INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT & MANAGEMENT

IJRCM

A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories

Indexed & Listed at:

Ulrich's Periodicals Directory ©, ProQuest, U.S.A., EBSCO Publishing, U.S.A., Cabell's Directories of Publishing Opportunities, U.S.A.,

Open J-Gage, India [link of the same is duly available at Inflibnet of University Grants Commission (U.G.C.)],

Index Copernicus Publishers Panel, Poland with IC Value of 5.09 & number of libraries all around the world.

Circulated all over the world & Google has verified that scholars of more than 2980Cities in 165 countries/territories are visiting our journal on regular basis.

Ground Floor, Building No. 1041-C-1, Devi Bhawan Bazar, JAGADHRI – 135 003, Yamunanagar, Haryana, INDIA

http://ijrcm.org.in/

CONTENTS

Sr. No.	TITLE & NAME OF THE AUTHOR (S)	Page No.
1.	ROLE OF IT IN COMMERCE EDUCATION IN INDIA: A KEY TO ACHIEVE INCLUSIVE GROWTH AND SUSTAINABILITY *DR. SONAL SHARMA & DR. M. K. SINGH*	1
2.	AGRIBUSINESS POTENTIAL IMPACT OF HORTICULTURE CROPS: AN AGRICULTURAL ECONOMIC ANALYSIS OF CASHEW NUT IN TAMIL NADU *DR. R.LOGANATHAN & DR. M.CHANDRASEKARAN*	8
3.	REAL IMPACT OF IMPACT FACTOR RESEARCH JOURNALS ON RESEARCH PAPERS *SHUBHANGI JAIN & DR. PRATEEK SHARMA*	13
4.	GREEN CONSUMERISM: AWARENESS OF ENVIRONMENTAL ISSUES AMONG CONSUMERS IN TAMILNADU *DR. K. SALEEM KHAN, DR. A. MOHAMED SALI & K.SHARIFA NIZARA*	21
5.	REFINED HR SCENARIO IN INDIAN IT INDUSTRY *U. JEYASUTHARSAN & DR. N. RAJASEKAR*	27
6.	AN ANALYSIS OF FACTORS AFFECTING POST-HARVESTING FOOD LOSS IN PERISHABLE CHAIN *N. ARUNFRED & DR. D. KINSLIN*	32
7.	ANALYSIS OF LIQUIDITY AND PROFITABILITY IN TEXTILE INDUSTRY IN INDIA *DR. T. MADHU SUDANA & DR. B. PHANISWARA RAJU*	35
8.	TECHNOLOGICAL DEVELOPMENTS IN INDIAN BANKING SECTOR *N. SURESH BABU & DR. G.V.CHALAM*	43
9.	FOREIGN DIRECT INVESTMENT IN MULTIBRAND RETAILING IN INDIA: FROM STAKEHOLDERS PERSPECTIVES *DR. P. SANTHI*	48
10.	COMPARATIVE STUDY OF IMAGE ENHANCEMENT TECHNIQUES *SANJEEV KUMAR & NAVNEET GOLCHHA*	53
11.	IMPLEMENTATION OF SHORTEST PATH ALGORITHM FOR RECTILINEAR STEINER TREE PROBLEM *SAKSHI RAJPUT*	57
12.	A STUDY ON FAST MOVING CONSUMER GOODS MARKETING WITH SPECIAL REFERENCE TO SAKTHI MASALA PRODUCTS *R. BUVANESWARI, B.BHARATHI & MAHALAKSHMI VENKATESH*	61
13.	A STUDY ON CONSUMER BEHAVIOUR TOWARDS RETAIL STORES WITH REFERENCE TO BIG BAZAAR IN COIMBATORE CITY *B.DEVIPRIYA & DR. M. NANDHINI*	64
14.	ROLE OF MARKET ORIENTATION IN PERFORMANCE OF SMALL-SCALE INDUSTRIES: A STUDY OF UNISOPENT PVT. LTD. *NISHU MARWAH*	67
15.	STRATEGIC THINKING: A KEY FOR COMPETITIVENESS IN SMALL BUSINESS OPERATING IN NIGERIA *ONYEAGHALA OBIOMA, H. & UKPATA, SUNDAY IJUO*	70
16.	IS SMALL SCALE IRRIGATION A SOLUTION FOR ALLEVIATING RURAL POVERTY IN TIGRAY? (CASE STUDY IN HINTALLO WAJIRAT) *TEFERA KEBEDE LEYU*	77
17.	ENVIRONMENTAL CORRELATES OF SCIENCE, TECHNICAL, VOCATIONAL AND BUSINESS EDUCATION FOR ECONOMIC TRANSFORMATION IN NIGERIA *UKPATA, SUNDAY IJUO & DR. ONYEUKWU, PAULINE EBERE*	85
18.	EMPLOYEES PERCEPTION TOWARDS HRD CLIMATE IN THE BANKING SECTOR: A CASE STUDY OF JAMMU AND KASHMIR BANK *RAFIA GULZAR*	90
19.	POVERTY REDUCTION: A PREDICATE OF HUMAN CAPACITY DEVELOPMENT IN NIGERIA *ONYEAGHALA, OBIOMA, H., KAPPE, MAMMAN, P. & DIBAL, HYELADI STANLEY*	95
20.	A STUDY ON LEADERSHIP STYLES OF SELECTED ENGINEERING UNITS LOCATED IN GIDC, VITTHAL UDYOGNAGAR, GUJARAT *SAMIR P RATHOD & MEHUL J MISTRY*	101
21.	ADOPTION OF THE TECHNOLOGY ACCEPTANCE MODEL TO DETERMINE THE FACTORS THAT DRIVE TO SHOP ONLINE *ANKUR SANGWAN*	107
22.	TO ASSESS THE EFFECT OF INTELLECTUAL CAPITAL ON ORGANIZATIONAL PERFORMANCE IN THE MANUFACTURING SECTOR *JOHN WEKESA WANJALA*	113
23.	THE ANALYSIS AND DERIVATION OF A NEW FRAMEWORK TO INVEST IN GOLD *ANKUR SANGWAN*	119
24.	THE FINANCIAL STATEMENT ANALYSIS OF TAMIL NADU NEWSPRINT AND PAPERS LIMITED, KARUR *OMBEGA OGUTA KEPHAR*	127
25.	NATURAL RESOURCE AND CIVIL WARS: A CRITICAL ANALYSIS *SIDDHARTH RATHORE*	136
26.	EMERGENCE OF HEDGE FUNDS: IMPLICATIONS ON THE INDIAN CAPITAL MARKET *ANINDITA CHAKRAVORTY*	140
27.	TRAINING AND DEVELOPMENT PROGRAMMES IN TAMILNADU STATE TRANSPORT CORPORATION LIMITED, KUMBAKONAM *D. PAUL DHINAKARAN*	146
28.	INDIGENIZATION OF MILITARY HARDWARE: A NECESSITY FOR INDIA? *SIDDHARTH RATHORE*	150
29.	A STUDY ON THE STATUS OF FACULTY DEVELOPMENT ACTIVITIES IN ENGINEERING INSTITUTIONS *S. MURALI*	153
30.	WIRELESS MONITORING AND RECORDING OF ENVIRONMENTAL PARAMETERS BASED ON XBEE AND PIC *ARAVIND.S*	158
	REQUEST FOR FEEDBACK & DISCLAIMER	163

CALL FOR MANUSCRIPTS

We invite unpublished novel, original, empirical and high quality research work pertaining to recent developments & practices in the areas of Computer Science & Applications; Commerce; Business; Finance; Marketing; Human Resource Management; General Management; Banking; Economics; Tourism Administration & Management; Education; Law; Library & Information Science; Defence & Strategic Studies; Electronic Science; Corporate Governance; Industrial Relations; and emerging paradigms in allied subjects like Accounting; Accounting Information Systems; Accounting Theory & Practice; Auditing; Behavioral Accounting; Behavioral Economics; Corporate Finance; Cost Accounting; Econometrics; Economic Development; Economic History; Financial Institutions & Markets; Financial Services; Fiscal Policy; Government & Non Profit Accounting; Industrial Organization; International Economics & Trade; International Finance; Macro Economics; Micro Economics; Rural Economics; Co-operation; Demography: Development Planning; Development Studies; Applied Economics; Development Economics; Business Economics; Monetary Policy; Public Policy Economics; Real Estate; Regional Economics; Political Science; Continuing Education; Labour Welfare; Philosophy; Psychology; Sociology; Tax Accounting; Advertising & Promotion Management; Management Information Systems (MIS); Business Law; Public Responsibility & Ethics; Communication; Direct Marketing; E-Commerce; Global Business; Health Care Administration; Labour Relations & Human Resource Management; Marketing Research; Marketing Theory & Applications; Non-Profit Organizations; Office Administration/Management; Operations Research/Statistics; Organizational Behavior & Theory; Organizational Development; Production/Operations; International Relations; Human Rights & Duties; Public Administration; Population Studies; Purchasing/Materials Management; Retailing; Sales/Selling; Services; Small Business Entrepreneurship; Strategic Management Policy; Technology/Innovation; Tourism & Hospitality; Transportation Distribution; Algorithms; Artificial Intelligence; Compilers & Translation; Computer Aided Design (CAD); Computer Aided Manufacturing; Computer Graphics; Computer Organization & Architecture; Database Structures & Systems; Discrete Structures; Internet; Management Information Systems; Modeling & Simulation; Neural Systems/Neural Networks; Numerical Analysis/Scientific Computing; Object Oriented Programming; Operating Systems; Programming Languages; Robotics; Symbolic & Formal Logic; Web Design and emerging paradigms in allied subjects.

Anybody can submit the **soft copy** of unpublished novel; original; empirical and high quality **research work/manuscript** ***anytime*** in ***M.S. Word format*** after preparing the same as per our **GUIDELINES FOR SUBMISSION**; at our email address i.e. infoijrcm@gmail.com or online by clicking the link **online submission** as given on our website (***FOR ONLINE SUBMISSION, CLICK HERE***).

GUIDELINES FOR SUBMISSION OF MANUSCRIPT

1. **COVERING LETTER FOR SUBMISSION:**

DATED: _____

THE EDITOR
IJRCM

Subject: **SUBMISSION OF MANUSCRIPT IN THE AREA OF.**

(e.g. Finance/Marketing/HRM/General Management/Economics/Psychology/Law/Computer/IT/Engineering/Mathematics/other, please specify)

DEAR SIR/MADAM

Please find my submission of manuscript entitled '_____' for possible publication in your journals.

I hereby affirm that the contents of this manuscript are original. Furthermore, it has neither been published elsewhere in any language fully or partly, nor is it under review for publication elsewhere.

I affirm that all the author (s) have seen and agreed to the submitted version of the manuscript and their inclusion of name (s) as co-author (s).

Also, if my/our manuscript is accepted, I/We agree to comply with the formalities as given on the website of the journal & you are free to publish our contribution in any of your journals.

NAME OF CORRESPONDING AUTHOR:
Designation:
Affiliation with full address, contact numbers & Pin Code:
Residential address with Pin Code:
Mobile Number (s):
Landline Number (s):
E-mail Address:
Alternate E-mail Address:

NOTES:

a) The whole manuscript is required to be in ***ONE MS WORD FILE*** only (pdf. version is liable to be rejected without any consideration), which will start from the covering letter, inside the manuscript.
b) The sender is required to mentionthe following in the **SUBJECT COLUMN** of the mail:
New Manuscript for Review in the area of (Finance/Marketing/HRM/General Management/Economics/Psychology/Law/Computer/IT/ Engineering/Mathematics/other, please specify)
c) There is no need to give any text in the body of mail, except the cases where the author wishes to give any specific message w.r.t. to the manuscript.
d) The total size of the file containing the manuscript is required to be below **500 KB**.
e) Abstract alone will not be considered for review, and the author is required to submit the complete manuscript in the first instance.
f) The journal gives acknowledgement w.r.t. the receipt of every email and in case of non-receipt of acknowledgment from the journal, w.r.t. the submission of manuscript, within two days of submission, the corresponding author is required to demand for the same by sending separate mail to the journal.

2. **MANUSCRIPT TITLE:** The title of the paper should be in a 12 point Calibri Font. It should be bold typed, centered and fully capitalised.

3. **AUTHOR NAME (S) & AFFILIATIONS:** The author (s) **full name**, **designation**, **affiliation** (s), **address**, **mobile/landline numbers**, and **email/alternate email address** should be in italic & 11-point Calibri Font. It must be centered underneath the title.

4. **ABSTRACT:** Abstract should be in fully italicized text, not exceeding 250 words. The abstract must be informative and explain the background, aims, methods, results & conclusion in a single para. Abbreviations must be mentioned in full.

5. **KEYWORDS:** Abstract must be followed by a list of keywords, subject to the maximum of five. These should be arranged in alphabetic order separated by commas and full stops at the end.

6. **MANUSCRIPT:** Manuscript must be in ***BRITISH ENGLISH*** prepared on a standard A4 size ***PORTRAIT SETTING PAPER***. It must be prepared on a single space and single column with 1" margin set for top, bottom, left and right. It should be typed in 8 point Calibri Font with page numbers at the bottom and centre of every page. It should be free from grammatical, spelling and punctuation errors and must be thoroughly edited.

7. **HEADINGS:** All the headings should be in a 10 point Calibri Font. These must be bold-faced, aligned left and fully capitalised. Leave a blank line before each heading.

8. **SUB-HEADINGS:** All the sub-headings should be in a 8 point Calibri Font. These must be bold-faced, aligned left and fully capitalised.

9. **MAIN TEXT:** The main text should follow the following sequence:

INTRODUCTION

REVIEW OF LITERATURE

NEED/IMPORTANCE OF THE STUDY

STATEMENT OF THE PROBLEM

OBJECTIVES

HYPOTHESES

RESEARCH METHODOLOGY

RESULTS & DISCUSSION

FINDINGS

RECOMMENDATIONS/SUGGESTIONS

CONCLUSIONS

SCOPE FOR FURTHER RESEARCH

ACKNOWLEDGMENTS

REFERENCES

APPENDIX/ANNEXURE

It should be in a 8 point Calibri Font, single spaced and justified. The manuscript should preferably not exceed ***5000 WORDS***.

10. **FIGURES &TABLES:** These should be simple, crystal clear, centered, separately numbered & self explained, and **titles must be above the table/figure**. **Sources of data should be mentioned below the table/figure**. It should be ensured that the tables/figures are referred to from the main text.

11. **EQUATIONS:**These should be consecutively numbered in parentheses, horizontally centered with equation number placed at the right.

12. **REFERENCES:** The list of all references should be alphabetically arranged. The author (s) should mention only the actually utilised references in the preparation of manuscript and they are supposed to follow **Harvard Style of Referencing**. The author (s) are supposed to follow the references as per the following:

- All works cited in the text (including sources for tables and figures) should be listed alphabetically.
- Use (**ed.**) for one editor, and (**ed.s)** for multiple editors.
- When listing two or more works by one author, use --- (20xx), such as after Kohl (1997), use --- (2001), etc, in chronologically ascending order.
- Indicate (opening and closing) page numbers for articles in journals and for chapters in books.
- The title of books and journals should be in italics. Double quotation marks are used for titles of journal articles, book chapters, dissertations, reports, working papers, unpublished material, etc.
- For titles in a language other than English, provide an English translation in parentheses.
- The location of endnotes within the text should be indicated by superscript numbers.

PLEASE USE THE FOLLOWING FOR STYLE AND PUNCTUATION IN REFERENCES:

BOOKS

- Bowersox, Donald J., Closs, David J., (1996), "Logistical Management." Tata McGraw, Hill, New Delhi.
- Hunker, H.L. and A.J. Wright (1963), "Factors of Industrial Location in Ohio" Ohio State University, Nigeria.

CONTRIBUTIONS TO BOOKS

- Sharma T., Kwatra, G. (2008) Effectiveness of Social Advertising: A Study of Selected Campaigns, Corporate Social Responsibility, Edited by David Crowther & Nicholas Capaldi, Ashgate Research Companion to Corporate Social Responsibility, Chapter 15, pp 287-303.

JOURNAL AND OTHER ARTICLES

- Schemenner, R.W., Huber, J.C. and Cook, R.L. (1987), "Geographic Differences and the Location of New Manufacturing Facilities," Journal of Urban Economics, Vol. 21, No. 1, pp. 83-104.

CONFERENCE PAPERS

- Garg, Sambhav (2011): "Business Ethics" Paper presented at the Annual International Conference for the All India Management Association, New Delhi, India, 19–22 June.

UNPUBLISHED DISSERTATIONS AND THESES

- Kumar S. (2011): "Customer Value: A Comparative Study of Rural and Urban Customers," Thesis, Kurukshetra University, Kurukshetra.

ONLINE RESOURCES

- Always indicate the date that the source was accessed, as online resources are frequently updated or removed.

WEBSITES

- Garg, Bhavet (2011): Towards a New Natural Gas Policy, Political Weekly, Viewed on January 01, 2012 http://epw.in/user/viewabstract.jsp

IS SMALL SCALE IRRIGATION A SOLUTION FOR ALLEVIATING RURAL POVERTY IN TIGRAY?
(CASE STUDY IN HINTALLO WAJIRAT)

TEFERA KEBEDE LEYU
LECTURER
DEPARTMENT OF ECONOMICS
COLLEGE OF BUSINESS AND ECONOMICS
MEKLLE UNIVERSITY
MEK'ELE

ABSTRACT

It has long been since rural poverty became a multifaceted problem in most developing countries. Furthermore, one of the agendas of the Milenium Development Goals is to eradicate rural poverty by 2015. In Ethiopia, where about 85% of the population lives in the country side, rural poverty reduction is the top agenda of the government. To this end, the government has clearly stated in the Growth and Transformation Plan that one way of eradicating rural poverty is through the expansion of small scale irrigation practices in the rural areas of the country. It is with this understanding that this study was conducted using a sample of 240 households selected using simple random and a two- stage stratified sampling with rural as a an ultimate unit for obtaining first hand information. Using the Foster, Greer and Thorbeck, FGT, class of poverty measures we assessed the incidence, depth and severity of poverty for both households with and without access to irrigation in the study wereda.. The stochastic dominance analysis showed that the incidence and depth of poverty were significantly lower in household with access to irrigation than in households without access to irrigation. Hence, continued investment in new irrigation projects and maintenance of existing ones in the study wereda will help to attain the government's goals of rural welfare improvements. Moreover, as a reducing poverty and decreasing inequality both have growth-enhancing effects; irrigation investment could have an added benefit. Thus, irrigation in the Hintalo Wajirat Wereda appears to be an investment that can lead to both growth and equity.

KEYWORDS
Small scale Irrigation, Rural poverty, FGT.

1.1 INTRODUCTION

Ethiopia has diversified physical features that range from the lowest depression known as the Danakil Depression (about 500 metres below sea level) in the Afar Region to the highest peak in the Smien Mountains (over 4,600 metres above sea level. As a result of this and other environmental features, the country has varieties of agro-ecological zones. In addition, Ethiopia is endowed with massive human resource, arable land, livestock and natural resources, which is manifested by the fact that Ethiopia is the second populous country in Sub-Saharan Africa (SSA) and third in the continent with population surpassing 80 million and about 85% of its people are dependent on traditional agriculture and live in rural areas. Agriculture, in Ethiopia, employs about 80% of the labour force and accounts 50% of the GDP (Ministry of Education, 2002, CSA, 2007).

Furthermore, Ethiopia is highly endowed with vast riches of water resources, which include 12 major river basins and 12 natural and artificial lakes. The total runoff, regardless of its distribution, is estimated to be about 122 billion m^3, of which 75% drains to neighbouring countries. It is also estimated that there is about 2.50 billion m^3 of usable ground water that is not yet exploited much with the exception of rural and urban water supply((UNDP/HDR, 2007/08).

Being an agrarian economy, the Ethiopian economy is highly dependent on the traditional farming system, which is the main stay of the economy. This sector in turn heavily depends on nature in which production and productivity are highly influenced by natural calamities such as climate and hydrological variability that are reflected as droughts, and floods. As a result of low and erratic rain-fall, drought has been frequently manifested and threatened the lives of many people in Ethiopia in general and Tigray regional state in particular (Hagos, *et al,* 1999; Pender and G/medhin, 2004, 2007, G/her 2008).

Moreover, the above problems are manifested in different forms such as low agricultural productivity which resulted in incomes of the poor to be less than one dollar a day, which in turn, is exacerbated by population pressure due to small landholding with landholding being 1 hectare on average (ibid). As a result, rural poverty constitutes the major form of poverty in Ethiopia (Fasil, 1993; Demery, 1999). Hence, it is said that Ethiopia is among the poorest nations in the world. Accordingly, the World Development Report (2007) calculated a per capita income of US$ 160 (World Bank, 2007), and in the Human Development Index (HDI), Ethiopia has been ranked 170th out of 177 nations with HDI value of 0.371(UNDP, 2006).

This demands poverty reduction policies in Ethiopia to focus on strategies that enhance agricultural productivity of smallholders sector through access to improved extension packages, provision of input and credit supply services, building of infrastructure (mainly rural roads and water supply), and expansion of primary education and health care services.

To this end, the government has been developing macroeconomic strategies that have focused on the reduction of poverty in the nation as a whole.

Achieving broad-based, accelerated and sustained economic growth so as to eradicate poverty has been and is a key objective of the government of Ethiopia. One of the these strategies was the last five year (2005/06-2009/10) development plan which was the plan for Accelerated and Sustained Development to End Poverty (PASDEP). During this plan's period, high and sustained economic growth and significant social and human development results were realised.

To carry forward the important strategic direction pursued in the PASDEP, the government has formulated the five year Growth and Transformation Plan (GTP)(2010/11-2014/15). The GTP envisages that besides maintaining a fast growing economy, better results will be realised in all sectors. During the GTP period, one of the special emphases will be given to agriculture and rural development.

1.2 THE PROBLEM STATEMENT

The Ethiopian economy is highly dependent on the agricultural sector which, in turn, primarily depends on erratic and often insufficient rainfall. As a result, there are frequent failures of agricultural production which has a direct negative impact on the income of the rural poor and poverty in the rural areas is more entrenched and widespread than in urban areas.

Because of the spill over effects of the failures in the rural sector, Ethiopia with gross national income per capita of only about US$ 160 per year and average income of much less than $1 per person per day is ranking 202^{nd} out of 208 countries (World Bank 2006). Moreover, it is estimated that about 39% of the population lives on absolute poverty of less than a $1 a day poverty line (MoFED, 2006) while close to 80% falls below US $2 a day poverty line (World Bank, 2005). The Incidence of extreme poverty is higher in rural areas (39.3 percent) compared to urban areas (35.1 percent) MoFED, 2006).

Despite this severe and prolonged poverty in rural Ethiopia, the country's economy continues to be highly reliant on one sector which, in turn, is heavily dependent on erratic rain-fall in which productivity and production are strongly influenced by climatic and hydrological variability that are reflected as dry spells, droughts and floods.

Therefore, in such type of economy, some kinds of intervention that are deemed important to escape people out of poverty are inevitable not only from economics point of view but also from moral and ethical considerations.

Accordingly, several searchers argued that since the poor are vulnerable and susceptible to exogenous negative shocks due to natural disasters such as drought, flood, typhoon, and etc, providing households with coping strategies against the emergence of such temporary poverty becomes an important policy target.

Empirical evidences suggest that irrigation projects have positive impacts on agricultural production and the reduction of poverty (Hussain and Hanjra 2004; Smith 2004; Lipton 2007; and Hussain 2007b, Kebede, 2011). Lipton (2007) reports that in India, irrigated areas had 2.5 times lower standard deviation of crop output per year during the period 1971—84 (as cited in Dilon,2005). Hagos et al (2007) indicates that in Ethiopia there is significant difference in incidence, depth and severity of poverty in households with access to irrigation than those without irrigation.

Nevertheless, Pender et al (2002) reported that returns from investment in irrigation have been relatively low in the Tigray region.

Contrary to this last study, Gebregziabher (2008) has found positive and significant impacts of investment in small scale irrigation on income and hence reducing poverty in the Tigray region. In addition, Kebede(2011), using a censored regression model found that access to small–scale irrigation significantly increased mean annual household income in the lake Tana basin of Ethiopia.

Thus, the present study is carried out in order to test the impact of small scale irrigation on rural poverty using cross-sectional data in Hintalo Wajirat in the Tigray regional state..

1.3 RESEARCH QUESTIONS

This research aims at addressing the impact of small scale irrigation on poverty reduction in rural Tigray. Specifically, the research intends to answer the following question:

1. Does access to small scale irrigation make a difference on the incidence, depth and severity of poverty in the study areas?

1.4 THE RESEARCH OBJECTIVE

The overall objective of the present study is to examine the impact of small scale irrigation on poverty of the farm households in Tigray.

To achieve the general objective of the research, the study has the following specific objective**:**

To assess the impact of small scale irrigation on the incidence, depth and severity of poverty in the study area

1.5 RESEARCH HYPOTHESIS

In order to test the realization of the specific objectives of the study, the research intends to test the following hypotheses:

Hypothesis: The incidence, depth and severity of poverty are not lower for households with access to small scale irrigation than households without access.

1.6 SIGNIFICANCE OF THE RESEARCH

Since the objective of the study is assessing the impact of small scale irrigation on rural poverty in Tigray, the output of the study, therefore, has the following academic and policy issues:

- the study may help to provide an up-to –date picture on the present status of poverty in the study area.
- the study will try to indicate which groups of the poor need an immediate action in lifting them up and it also tries to highlight the role of some interventions such as irrigation in alleviating rural poverty. Hence, this in turn will help for policy planners to take an action deemed to up lift the poorest of the poor in rural areas.
- it is assumed that the study may provide some alternatives or feasible recommendations that may help in linking poverty and irrigation practices in the poverty prone areas of Tigray.

1.7 MATERIALS AND METHODS

1.7.1 DATA SOURCES

In order to achieve the objectives of the research, the data sources for the present study are mainly primary cross-sectional household surveys coupled with secondary data sources mainly from various organizations including wereda profiles of the study area.

The primary data are collected through structured questionnaire, focus group discussion with key informants and an in-depth interview with governmental officers and other stakeholders in the study area.

1.7.2 SAMPLING PROCEDURES

In this study, the researcher selected the district using purposive sampling technique. Geographically, Hintallo Wajirat is found in the South Eastern zone in Tigray. From the district, the researcher selected three Tabias(Kebelle) on the basis of the availability of small scale irrigation to farm households in each Kushet(lowest administrative section) using purposive sampling. In the selection of farm households, we used proportionate stratified random sampling technique. This method was employed due to the fact that all the households don't have access to small scale irrigation in the study areas. From each stratum, sample households were selected using systematic random sampling. As a result, a total sample size of 240 sample households, of which 144 households have access to small scale irrigation while 96 households don't have the access.

1.7.3 DATA ANALYSIS

1.7.3.1 DESCRIPTIVE ANALYSIS

The purpose of using this type of analytical tool is to summarise the data by describing the basic features of the data in the study, and to provide simple summaries of the variables and measures in the form of percentages, tables, charts, mean values and we also tested the significance of some variables using simple t-test and chi-square tests.

1.7.3.2 ECONOMETRIC MODELS

MEASURING POVERTY INDICES

In this part, the different poverty indices were analyzed. To be more specific, we use the most standard and widely used poverty measure, the Foster, Greer and Thorbecke (1984), FGT, class of poverty index for the measures of poverty.

Given information on a welfare measure such as per capita consumption, and a poverty line, then the only remaining problem is deciding on an appropriate summary measure of aggregate poverty.

The World Bank (2005) states that poverty measures serve to monitor and evaluate social and economic conditions and to give benchmarks of success or failure. In this case, poverty measures are indicators through which interventions are judged and by which the impact of vents (e.g., runaway inflation or the introduction of a government transfer program) can be weighed. Another important use of poverty measures is descriptive. That means poverty measures serve in summarizing complex social and economic conditions that give information with regard to conversations around economic and social priorities. For this purpose, effective measures need not completely capture all (or even most) morally relevant aspects of poverty.

The Foster- Greer-Thorbecke (FGT) class of poverty measures is given as:

$$P\alpha = \frac{1}{n}\sum_{i=1}^{q}\left(\frac{Z - Yi}{z}\right)^{\alpha} \qquad (1)$$

where α = Poverty aversion parameter

n = Total number of individuals in the population or sample

q = Total number of poor individuals
Z = Poverty line
Y i=Expenditure of individuals below poverty line *i* = 1, 2… *q*.

In contrast to Sen's measure (1976) that adopts a rank-order weighting scheme, P_α takes the weights to be the shortfalls themselves. In this case, deprivation depends on the distance between a poor household's actual expenditure and the poverty line, not the number of households that lie between a given household and the poverty line. It also meets the relative deprivation – the expenditure shortfall of that household criterion of poverty.

If $\alpha = 0, \longrightarrow p_0 = \frac{q}{n}$ (2)

This index is a head count ratio index that reflects the proportion of the poor in total population measuring the incidence of poverty in the whole population. The advantage of the head count measure is that the overall progress in reducing poverty can be assessed right away. Nevertheless, it is insensitive to the depth or severity of poverty and hence, not good to assess the impact of a policy measure.

The advantages of the headcount index are that it is simple to construct and easy to understand. These are important qualities. However the measure has at least three weaknesses:

First, the headcount index does not take the intensity of poverty into account. Consider the following two income distributions:

As a welfare function, the headcount index is unsatisfactory in that it violates the transfer principle – an idea first formulated by Dalton (1920) that states that transfers from a richer to a poorer person should improve the measure of welfare. Here if a somewhat poor household were to give to a very poor household, the headcount index would be unchanged, even though it is reasonable to suppose that poverty overall has lessened.

Second, when a very poor person becomes less poor and when a poor person becomes even poorer, poverty measure must change, but the headcount registers no change in this situation. Most observers, though, following Watts (1968) and Sen (1976), argue that changes in the income distribution below the poverty line matter in a moral sense. This notion is captured by the transfer axiom above, but the headcount fails the test.

Moreover, the easiest way to reduce the headcount index is to target benefits to people just below the poverty line, because they are the ones who are cheapest to move across the line. But by most normative standards, people just below the poverty line are the least deserving of the poor.

If $\alpha = 1 \longrightarrow P_1 = \frac{1}{nz}\sum_{i=1}^{q}(Z - Yi)$ (3)

This measure, known as poverty gap, estimates the average distance separating the poor from the poverty line. The poverty gap could be understood as the amount of income transfer needed to close up the gap. P1 is sensitive to the depth of poverty but not to its severity.

This measure is the mean proportionate poverty gap in the population (where the non-poor have zero poverty gap). Some people find it helpful to think of this measure as the cost of eliminating poverty (relative to the poverty line), because it shows how much would have to be transferred to the poor to bring their incomes or expenditures up to the poverty line (as a proportion of the poverty line). The minimum cost of eliminating poverty using targeted transfers is simply the sum of all the poverty gaps in a population; every gap is filled up to the poverty line. However this interpretation is only reasonable if the transfers could be made perfectly efficiently, for instance with lump sum transfers, which is implausible. Clearly this assumes that the policymaker has a lot of information; one should not be surprised to find that a very "pro-poor" government would need to spend far more than this in the name of poverty reduction.

At the other extreme, one can consider the maximum cost of eliminating poverty, assuming that the policymaker knows nothing about who is poor and who is not. From the form of the index, it can be seen that the ratio of the minimum cost of eliminating poverty with perfect targeting (i.e.*Gi*) to the maximum cost with no targeting (i.e. z, which would involve providing everyone with enough to ensure they are not below the poverty line) is simply the poverty gap index. Thus this measure is an indicator of the potential saving to the poverty alleviation budget from targeting: the smaller is the poverty gap index, the greater the potential economies for a poverty alleviation budget from identifying the characteristics of the poor – using survey or other information – so as to target benefits and programs.

If $\alpha = 2 \longrightarrow P_2 = \frac{1}{nz^2}\sum_{i=1}^{q}(Z - Yi)^2$ (4)

This is a measure of the severity of poverty. It depicts the severity of poverty by assigning each individual a weight equal to his/her distance from the poverty line. Hence, P2 takes into account not only the distance separating the poor from the poverty line, but also the inequality among the poor.

This is simply a weighted sum of poverty gaps (as a proportion of the poverty line), where the weights are the proportionate poverty gaps themselves; a poverty gap of (say) 10% of the poverty line is given a weight of 10% while one of 50% is given a weight of 50%; this is in contrast with the poverty gap index, where they are weighted equally. Hence, by squaring the poverty gap index, the measure implicitly puts more weight on observations that fall well below the poverty line.

Although the Foster, Greer and Thorbecke measure provides an elegant unifying framework for measures of poverty, it leaves unanswered the question of what is the best value of α. Moreover some of these measures also lack emotional appeal.

The measures of poverty depth and poverty severity provide complementary information on the incidence of poverty. It might be the case that some groups have a high poverty incidence but low poverty gap (when numerous members are just below the poverty line), while other groups have a low poverty incidence but a high poverty gap for those who are poor (when relatively few members are below the poverty line but with extremely low levels of consumption). This has a greater implication on the types of interventions needed to help the two groups, which therefore likely to be different.

The validity of these measures was tested using the stochastic dominance tests, which is a graphical representation of the measures. The basic reason for the stochastic dominance test is that poverty measures may change with the variation in the poverty line used. Put it in another way, stochastic dominance tests in poverty analysis check whether the poverty ordering remains the same over different multiples of the poverty line (Dercon, 1998).

In addition, the significance of each poverty measure can be tested using t-test following Kakwani(1993). In this regard, Kakwani(1993) shows that the standard error of $P_\alpha = \sqrt{\frac{P^1{}_\alpha - P^2{}_\alpha}{n}}$ and sample variance σ^2 (for the Foster class of poverty measure P_α can also be calculated by ($\sqrt{NP_\alpha}$). Kakwani(1993) further demonstrates that standard error of P_α is asymptotically normally distributed with zero mean and variance $\sigma^2(P_\alpha)$.

Then, the standard error of difference in poverty index between two groups $(p^*{}_1 - p^*{}_2)$ is given by $\sqrt{\frac{\sigma^2{}_1}{n_1} + \frac{\sigma^2{}_2}{n_2}}$

Thus, η can be used to perform hypothesis testing regarding estimates that the observed poverty difference between two groups is statistically significant or not.

$$\eta = \frac{\left(P^*_1 - P^*_2\right)}{SE\left(P^*_1 - P^*_2\right)}$$

In this regard, The formula is .

According to Kakwani(1993), the t-value of each poverty index is obtained by dividing the value of poverty measurement by its standard error. The t-value gives an indication of how large the standard error is relative to the value of the estimates. Thus, the larger the value of the estimate of t-value, the greater the precision with the poverty can be estimated from the given sample.

THE POVERTY THRESHOLD

In this paper, we use the poverty line developed by Nega (2008). Off course, other researchers like Hagos (2003) constructed poverty line for Tigray based on the cost of basic needs approach. the poverty line for the region was 1033.45 ETB while the food poverty line was 909.44 ETB. However, Nega (2008) constructed poverty line of 1008 ETB compare to the food poverty line of 828 ETB for Hintalo Wajirat. The data collected for this thesis was only for one month; so we converted the poverty line developed by Nega(2008) in to one month. In this paper 143.64 ETB is the poverty line used after taking in to account the effect of inflation in the region.

2. ESTIMATION RESULTS AND DISCUSSIONS

This section presents and discusses the empirical findings of the survey. Both descriptive and inferential analysis are performed. However, before discussing the estimation results, it better to discuss the different explanatory variables employed in the estimation. The selection of these variables was based on the conceptual framework WB (2005) and the empirical works of Hagos (2003), Mohammednur (2007), and G/egziabher (2008) in the Tigray region and Seyum (2006), Weldehana et al (2008) and other works in Ethiopia.

Accordingly, the selected explanatory variables were: household demographic characteristics, household livestock ownership, and variables that convey information about access to irrigation.

Some of the household demographic characteristics considered in this case were age of the head of the household,(and its square), gender of the head(male=1 , female=0), family size of the household, dependency ratio in the household, marital status of the head of the household, the number of adults (aged between 15 and 64), the number of seniors(aged above 65), and household members with secondary education.

The irrigation related variables include: whether the household has access to irrigation or not, fertilizer adoption, soil type, land quality and plot distance from water source, tropical live stock unit per adult equivalent, oxen ownership.

2.1 DESCRIPTIVE STATISTICS OF VARIABLES

The sample was taken for 240 households from three selected villages, 80 from each, in the study area. Of these households surveyed, 144(60%) were households who have no access to irrigation (non-irrigators) and 96 (40%) were households with access to small scale irrigation (irrigators). Of the irrigators, about 22 (15%) households used river diversion while 122(85%) households used dam as a source of water for irrigating their plots. The average plot distance from the water source is 283.21 metre which ranged from 20 to 2230 metres. Out of the 240 households surveyed , 44. (18.52%) were female headed households and 196 (81.48%) were male headed households. The average family size of the surveyed households is 5.19 ranged from 3 to 12. The data also showed that the average household age was 46.14 years which is ranged from 28 to 61 years. With regard to the dependency ratio, the data showed that the average was 1.05 which is ranged from 0 to 3. Out of the total 240 households surveyed, about 48% were poor households whereas about 52% were non-poor households.

TABLE 2.1: SUMMARY OF VARIABLES USED FOR ANALYSIS

	Mean value		t- test
Characteristics	**irrigators**	**non-irrigators**	
Gender of Household head	0.830(.379)	0.8024 (.4006)	0.400
Age of the household head	46.245(6.318)	46.160 (6.794)	0.072
Age square of the head	2177.792(591.190)	2176.383(626.9)	0.013
Head's Education	0.528(.503)	0.543 (.501)	-6.809
Family size of the household	5.150(1.955)	5.234 (1.976)	- 0.240
Fertilizer adoption	0.735(.445)	0.580 (.496)	0.000***
Dependency ratio	1.099(.763)	1.022 (.539)	0.684
Land size per adult	0.512(.240)	0.453 (.175)	1.639*
Plot in fertile area	0.603(.493)	0.419 (.496)	2.102**
Log Plot distance from water	4.679(.518)	5.783 (.545)	-11.676***
Distance to market	2.867(1.468)	1.925 (1.394)	3.744***
Distance to irrig.ext off	0.660(.478)	0.325(.471)	4.004***
Expenditure per adult	162.520(46.773)	145.957 (46.412)	2.013**
Oxen per adult equivalent	0.199(.044)	0.1962 (.044)	0.325
TLU per adult equivalent	0.660(.363)	0.588 (.284)	1.293*
Non-land agr. assets per adult	69.060(42.491)	61.342 (28.615)	1.257
Non productive assets per adult	149.290 (159.018)	162.065 (167.0883)	-0.441
Number of seniors	0 .207(.409)	0.1234 (.331)	1.307*
Member with elementary education	2.037(1.343)	2.580 (1.556)	-2.080**
Member with secondary education	1.075(.997)	0.888 (1.060)	1.019
Manur adoption	0.886(.319)	0.654 (.478)	3.109***
Improved seed adoption	0.849(.361)	0.7160 (.453)	1.793**

*** Significant at 1%, ** Significant at 5%, and * Significant at 10%.

Values in the parenthesis represent standard deviations of the given variables.

Source: Author's Calculation.

2.2 MEASURING POVERTY INDICES

As it was mentioned above, having information on a welfare measure such as per adult equivalent consumption expenditure and the poverty threshold, then the only remaining problem is deciding on an appropriate summary measure of aggregate poverty. In this case, we use the popular Foster, Greer and Thorbeck (1984) style of poverty measure (FGT), which gives a more convincing classification of poverty among those households, who have access to irrigation and those without it. Consumption expenditure of each household was adjusted for adult equivalence based on the energy required to sustain it. To obtain consumption expenditure per adult equivalent, consumption expenditure was divided by household size adjusted for adult equivalent. We use the equivalence scales used by Hagos et al (2003), Dercon et at (1998).

Table 4.2 indicated that there is significant difference in incidence, depth and severity of poverty between households with access to irrigation and those without it.

TABLE 2.2: THE FGT POVERTY INDICES OF POVERTY MEASURE

	Irrigators	non-irrigators
FGT Index	**estimated value**	**estimated value**
Head count ($P_\alpha = 0$)	0.396 (0.067)	0.567 (0.053)
Poverty gap ($P_\alpha = 1$)	0.068 (0.016)	0.130 (0.017)
Poverty severity ($P_\alpha = 2$)	0.018 (0.005)	0.042 (0.007)

Values in parenthesis represent standard errors.

Source: Author's Calculations

As it can be seen from table 2.2, comparatively, the poverty incidence as measured by the head count index, is lower (about 39%) in households who have access to irrigation than in households with out access to irrigation (about 56%) and this idea is supported by the first stochastic dominance test, which showed the head count index is higher in house households with out access to irrigation than households with access to irrigation (see figure 1). The same table also indicated that the depth of poverty, as measured by the poverty gap, is about 6% in households with access to irrigation while it is about 13% in households with out access to irrigation. This shows us that the depth of poverty for households below the poverty line is higher in households with out access to irrigation. This is also confirmed by the second order stochastic dominance test which indicated that poverty depth in households below the poverty line is lower for irrigation users than rain-fed farm households.

Following Kakwani(1993), we tested the significance of each of these poverty indices using the t-test and the results are summarized in table 2.3.

TABLE 2.3 T- TEST FOR THE FOSTER, GREER AND THORBECK CLASS OF POVERTY MEASURES

	Irrigators	non-irrigators	
FGT Index	**estimated value**	**estimated value**	**t-test**
Head count ($P_\alpha = 0$)	0.396 (0.067)	0.567 (0.053)	-12.27***
Poverty gap ($P_\alpha = 1$)	0.068 (0.016)	0.130 (0.017)	104.96****
Poverty severity ($P_\alpha = 2$)	0.018 (0.005)	0.042 (0.007)	11.56***

*** Significant at 1%, ** Significant at 5%, and * Significant at 10%.

Values in the parenthesis represent standard deviations of the given variables.

Source: Author's Calculation

As it is mentioned in table 2.3above, according to Kakwani (1993), the t-value gives an indication of how large the standard error is relative to the value of the estimates. Thus, in this case, since the t-values are large and significant, it indicates that the precision with which poverty can be estimated from the samples is very high.

ACKNOWLEDGEMENT

First and foremost, I am very happy to mention the most valuable contributions of my father, mother and brothers as well as sisters in sending me to school and their consistent encouragement and support.

Moreover, I must thank the office of the wereda administration of Hintalo Wajirat, chairpersons and Bureau of Agriculture staff of the wereda for their cooperation in facilitating the data collection process. I am also indebted to the household heads and their family members who had to respond to the questions I asked them.

REFERENCES

1. Awulachew, S. B., 2001. Investigation of water resources aimed at multi-objective development with respect to limited data situation:The case of Abaya-Chamo Basin, Ethiopia. Ph.D. Dissertation, Dresden University of Technology, Dresden, Germany.
2. Becker, S. and Ichino, A. (2002), "Estimation of Average Treatment Effects based on Propensity
3. CSA (1994), Ethiopian Population and Houses Census by Ethiopian Central Statistical Authority, Addis Ababa
4. CSA (2007), Ethiopian Population and Houses Census by Ethiopian Central Statistical Authority, Addis Ababa.
5. D. Ray. Development Economics. Princeton University Press, 1998.
6. Dalton, H. 1920. The measurement of the inequality of incomes. Economic Journal 30, 348- 361.
7. Deaton, A. (1997), "The analysis of household surveys: a micro-econometric approach to development policy", The John Hopkins University Press for the World Bank, Washington DC.
8. Deaton, A. and C. Paxson (1997) Economies of Scale, Household Size and the Demand for Food, Journal of Political Economy, 106 (5): 897-930.
9. Demery, L. (1999). Poverty dynamics in Africa: An update. World Bank, Africa Region, Poverty Reduction and Social Development Unit. The World Bank.
10. Dercon, S (2006). Economic reform, growth and the poor: Evidence from rural Ethiopia: Journal of Development Economics, 81(1), 1-24.
11. Dercon, S et al. (2005). Shocks and Consumption in 15 Ethiopian Villages,1999– 2004. Journal of African Economies.
12. Dhawan BD, Datta HS. 1992. Impact of irrigation on multiple cropping. Economic and Political Weekly, March 28: A15–A18. Fan S, Hazell P, Thorat SK. 2000a. Should developing countries invest more in less-favoured areas? Am empirical analysis of rural India. Economic and Political Weekly, April 22: 1455–1464.
13. Dillon, A. 2005. The extension of the Zone Lacustre, Mali data set: Feasibility study. Report to the International Food Policy Research Institute and the Einaudi Center, Washington, D.C.
14. FAO (1986), Ethiopian Highland Reclamation Study, Final Report, Food and Agriculture Organization in Rome.
15. FAO (2002a), Crops and drops - making the best use of water for agriculture, Rome.
16. FAO (Food and Agriculture Organization of the United Nations) (1988): Potencialidades de desarrollo agrícola y rural en América Latina y el Caribe,Rome.
17. FAO. 1998. Guidelines for the water control component of the Special Programme for Food Security. Unpublished document.

18. Fassil G. (1993). The subsistence crisis in Africa: The case of Ethiopia. Organization for Social Science Research in eastern Africa.
19. FDRE (2000) Federal Democratic Republic of Ethiopia Interim Poverty Reduction Strategy Paper, Addis Ababa, Ethiopia.
20. Federal Democratic Republic of Ethiopia. 2002. Sustainable Development and Poverty Reduction Programme. Ministry of Finance and Economic Development, Addis Ababa.
21. Ferreira M. L. 1996. Poverty and Inequality: During Structural Adjustment in Tanzania. Policy Research Working Paper 16411, The World Bank, Policy Research Department, Transition Economics Division, Washington DC
22. Foster, J., Greer, J. and Thorbecke, E. (1984): A Class of Decomposable Poverty Measures. Econometrica, 52(3), 761-766.
23. G/hawaria G.(2008). Irrigation Investment and its Impact on Household Income: Empirical Evidence from Tigray, Ethiopia Department of Economics and Resource Management, Norwegian University of Life Sciences (UMB) Ås, Norway; and Department of Economics, Mekelle University.
24. Gini C. (1912). Variabilità e mutabilità. Memori di Metodologia Statistica 1. Variabilità e Concentrazione. Libreria Eredi Virgilio Veschi. Rome, p. 211-382.
25. Greene, W. H. (2003), Econometric Analysis 5th edition, Upper Saddle River, NJ, Prentice-Hall.
26. Hagos F. et al (2007:30), Rural Poverty & Inequality in Ethiopia: Can irrigation make a difference?, Addis Ababa, Ethiopia.
27. Hagos, F., and S. Holden. 2005. "Rural Household Poverty Dynamics in Northern Ethiopia 1997–2000: Analysis ofDeterminants of Poverty." Agricultural University of Norway, Department of Economics and Social Sciences, Aas, Norway.
28. Hagos, H., J. Pender and Nega Gebreselassie (1999). Land degradation and strategies for sustainable land management in the Ethiopian highlands: Tigray region, Socio- economic and Policy Research Working Paper, 25, International Livestock Research Institute, Nairobi,Kenya.
29. Hamdane, A. (2002), Valuation of Irrigation Water - the Case of Tunisia, Water Demand Management Forum on Water Valuation, 25–27 June 2002, Beirut, Lebanon.
30. Heckman, J., Ichimura, H. and P. Todd, (1998), "Matching as an Econometric Evaluation Estimator". Review of Economic Studies (U.K.); 65, pp. 261-94.
31. Heckman, James, Hidehiko Ichimura and Petra Todd (1998), "Matching As An Econometric Evaluation Estimator," Review of Economic Studies, 65(2), 261-294.
32. Huang, Q., David Dawe, Scott Rozelle, Jikun Huang, and Jinxia Wang. 2005. "Irrigation, Poverty and Inequality in RuralChina." Australian Journal of Agricultural and Resource Economics 49 (2): 159–75.
33. Hussain, I. 2005. Pro-poor Intervention Strategies in Irrigation Agriculture in Asia: Poverty in Irrigated Agriculture—Issues, Lessons, Options and Guidelines. Colombo: International Water Management Institute and Asian Development Bank.
34. Hussain, I. 2007b. Pro-poor intervention strategies in irrigated agriculture in Asia: issues, lessons, options and guidelines. Irri. Drain., 56(2–3): 119–126.
35. Hussain, I., and M.A. Hanjra. 2003. "Does Irrigation Water Matter for Rural Poverty Alleviation? Evidence from South and South-East Asia." Water Policy 5 (5–6): 429–42.
36. Hussain, I., D. Wijerathna, S.S. Arif, Murtiningrum, A. Mawarni, and Suparmi. 2006. "Irrigation, Productivity andPoverty Linkages in Irrigation Systems in Java, Indonesia." Water Resources Management 20 (3): 313–36.
37. Hussain, I.; R. Sakthivadivel; and U. Amarasinghe. Forthcoming. Land and water productivity of wheat in western Indo-Gangetic plains of India and Pakistan: A comparative analysis. IWMI Research Report (under review).
38. Hussain, M. 2004. "Impact of Small Scale Irrigation Schemes on Poverty Alleviation in Marginal Areas of Punjab,Pakistan." PhD Thesis. University of Agriculture, Agri-Economics, Faisalabad, Pakistan.
39. Kakwani, N. (1993). Statistical inference in the measurement of poverty. Review of Economics and Statistics, 75(4): 632-639.
40. Lipton, M., Litchfield, J. & Faurès, J.M. 2004. The effects of irrigation on poverty: a framework for analysis. Water Pol., 5: 413–427.
41. Maddala, G.S. (1993): Limited Dependent and Qualitative Variables in Econometrics. Cambridge University Press.
42. Mekonnen Tadesse (1999), Determinants and Dynamics of Urban Poverty in Ethiopia, Ethiopian Journal of Economics, Special Issue, volume III, Number 1.
43. MOFED (2006) Ethiopia: Building on Progress. A Plan for Accelerated and Sustained Development to End Poverty (PASDEP) (2005/06-2009/10). Volume II: Policy Matrix. Addis Ababa: Ministry of Finance and Economic Development
44. Mohammednur.Y(2007)Vulnerability and Poverty Dynamics in Rural Ethiopia, Department of Economics University of Oslo.
45. Mussard, Stéphane, Françoise Seyte, and Michel Terraza, (2003) "Decomposition of Gini and the generalized entropy inequality measures." Economics Bulletin, Vol. 4, No. 7 pp. 1−6
46. Nega F.(2008), Poverty, asset accumulation, household livelihood and interactions with local institutions in Northern Ethiopia, Kapholiek University of Leuven Belgium.
47. Pender, J., Gebremedhin, B., 2004. Impacts of Policies and Technologies in Dryland Agriculture: Evidence from Northern Ethiopia. In: Challenges and Strategies for Dryland Agriculture. CSSA Special Publication no. 32.
48. Pender, J., Gebremedhin, B., 2007. Determinants of Agricultural and Land Management Practices and Impacts on Crop Production and Household Income in the Highlands of Tigray, Ethiopia. JOURNAL OF AFRICAN ECONOMIES.
49. Pender, J., P.Jagger, Gebremedhin, B., Haile, M., 2002. Agricultural Change and Land Management in the Highlands of Tigray: Causes and Implications. Policies for Sustainable Land Management in the Highlands of Tigray, Northern Ethiopia.
50. Q. Huang, David Dawe, Scott Rozelle, Jikun Huang and Jinxia Wang, (2005), Irrigation, Poverty and Inequality in Rural China, The Australian Journal of Agricultural and Resource Economics, 49, 159-175.
51. R.E. Namara, G.Makombe, F.Hagos, S.B. Awulachew.. (2007), Rural Poverty & Inequality in Ethiopia: Can irrigation make a difference? Addis Ababa.
52. Ravallion, M. (1994) Poverty Comparisons, Philadelphia: Harwood Academic Publishers.
53. Ravallion, M. (1998), " Poverty lines in theory and practice" , Living Standard Measurement Study, Working Paper No 33, World Bank
54. Ravallion, M. and B. Bidani (1994) "How robust is a poverty profile?", World Bank Economic Review 8(1): 75-102.
55. Ravallion, M., and S. Chen. 2005. Hidden impact? Household saving in response to a poor-area development project. Journal of Public Economics 89: 2183–2204.
56. Rosenbaum, P.R., and D.B. Rubin (1983) "The Central Role of the Propensity Score in Observational Studies for Causal Effects", Biometrika 70(1), 41-55.
57. Scores," The Stata Journal, 2(4), 358-377.Heckman, James, Hidehiko Ichimura and Petra Todd (1997): "Matching As An Econometric Evaluation Estimator: Evidence from Evaluating a Job Training Program," Review of Economic Studies, 64(4), 605-654.
58. Sen, A. 1999. Development as Freedom. New York: Oxford University Press.
59. Seyoum .A (2006). Evaluating the Effects of Irrigation on Poverty and Inequality in Banja Woreda-Amhara Region,Addis Ababa University.
60. Smith, L. E. D. 2004. Assessment of the contribution of irrigation to poverty reduction and sustainable livelihoods. Water Resources Development 20 (2): 243–257.
61. Tafesse.M(2003). Small-scale irrigation for food security in sub-Saharan Africa
62. The Ethiopian Economy ,student text ,ministry of education ,Addis Ababa,2002
63. The Ethiopian Economy, student text ,grade 12, ministry of education, Addis Ababa, Ethiopia,2002, Mega Publishing Enterprise.
64. UN Millennium Project. 2005. Investing in Development: A Practical Plan to Achieve the Millennium Development Goals.New York: Earthscan.
65. UNDP (United Nations Development Programme). 2006. The Path out of Poverty. National Human Development Report for Timor- Leste. Dili
66. UNDP (United Nations Development Programme). Human Development Report 2007/2008 Fighting climate change: Human solidarity in a divided world
67. UNDP (United Nations Development Programme).2007. Social Inclusion in BiH. National Human Development Report for Bosnia and Herzegovina. Sarajevo.
68. Weldehana.T et al(2008). Young Lives: Ethiopia Round 2 Survey Report, Department of International Development, University of Oxford, Oxford OX1 3TB, UK

69. World Bank (2005). World Development Indicators, World Bank: Washington DC.
70. World Bank 1973. Ethiopia: Agriculture sector review. Volume II, Annex 11. Report No. PA- 143a. Washington, January 15, Cited in Rahmato, D. 1999. Water resource development in Ethiopia: Issues of sustainability and participation. Forum for Social Studies, Addis Ababa, June1999.
71. World Bank, 2000. Panama Poverty Assessment: Priorities and Strategies for Poverty Reduction, Washington DC: World Bank Country Study.
72. World Bank. 2000. Attacking poverty. World Development Report 2000/2001. New York: Oxford University Press.

ANNEXURE

FIG 1: HEAD COUNT INDEX OF HOUSEHOLDS WITH AND WITH OUT ACCESS TO IRRIGATION

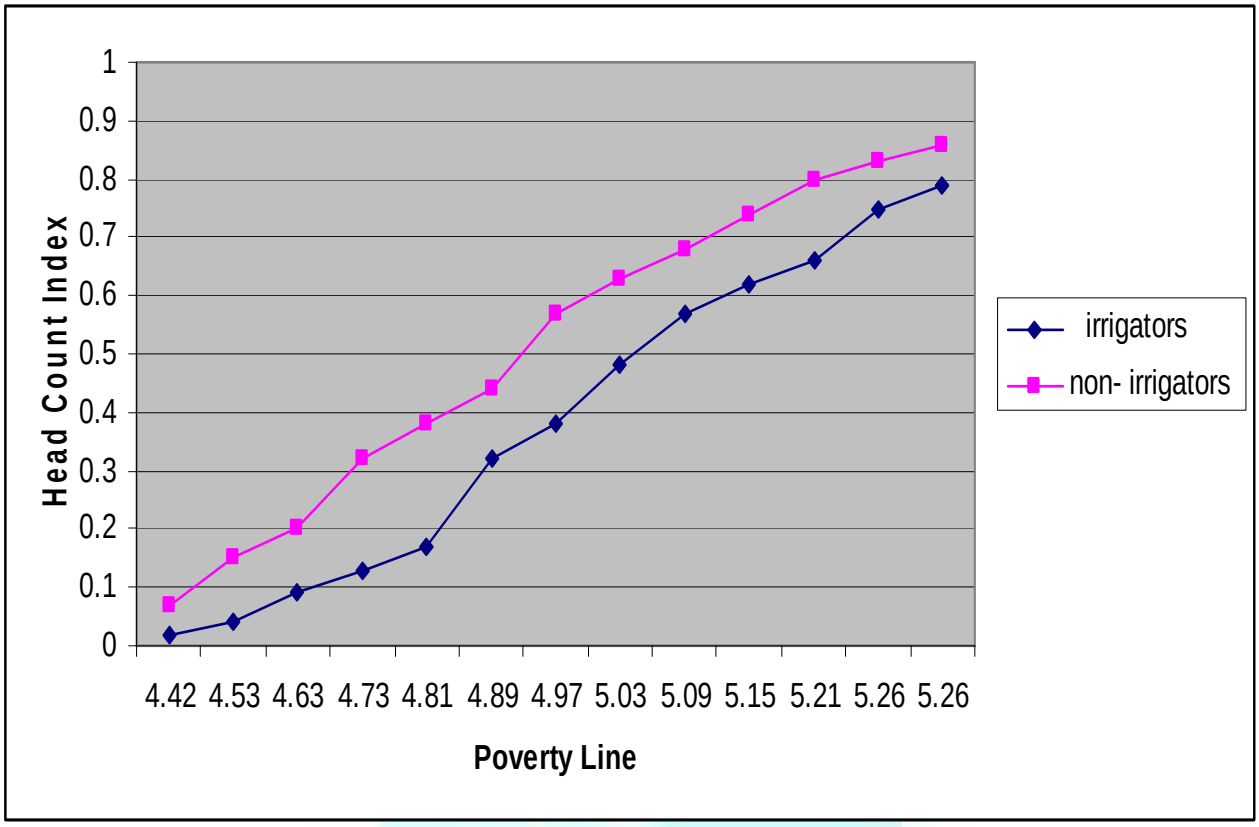
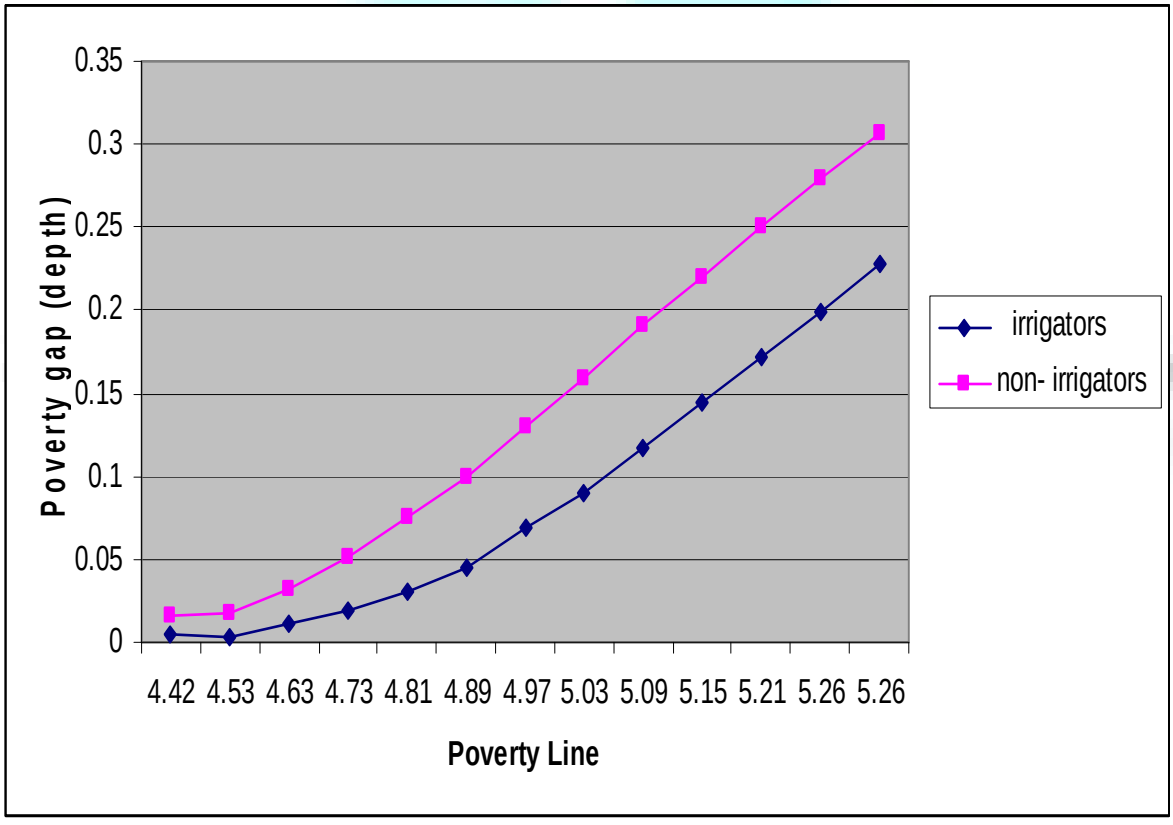


FIG 2: POVERTY GAP (DEPTH) OF HOUSEHOLDS WITH AND WITH OUT ACCESS TO IRRIGATION



SUMMARY OF VARIABLES

IRRIGATORS

Variable	Obs	Mean	Std. Dev.	Min	Max
headfemale	53	.8301887	.37906	0	1
headage	53	46.24528	6.318184	35	59
headage2	53	2177.792	591.1908	1225	3481
dependncyr~o	53	1.099057	.7639473	0	3
fertlzr	53	.7358491	.4450991	0	1
manur	53	.8867925	.3198784	0	1
seed	53	.8490566	.3614196	0	1
timtwnmrkt	53	2.867925	1.468093	1	4
timhaethst~n	53	1	0	1	1
timagriext~f	53	.6603774	.4781131	0	1
Madlteqvte~s	53	162.5201	46.77339	80.78407	296.6993
nlndagrias~q	53	69.06031	42.49138	14.63415	261.5385
nprdctasts~q	53	149.2904	159.0189	17.59531	724.6377
oxnperadlt	53	.1998312	.0443586	.093633	.3225807
tluperadlt	53	.6609931	.363471	.1150307	1.565217
seniors	53	.2075472	.4094316	0	1
membreleme~y	53	2.037736	1.343965	0	5
membrsecdry	53	1.075472	.997093	0	3
farmszpera~t	53	.5122857	.2408044	.1358696	1.449275
lnplotdist	53	4.679623	.5189159	2.995732	6.519147
headeduc1	53	.5283019	.5039755	0	1
frtlelnd	53	.6037736	.4937931	0	1

NON-IRRIGATORS

Variable	Obs	Mean	Std. Dev.	Min	Max
headfemale	81	.8024691	.4006168	0	1
headage	81	46.16049	6.79422	28	61
headage2	81	2176.383	626.919	784	3721
dependncyr~o	81	1.022016	.5390889	0	2
fertlzr	81	.5802469	.4965933	0	1
manur	81	.654321	.4785523	0	1
seed	81	.7160494	.4537226	0	1
timtwnmrkt	81	1.925926	1.394433	1	4
timhaethst~n	81	1	0	1	1
timagriext~f	80	.325	.4713299	0	1
Madlteqvte~s	81	145.9572	46.41224	61.75538	249.7406
nlndagrias~q	81	61.34283	28.61527	11.68539	147.3171
nprdctasts~q	81	162.0659	167.0883	10.27919	626.5664
oxnperadlt	81	.1962455	.0448725	.1079914	.2808989
tluperadlt	81	.588288	.2848052	.1098097	1.317073
seniors	81	.1234568	.3310104	0	1
membreleme~y	81	2.580247	1.556151	0	8
membrsecdry	81	.8888889	1.06066	0	4
farmszpera~t	81	.4532323	.1757666	.1331558	.9756098
lnplotdist	81	5.783808	.5456313	4.60517	7.709757
headeduc1	81	.5432099	.501233	0	1
frtlelnd	81	.4197531	.4965933	0	1

REQUEST FOR FEEDBACK

Dear Readers

At the very outset, International Journal of Research in Commerce, IT & Management (IJRCM) acknowledges & appreciates your efforts in showing interest in our present issue under your kind perusal.

I would like to request you tosupply your critical comments and suggestions about the material published in this issue as well as on the journal as a whole, on our E-mail**infoijrcm@gmail.com** for further improvements in the interest of research.

If youhave any queries please feel free to contact us on our E-mail **infoijrcm@gmail.com**.

I am sure that your feedback and deliberations would make future issues better – a result of our joint effort.

Looking forward an appropriate consideration.

With sincere regards

Thanking you profoundly

Academically yours

Sd/-
Co-ordinator

DISCLAIMER

The information and opinions presented in the Journal reflect the views of the authors and not of the Journal or its Editorial Board or the Publishers/Editors. Publication does not constitute endorsement by the journal. Neither the Journal nor its publishers/Editors/Editorial Board nor anyone else involved in creating, producing or delivering the journal or the materials contained therein, assumes any liability or responsibility for the accuracy, completeness, or usefulness of any information provided in the journal, nor shall they be liable for any direct, indirect, incidental, special, consequential or punitive damages arising out of the use of information/material contained in the journal. The journal, nor its publishers/Editors/ Editorial Board, nor any other party involved in the preparation of material contained in the journal represents or warrants that the information contained herein is in every respect accurate or complete, and they are not responsible for any errors or omissions or for the results obtained from the use of such material. Readers are encouraged to confirm the information contained herein with other sources. The responsibility of the contents and the opinions expressed in this journal is exclusively of the author (s) concerned.

ABOUT THE JOURNAL

In this age of Commerce, Economics, Computer, I.T. & Management and cut throat competition, a group of intellectuals felt the need to have some platform, where young and budding managers and academicians could express their views and discuss the problems among their peers. This journal was conceived with this noble intention in view. This journal has been introduced to give an opportunity for expressing refined and innovative ideas in this field. It is our humble endeavour to provide a springboard to the upcoming specialists and give a chance to know about the latest in the sphere of research and knowledge. We have taken a small step and we hope that with the active co-operation of like-minded scholars, we shall be able to serve the society with our humble efforts.

Our Other Journals