing and then listing, in a series of separate tables, the necessary and required personnel, per diem days required to conduct research, transportation costs, supervision, equipment, stationery, expendable research supplies and materials and any associated services for the project. Budget source must indicate at the bottom of table. The budget source may be from Meteorological Research and Studies Directorate or from others Governmental and Non-Governmental institutions/Organizations. Every budget item must be justified if funds are to be expected to support the research. Item costs should be reasonable and reflect a fair and current market price. The budget should be prepared in accordance with National Meteorological Agency policies. The budget chapter will then have the budget source shall be indicated.

Example for Table of Requests Budget Breakdown:

Description/ Purpose	No of Persons and Days	Per day Payment(ETB)	Total Cost(ETB)	Remark
Awareness work shop for AWS vs CWS at six branch offices for 10 data experts	5*10person	100.00	5000.00	Adama, Awasa, Jimma, Combolcha
Per dim payment for two experts Visiting selected AWS and Conventional Station	2*30 days	208.00	12480.00	To visit status of selected Stations
Per dim payment for driver	1*30	165.00	4950.00	
Transportation fuel	1105km	16.50per liter	18232.50	
Contact Advisors	Twice per year	xxx	xxxx	Within the Research period
Total	40662.50(Forty Thousand Six Hundred Sixty Two50/100 Birr)			

Budget Source: Meteorological Research and Studies Directorate.

2.2.12. References

This must be provided in the usual scholarly fashion. It helps to convince your reader that your proposal is worth pursuing if you can identify literature in field and demonstrate that you understand it. It makes a very strong impact if you can identify where there is search gap in the literature that your proposal hopes to fill. In text references should be provided carefully follow the style shown in example of this guideline which provides many examples. References chapter must include all works cited in research proposal. All citations appearing in the text body of the proposal must be included in the references chapter and vice versa. While, the references not needed to cite in text body of the manual or guideline. But all citations appearing included in the references chapter used to write the documents. The list should use the hanging indent method where all lines after the first one are indented 0.5 inch. The list should be in alphabetical order by the last names of the first authors (A, B, C...).

Format for reference:

Authors and Co-Authors Name. Year. Article Title. Name of Publisher/Journal or Book Name, Volume and Page Number City and Country

Example for Citation on text body:

Climate data is.....variability.....extremes (Agnihotri and Panda, 2014). Furthermore,vegetation. Thus, oneavailable (Bautista and Delgado, 2010). Though, African and management. (Anita et al., 2014).

Example for Reference:

Journal Articles:

Kebede Yemane. 2008. Cigarette smoking and khat chewing among university instructors in Ethiopia. *East African Medical Journal* 16:9-17.

Agnihotri Mars and Panda John. 2014. Comparison of rainfall from automatic and ordinary rain gauges in Karnatka. *Sciences Journal*, 65:4, 575-584.

Anita Anna, Neil Mark and Maxm Kitim. 2010. Evaluation of five satellite products for estimation of rainfall over Uganda. *Hydrological Sciences Journal*, 53:6, 1137-1150.

Bautista Fule and Delgado Cheers. 2009. Calibration of the equations of Hargreaves and Thornthwaite to estimate the PET in semi-arid and sub-humid tropical climates for regional applications. *Atmosfera*, Mexico, 331-348.

Books:

Dyckman, Thomson and Pfeiffer Grimes. 2010. Financial Accounting, 3rd Edition. Boston, MA, USA: Cambridge Business Press.

Chapter in Edited Book:

Abu Elteen, Kinio Hamber and Hamad Miliyas. 2007. Determination of the virulence factors of *Candida albicans* and related yeast species. *Medical Mycology: Cellular and Molecular Techniques*. West Sussex, England: John Wiley & Sons. pp. 69-91

Paper in Conference Proceedings:

Tessema Megenasa. 2008. Keynote Address. Proceedings of the 14th Annual Conference of the Plant Protection Society of Ethiopia, 19-22 December 2006. Addis Ababa, Ethiopia: *Plant Protection Society of Ethiopia*. pp. 11- 19

MSc. Theses and PhD Dissertations

Eyob Shenkut. 2010. Mathematics Anxiety of 9th and 10th Grade students: The Case of Three Selected Schools in Dire Dawa. Thesis, *Addis Ababa University*, Addis Ababa, Ethiopia.

Technical Reports:

United States Department of Agriculture (USDA). 2011. Technical Report on Food Insecurity in US Households with Children: Prevalence, Severity and Household Characteristics. Washington, DC: USDA.

Non- Periodical Web Document:

World Health Organization (WHO). 2002. Adolescent-friendly health services: an agenda for change. (<http://www.who.int/child-adolescent-health>) Accessed on June 1, 2010.

2.2.13. Appendix (s)

If there is any appendix, it will appear as the last chapter of the research proposal. It includes information such as drafts of questionnaires in English and other languages, participant informed consent forms, observation check lists, pictures and specifications of the equipment to be used in the research, mathematical formulae, a detailed description of the sample selection procedures and tables.

2.2.14. Letter of Agreement Sheet

The Letter of agreement sheet is the last page of a research proposal and the agreement page will be used to get formal responsibility and authorization of the proposal. Example for letter of agreement sheet can refer on chapter 6 appendix in this guideline.

CHAPTER 3 OPERATIONALS MANUAL, GUIDELINE AND SOP WRITING

The operational or technical manual, guideline and SOP are the documentation by which an organization provides guidance for members and experts to perform their functions correctly and reasonably efficiently. It documents the approved standard procedures for performing operations safely to produce goods and provide services.

3.1. Definition:

What is Operations/ Technical Manual?

The Operational manual is usually either a physical document (book, booklet, etc.) or an online resource. This Operational Manual contains the operational policies, directives, procedures and other instructions to meteorological experts that apply to operations. The Manual is organized according to instrument, country engagement, development policy and advisory services and analytics including compensate advisory services. Thus, compliance with the operations manual will generally be considered as activity approved by the persons legally responsible for the agency. The operational manual must contain the relevant procedures from cover page to

appendix page on this Meteorological Research Proposal, Manual and Research Writing Guideline.

What is Operational/ Technical Guideline?

A guideline is a statement by which to determine a course of action. A guideline aims to streamline particular processes according to a set routine or sound practice. Guidelines may be issued by and used by any organization to make the actions of its employees or divisions more predictable, and presumably of higher quality. A guideline is similar to a rule. A guideline is something that can be used to help you plan your actions or to form an opinion about something. The difficulty in writing an Operational Guideline, like any technical document, is to know where to start. Here's a suggested approach:

- **Who:** define who will read the Operational Guide, for example, is it observer, climate experts or users?
- **What:** identify the most important tasks you need to write to help experts. How do you find out?
- **Where:** identify where it will be used. Will it be used online, printed out or read on a mobile device and computer.
- **When:** is this document used in an emergency? Or is it used in less pressurized settings? How does this affect the content and the way it's structured? When is it due for completion?
- **How:** create a list of who will help you write the document, provide answers, review it, and then sign off.
- **Others:** you'll also need things like style guides and other supporting documents.

What is Standard Operational Procedure (SOP)?

It is a set of written instructions that document a routine or repetitive activity followed by an organization. The development and use of SOP is an integral part of a successful quality system as it provides individuals with the information to perform a job properly, and facilitates consistency in the quality and integrity of a product or end-result. SOPs describe both technical and fundamental programmatic operational elements of an organization that would be managed

under a work plan. Purpose of SOP details the regularly recurring work processes that are to be conducted or followed within an organization. They document the way activities are to be performed to facilitate consistent conformance to technical and quality system requirements and to support data quality. SOPs should be written in brief, step-by-step, easy-to-read format. The information presented should be unambiguous and not overly complicated. The active voice and present verb tense should be used. The document should not be wordy, redundant, or overly lengthy. Keep it simple and short and information should be conveyed clearly and explicitly to remove any doubt as to what is required. Also, use a flow chart to illustrate the process being described. All generalized format of SOP is discussed in this guideline and follow the same format guide from the cover page to the last chapter. In addition, mainly follow the style guide used Meteorological Research Proposal, Manual and Writing Guideline by MRSD. Example: font size, type, margins and etc.

3.2. Seven Steps to Follow SOP

The following are seven steps to follow when building a standard operating procedure manual. A standard operating procedures manual is a written document that lists the instructions, step-by-step, on how to complete a job task or how to handle a specific situation when it arises in the workplace.

Step 1. Create an outline of all of the standard operating procedures you want to include. Since a manual is a group of specific standard operating procedures, make a list of each task you need to cover in the manual. The outline will acts as your guide to ensure you do not leave any of the tasks out as you start to write the manual.

Step 2. Write an introduction that speaks directly to the experts who will use the manual. Include a brief description of what the manual includes, what readers can expect to gain by using the manual and the best way to use the manual.

Step 3. List the first task. To complete an entire manual, you need to start with one task at a time: begin with the first standard operating procedure on your outline. Outline the steps involved in completing the task, then go back and write out the details for each step. Make sure each step is clear and concise, but provide enough detail that anyone can follow the instructions.

Step 4. Give the standard operating procedure to someone else to read. Have an expert or someone you know read through and follows the instructions. They can provide valuable feedback if there are steps they could not complete or did not understand.

Step 5. Refine the standard operating procedure based on the feedback. You may need to rewrite, edit or add to the instructions, usually a combination of all three.

Step 6. Write the next standard operating procedure, repeating Steps 3 to 5 for each.

Step 7. Compile all of the standard operating procedures into a binder or bound manual or electronic manual. Include a cover sheet with the name of the manual, a table of contents, the introduction and the standard operating procedures in the order of the table of contents.

In general, operational manual, guideline and SOP are include the following 11 points in the document accordingly.

1. **Cover Page:** It is the first page of the documents and includes name of agency, directorate, the title and date. Cover page is the only page of a document for which a page number is not assigned.
2. **Title Page:** It is the second page of a document and it includes title, name of directorate submitted to, address of the agency and date.
3. **Foreword:** A foreword is most often written by someone other than the author. A foreword is a (usually short) piece of writing sometimes placed at the beginning of a book or other piece of literature.
4. **Preface:** A foreword is often several pages of kind words that answer the question, “Why the reader should read this book?” It usually comes before the preface. A preface, on the other hand, is a brief introduction that answers the question, “How this book did come about?” It is placed before the main body of the book.
5. **Purpose:** A broad overview of why the operations manual exists and what it aims to accomplish. Describe relevant background information.
6. **Scope:** Scope who is supposed to follow the operations manual and what it covers. Identify the intended audience and activities where the operations manual may be relevant.

7. **Prerequisites:** Outline information required before proceeding with the listed procedure; for example, worksheets, documents, reports, etc.
8. **Roles and Responsibilities:** Identify the personnel that have a primary role in the operations manual and describe how their responsibilities relate to this operations manual. If necessary, include contact information.
9. **Procedure:** Provide the steps required to perform this procedure (who, what, when, where, why, how). Include a process flowchart.
10. **Definitions:** Identify and define frequently used terms or acronyms. Provide additional and/or relevant information needed to understand this operations manual.
11. **References:** List resources that may be useful when performing the procedure; for example, Admin policies, Municipal Code, government standards and other operations manuals and guideline.

CHAPTER4. RESEARCH WRITING

4.1. Cover Page and Title Page

The cover and title page is the first page and second page of a research or scientific manual. They include the title of the research or manual it is the same as the cover and title page of proposal. Cover page is the only page of a document for which a page number is not assigned. Please refer to the example of cover and title page for the proposal and delete the word “proposal” from and use for final research. In addition, the title page is the second page of a research and It includes the title of the directorate is presented. The names of the members of the advisor of the research are provided in the title page.

4.2. Research Letter of Agreement

Letter of agreement sheet, prepared based on the template provided in the chapter 6 appendix of this guideline is placed in last page. However, the final letter of agreement sheet page will be incorporated into the expert research after accordingly signed by the advisor and Research and Study Directorate, which is after the open evaluation.

4.3. Acknowledgements

The Acknowledgements page recognizes the persons and organizations the expert is obligated to for direction and support received, and those to whom he or she is thankful for special aid.

4.4. Acronyms and Abbreviations

Acronyms and abbreviations are listed in alphabetical order of the terms when written in full form. Other than S.I. units, each abbreviation and acronym should be defined in full when it is first used and followed by its abbreviation or acronym in parenthesis. Standard units such as g, kg, m, and km should not be listed. Internationally known abbreviation such as; i.e. and etc. are not italicized. A sample is provided in the 2.2.3 above.

4.5. Table of Contents

The headings and entries in the table of contents should correspond exactly in wording, fonts, and cases with the headings or entries as they appear in the text of the research. Also, there should be dotted lines connecting headings and respective page numbers as shown in 2.2.4 above. If the table of contents is more than one page, the title followed in parenthesis with the word “Continued” must appear.

4.6. List of Tables and Figures

A list of tables and figures are explained in 1.7 and 2.2.5 section of proposal above.

4.7. List of Appendix

An alternative way of listing appendices, meteorological experts may refer to the description under the “appendix” section at 2.2.13 of this guideline.

4.8. Abstract

The word abstract is written in capital letters and is centered and it should be one single block paragraph; use information in section 2.2.6 above. The abstract should not be divided into sections or paragraphs. The abstract should summarize the background of the study, methods used, data analysis methods, results obtained, conclusions drawn and recommendations.

4.9. Description of the Research

The research and manual are divided into chapters. These chapters include the introduction, literature review, materials and methods, results and discussion; finally, it includes conclusions and recommendations, references and appendix. The results and discussion be placed in one attached chapters.

4.9.1. Introduction

This chapter includes the background information on the subject, a statement of the problem, significance of the study, the need for the study and objectives of the study.

4.9.2. Literature Review

The literature review chapter should be a critical analysis of the existing knowledge on the research and manual topic. The literature review should be relevant with recent citations on the topic. Reference section of this guideline provides the information required to present the citations correctly in the research and manual and follow the information in section 2.2.8 above.

4.9.3. Materials and Methods

It presents the sources of data and the methods and procedures of data collection and analysis. Using the past tense, a concise description of the conditions under which the investigation was carried out and the materials, procedures, techniques, experimental design and the treatments and inputs used should be provided in this chapter. It can be divided into subheadings depending on the nature of the study. This chapter should also include the study area and time period, the source and study, sampling methods used, data collection methods, study variables, quality control methods, data processing and analysis procedures and limitations of the study. A more detailed description of this is found in chapter 2 (Research Proposal) in section 2.2.9 of this guideline above.

4.9.4. Results and Discussion

This part of the narrative presents the results and analyses and interprets them. Researcher may also choose to present the results and discussion in attached in the chapter. With the results, experts present their findings without interpretation in narrative and also in the form of tables and figures. Presenting the same data both in tables and in figures should be avoided. However, when data are presented in the form of a figure, the raw data may be shown in the appendix. The narrative for each table and figure should focus on observations that are most relevant. Researcher should write the results narrative in a way that is not highly redundant with the information in the tables and figures.

The results part should be an objective report of their findings. The researcher interpretation of the results should then be made in the discussion part. This chapter is divided into subheadings sequenced similar to the major subheadings of the materials and methods chapter. However, subheadings of the materials and methods chapter should not be copied verbatim as subheadings for the results but should be modified to reflect the findings of the study. Each subheading may then be further divided into various levels of subheadings. In summary, the researcher need to clearly present their results and focus on answering the research questions described in the introduction chapter. In the discussion, the researcher interprets their results. The discussion is used to highlight the importance of the study and describe the limitations of the study and implications for future research. If experts choose to write the results and discussion as one chapter, they should follow the description of major findings with appropriate interpretation and discussion. Results and discussion are conceptually different. In the discussion, interpreting and synthesizing the research results should be conducted. If the results differ from earlier published reports, explain why that may have happened. If the results agree with the researcher expectations, then describe the reports and interpretations to support them. The discussion should focus on the major findings which call for interpretation. Besides these, the discussion should not include any findings that have not been described in the results.

4.9.5. Conclusion and Recommendation

This part of the description is the fifth chapter of the research and provides a brief explanation of the objectives, materials and methods, and the major findings of the study. It presents the more important findings of the research. It draws conclusion and then gives recommendation on such issues as policy implications and other relevant alarms based on the results obtained from the research. The chapter does not exceed four pages and citations of previous studies and references to tables or figures in the narrative or the appendix should be avoided. Where required, references to numerical values and probability levels can be made. This chapter can be divided into conclusion, and recommendation. The conclusions should be presented in a descriptive sentence format; however, recommendation bulleting and numbering are appropriate. Recommendation resulting from the research findings are an important aspect of the research; also, should be relevant to the research and only derive from the research findings. Note that, this chapter is invalid for manual and guideline preparation, because the structure of the research and the others are different.

4.9.6. References

This chapter embraces all works cited in the research, manual and guideline and it should be applicable and current. All references showing in the references chapter of the documents must have been cited in the description. This chapter should include a complete list of on line searches, journal articles, books, national and national governmental and non-governmental reports. If possible, these publications and reports have been published within the last five years and no more than ten years old. All in-text citations and the reference list in the references chapter should follow in detail the style shown in section 2.2.12 of this guideline. This must be provided in the usual educated fashion. It helps to convince your reader that your proposal is worth pursuing if you can identify literature in the field and demonstrate that you understand it. It makes a very strong impact if you can identify where there is a research gap in the literature that your proposal hopes to fill. This is your contribution to the educated conversation. In text references should be provided for all sections of the proposal and final with the exception of the research plan and timetable.

4.9.7. Appendix

The appendix is the last chapter of research, manual and guideline. It will include questionnaires used in the research, focus group discussion guidelines, maps as appropriate, observation check lists, mathematical formulae, supplementary illustrative material and any other materials related to conducting and completing the research. Analysis of variance tables also usually appear in the appendix chapter. It is usual to label appendices as appendix table and appendix figure which can then be conveniently listed in the initial sections of the documents as list of tables in the appendix and list of figures in the appendix, respectively.

4.10. Submission Instructions

Research documents and letters should be submitted to Meteorological Research and Studies directorate. Submission of a research document to the NMA will be taken to mean that it represents original work not previously published that is not being considered elsewhere for publication. Research paper publication and, if accepted for publication, it will not be published elsewhere in the same form and any language. The submission should not been previously published, nor is it under consideration in another journal. All submissions should be in DOCX word format and PDF Papers are limited to 40 pages, including figures, tables and reference by soft copy and hard copy. Authors are encouraged and should read and accept the Meteorological Research Proposal, Manual and Writing Guideline.

CHAPTER5. GUIDELINES FOR EDITORS OF SCIENTIFIC DOCUMENT

Editors are in a unique position to indirectly foster responsible conduct of research through Meteorological Research Proposal, Manual and Research Writing Guideline. To achieve the maximum effect within the research community, ideally all editors should follow to universal standards and good practices. While there are important differences between different fields and not all areas covered are relevant to each research community, there are important common editorial guideline and principles that editors should follow to ensure the integrity of the research record. These guidelines are a starting point and are aimed at paper editors in particular. The purpose of scientific editing is to determine if the research paper written about in the paper sought information that either was previously not known or not completely understood; that the

research was properly designed, accurately conducted, and accurately recorded; and that the results were correctly interpreted and presented completely and accurately. The manuscript should follow the NMA research guideline and refer to the Meteorological Research Proposal, Manual and Research Writing Guideline for information about specific parts of a manuscript, statistics, mathematics, tables, and figures.

5.1. Responsibility of Editors of Meteorological Research and Manual

Editors have to take responsibility for research, manual and guideline content for everything they publish and should have procedures in place to ensure the quality of the material they publish and maintain the integrity of the published record. Furthermore, an important part of the responsibility to make fair and unbiased decisions is the upholding of the principle of editorial independence and honesty. Editors are in a powerful position by making decisions on publications, which makes it very important that this process is as fair and unbiased as possible, and is in accordance with the academic vision of the particular journal. All editorial processes should be made clear in the information for authors. In particular, it should be stated what is expected of authors, which types of papers are published, and how papers are handled by the journal. All editors should be fully familiar with the journal policies, vision, and scope. The studious editions make clear what they promise and keep their promises; so reliability is established by accuracy, adequacy, appropriateness, consistency and explicitness. In addition, accuracy with respect to texts, adequacy and appropriateness with respect to documenting editorial principles and practice, consistency and explicitness with respect to methods. The following are the responsibility of editors of meteorological research and manual manuscript.

1. An editor should give unbiased consideration to all manuscripts offered for publication, judging each on its merits without regard to race, gender, religious belief, ethnic origin, citizenship, or political philosophy of the author and an editor should process manuscripts punctually.
2. The editor has complete responsibility and authority to accept a submitted paper for publication or to reject it. The editor may confer with associate editors or reviewers for an evaluation to use in making this decision.
3. An editor should respect the intellectual independence of authors.

4. Editorial responsibility and authority for any manuscript authored by an editor and submitted to the editor's journal should be delegated to some other qualified person, such as another editor or an associate editor of that journal. Editors should avoid situations of real or perceived conflicts of interest. If an editor chooses to participate in an ongoing scientific debate within his journal, the editor should arrange for some other qualified person to take editorial responsibility.
5. Editors should avoid situations of real or perceived conflicts of interest. Such conflicts include, but are not limited to, handling papers from present and former students, from colleagues with whom the editor has recently collaborated, and from those in the same institution.
6. Unpublished information, arguments, or interpretations disclosed in a submitted manuscript should not be used in an editor's own research except with the consent of the author.
7. If an editor is presented with convincing evidence that the main substance or conclusions of a paper published in an editor's journal are erroneous, the editor should facilitate publication of an appropriate paper pointing out the error and, if possible, correcting it.
8. Editors are accountable and should take responsibility for everything they publish
9. Editors should make fair and unbiased decisions independent from commercial consideration and ensure a fair and appropriate peer review process
10. Editors should adopt editorial policies that encourage maximum transparency and complete, honest reporting
11. Editors should guard the integrity of the published record by issuing corrections and retractions when needed and pursuing suspected or alleged research and publication misconduct

5.2. Edit the Research and Manual Manuscript

Generally speaking, a good research paper, manual and guideline are well structured and written in high quality meteorological (climate) language. The text body should ideally be brief and clear. You could start by checking your paper for sentence structure, paragraph structure, grammar and language, punctuation, spelling errors and formatting and references. There are doubtless others that are equally effective, and some of these will be faster, but the approach that

will suggest is one that is thorough and defensible. First, make sure that you are an expert in the subject and aware of the recent literature on the topic you have in mind. Consider working with co-authors so that together your expertise in the area is broad and deep. Next, read all the other review papers that have been published on related topics, or similar topics in related fields, over the previous two to three decades, to make sure that you understand what has been already done and to make sure that there is a gap in the existing reviews. Then it is time to work out what question you will be trying to answer with your review. Some examples of checklist for detailed Comments to edit the research and manual paper that can be answered by review papers include:

1. Duplication: does the manuscript unnecessarily repeat already published work?
2. Objectives: is the statement of objectives adequate and appropriate?
3. Review of literature: is due credit given to relevant contributions? Is the author's contribution placed in its proper perspective in relation to the state of knowledge? Is the number of references adequate, too small, or excessive? Is there enough evidence in the existing literature to decide which of two competing conceptual models or theories is most likely to be correct? Is there enough evidence in the literature to justify a commonly held belief or assumption in this field?
4. Methods: are the methods appropriate? Have suitable measurements been performed? Have the methods been presented in sufficient detail to allow a competent scientist-reader to repeat the work? If not, are the sources cited where sufficient detail is available?
5. Calculations: randomly select a few instances and verify the calculations made by the author.
6. Effectiveness of data presentation: would data presented in tables be better presented in figures, or vice versa?
7. Tables and Figures. Are tables and figures understandable and complete apart from the text? Are they scientifically accurate? Are figure parts labeled sufficiently? Are they identified with the manuscript number?
8. Table Row and Column Headings: is the interpretation clear, unequivocal, and in SI unit? If the paper includes tables or figures, what do they add to the paper? Do they aid understanding or are they superfluous?
9. Table and Figure Captions: do the captions accurately and completely state the content, or could they be improved?

10. Conjecture: does the author clearly distinguish between fact and conjecture? Is the amount of conjecture excessive, or too little? As long as they are properly identified, speculation and extrapolation are encouraged.
11. Appropriate Units: is SI used throughout? (At their discretion, authors may also use other units as well as the SI, usually parenthetically in text, tables, and figures.)
12. What is the main question addressed by the research? Is it relevant and interesting?
13. How original is the topic? What does it add to the subject area compared with other published material?
14. Is the paper well written? Is the text clear and easy to read?
15. Are the conclusions consistent with the evidence and arguments presented? Do they address the main question posed? Conclusions: are they adequate and supported by the data?
16. If the author is disagreeing significantly with the current academic consensus, do they have a substantial case? If not, what would be required to make their case credible?

Major Flaws in Information: If methodology is less of an issue, it's often a good idea to look at the data tables, figures or images first. Especially in science research, it's all about the information gathered. If there are critical flaws in this, it's very likely the manuscript will need to be rejected. Such issues include insufficient data, statistically non-significant variations, unclear data tables, contradictory data that either are not self-consistent or disagree with the conclusions and confirmatory data that adds little, if anything, to current understanding - unless strong arguments for such repetition are made. In general, to edit the document the editor considers the following step by step.

A well written introduction: sets out the argument, summarizes recent research related to the topic and highlights gaps in current understanding or conflicts in current knowledge. In addition, establishes the originality of the research aims by demonstrating the need for investigations in the topic area, also gives a clear idea of the target readership, why the research was carried out and the novelty and topicality of the manuscript. Originality and topicality can only be established in the light of recent authoritative research. For example, it's impossible to argue that there is a conflict in current understanding by referencing articles that are 10 years old. Authors may make the case that a topic hasn't been investigated in several years and that new research is required.

This point is only valid if researchers can point to recent developments in data gathering techniques or to research in indirectly related fields that suggest the topic needs revisiting. Clearly, authors can only do this by referencing recent literature. Obviously, where older research is seminal or where aspects of the methodology rely upon it, then it is perfectly appropriate for authors to cite some older papers. It's common for the introduction to end by stating the research aims. By this point you should already have a good impression of them - if the explicit aims come as a surprise, then the introduction needs improvement.

Replicable Research: this makes sufficient use of control experiments, repeated analysis, repeated experiments and sampling. These are used to make sure observed trends are not due to chance and that the same experiment could be repeated by other researchers and result in the same outcome. Statistical analyses will not be sound if methods are not replicable. Where research is not replicable, the paper should be recommended for rejection.

Repeatable Methods: these give enough detail so that other researchers are able to carry out the same research. For example, equipment used or sampling methods should all be described in detail so that others could follow the same steps. Where methods are not detailed enough, it's usual to ask for the methods section to be revised.

Robust Research: This has enough data points to make sure the data are reliable. If there are insufficient data, it might be appropriate to recommend revision. You should also consider whether there is any in built bias not nullified by the control experiments.

Best Practice: During these checks you should keep in mind best practice are standard guidelines were followed, the health and safety of all participants in the study was not compromised and ethical standards were maintained. If the research fails to reach relevant best practice standards, it's usual to recommend rejection. What's more, you don't then need to read any further.

Results and Discussion section should tell a coherent story that is, what happened? What was discovered or confirmed? Certain patterns of good reporting need to be followed by the author are they should start by describing in simple terms what the data show, they should make reference to statistical analyses, such as significance or goodness of fit, once described, they

should evaluate the trends observed and explain the significance of the results to wider understanding. This can only be done by referencing published research and the outcome should be a critical analysis of the data collected. Discussion should always, at some point, gather all the information together into a single whole. Authors should describe and discuss the overall story formed. If there are gaps or inconsistencies in the story, they should address these and suggest ways future research might confirm the findings or take the research forward. Furthermore, a conclusion is usually no more than a few paragraphs and may be presented as part of the results and discussion, or in a separate section. The conclusions should reflect upon the aims whether they were achieved or not and, just like the aims, should not be surprising. If the conclusions are not evidence-based, it's appropriate to ask for them to be re-written.

If you find yourself looking at a piece of information from which you cannot discern a story, then you should ask for improvements in presentation. This could be an issue with titles, labels, statistical notation or image quality. Where information is clear, you should check that:

- The results seem reasonable, in case there is an error in data gathering
- The trends you can see support the paper's discussion and conclusions
- There are sufficient data. For example, in studies carried out over time are there sufficient data points to support the trends described by the author?

You should also check whether images have been edited or manipulated to emphasize the story they tell. This may be appropriate but only if authors report on how the image has been edited (e.g. by highlighting certain parts of an image). Where you feel that an image has been edited or manipulated without explanation, you should highlight this in a confidential comment to the editor in your report. Editor will need to check referencing for accuracy and adequacy.

Accuracy: Where a cited article is central to the author's argument, you should check the accuracy and format of the reference and bear in mind different subject areas may use citations differently. Otherwise, it's the editor's role to exhaustively check the reference section for accuracy and format.

Adequacy: You should consider if the referencing is adequate: Are important parts of the argument poorly supported? Are there published studies that show similar or dissimilar trends

that should be discussed? If a manuscript only uses half the citations typical in its field, this may be an indicator that referencing should be improved, but don't be guided solely by quantity and references should be relevant, recent and readily retrievable.

Plagiarism: By now you will have a deep understanding of the paper's content and you may have some concerns about plagiarism.

Identified Concern: If you find or already knew of a very similar paper, this may be because the author over looked it in their own literature search. Or it may be because it is very recent or published in a journal slightly outside their usual field. You may feel you can advise the author how to emphasize the novel aspects of their own study, so as to better differentiate it from similar research. If so, you may ask the author to discuss their aims and results, or modify their conclusions, in light of the similar article. Of course, the research similarities may be so great that they render the work unoriginal and you have no choice but to recommend rejection.

Suspected Concern: If you suspect plagiarism, including self-plagiarism, but cannot recall or locate exactly what is being plagiarized, notify the editor of your suspicion and ask for guidance. Editors are not out to police every paper, but when plagiarism is discovered during peer review it can be properly addressed ahead of publication. If plagiarism is discovered only after publication, the consequences are worse for both authors and readers, because a retraction may be necessary.

CHAPTER6 APPENDIX

ብሔራዊ የሚቲዎሮሎጂ ኤጀንሲ

የሚቲዎሮሎጂ ተዛማጅ ሳይንስ ጥናትና ምርምር ዳይሬክቶሬት

የጥናትና ምርምር ፕሮፖዛል አቅርቦው ተቀባይነት ባገኙ የኤጀንሲው ተመራማሪዎችና በሚቲዎሮሎጂና ተዛማጅ ሳይንስ ጥናትና ምርምር ዳይሬክቶሬት መካከል የሚፈረም የስምምነት ሰነድ (Letter of Agreement) ለሚቲዎሮሎጂ ሳይንስ እድገት ብሎም ለሀገሪቱ የማህበራዊና ኢኮኖሚያዊ እንቅስቃሴዎች አስተዋፅዖና ውጤታማ የሚያደርግ፣ የኢትዮጵያን የአየር ሁኔታና ጠባይ በሚገባ ለማወቅና ኤጀንሲው የሚሰጠውን የሚቲዎሮሎጂ አገልግሎት በጥራትና በብዛት ዘርፍ ተኮር የሆነ ችግር ፈች ጥናትና ምርምር በጋራምና በተናጠል ለማካሄድ እንዲቻል በመሠረታዊ የሥራ ሂደት ለውጥ ትግበራና በውጤት ተኮር ሥርዓት ግንባታ ሂደት ባለሙያዎች በጥናትና ምርምር ዘርፍ ለመሳተፍ እና ለደረጃ መሰላል እድገት የሚያስችላቸውን ኤጀንሲው ሁኔታዎች ያመቻቸት፡፡ በመሆኑም ለኤጀንሲው ባለሙያዎች በተካሄደው የጥናትና ምርምር ጥሪ (Call for Research Proposal) መሰረት አቶ/ወሮ/ወ/ሪት.....ባቀረቡት የጥናትና ምርምር ፕሮፖዛል”.....

.....በሚል ርእስ የብሔራዊ ሚቲዎሮሎጂ ኤጀንሲው አገልግሎት ለማሻሻል የሚያስችል ችግር ፈች ምርምር ሆኖ ተገኝቷል፡፡ በተጨማሪም ከዚህ ቀደም ተዘጋጅቶ ለአገልግሎት ስራ ላይ የዋለውን የጥናት ምርምር ውጤት ወቅታዊ (Update) በማድረግ በማገዝ በኩል ያለው አስተዋፅኦ ከፍተኛ ሆኖ በመገኘቱ የጥናትና ምርምሩን ሂደት ለማስጀመር የሚያስችል የስምምነት ውል አስፈላጊ በመሆኑ ከዚህ በታች በተገለጹት ግዴታዎች አማካይነት ከኤጀንሲው ባለሙያ ጋር የስምምነት ሰነድ (Letter of Agreement) ይፈረማል፡፡

ስለሆነም፤

1. የተመራማሪዎች ግዴታዎች

- ከዚህ የስምምነት ሰነድ ጋር በተያያዘው እቅድ መሠረት ወርሃዊ ሪፖርት ማቅረብ
- ጥናትና ምርምሩ የደረሰበትን ውጤት በየስድስት ወሩ በሴሚናር መልክ ማቅረብ
- ለአበል ለትራንስፖርት ለማቴርያሎች ግዥ ወዘተ ለዋሉ ወጭዎች አስፈላጊውን የሂሳብ ማመሳከሪያ ሰነድ ማቅረብ
- ተመራማሪው ፕሮፖዛል ካቀረበና ከጸደቀ በኋላ በገዛ ፍቃዱ እርእስ፣ የጥናቱን አላማ እና Data and Methods መቀየር አይቻልም
- ተመራማሪው ባቀረበው ፕሮፖዛል መሰረት የጥናት ምርምር ውጤት በጸደቀው የጊዜ ሰሌዳ መሰረት ለሚቲዎሮሎጂ ጥናትና ምርምር ዳይሬክቶሬት ባያቀርብ ለዚህ የወጣውን ውጪ በሙሉ ለኤጀንሲው ተመላሽ ያደርጋል

2. የተመራማሪው ዳይሬክቶሬት ወይም አገልግሎት ማእከል ግዴታዎች

- ተመራማሪው ሪፖርቱን ለሚቲዎሮሎጂና ተዛማጅ የሳይንስ ዘርፎች ዳይሬክቶሬት በወቅቱ መላኩን ማረጋገጥና የስራ ክትትል ማድረግ

3. የሚቲዎርሎጂ ጥናትና ምርምር ዳይሬክቶሬት ግዴታዎች

- በሚቀርቡት ወርሀዊ ሪፖርቶች ላይ ክትትል ማድረግና አስፈላጊውን ግብረ መልስ ማዘጋጀትና ለሞያተኛው ሳይንሳዊ ምክርና ሞያዊ እገዛ መስጠት፤
- ተመራማሪዎች የሰድስት ወር ጥናታዊ ሪፖርቶች በሚያቀርቡበት ጊዜ አስፈላጊውን ቅድመ ዝግጅት ማከናወን፤ ለምርምሩ የተፈቀደው በጀት በትክክል ሥራ ላይ መዋሉን ማረጋገጥ፤
- ለተመራማሪዎች ሞያተኛ አማካሪዎች መመደብ
- የጥናትና ምርምሩን ማጠቃለያ ሪፖርት ተዘጋጅቶ እንዲቀርብ ማድረግ

የተመራማሪው ስም	ፊርማ	ቀን

የሚቲዎርሎጂ ተዛማጅ ሳይንሶች ጥናትና ምርምር ዳይሬክቶሬት ኃላፊ

ስም _____ ፊርማ _____ ቀን _____

ማሳሰቢያ:-

ይህ ስምምነት ከጸደቀው ጥናት ምርምር ፕሮፖዛል ጋር ተያይዞ በሶስት ቅጂዎች ተዘጋጅቶ በተመራማሪዎቹ ዳይሬክቶሬት ወይም አገልግሎት ማዕከላት እንዲሁም በጥናትና ምርምር ዳይሬክቶሬት ለክትትል በሚያመች መንገድ ተዘጋጅቶ ይቀመጣል፡፡

====THE END=====