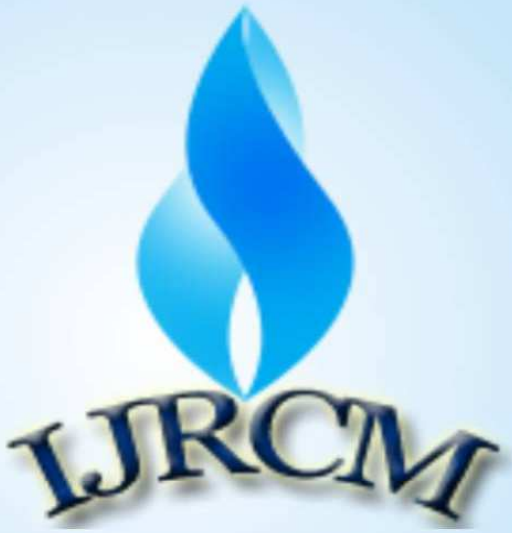
INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT

IJRCM



A Monthly Double-Blind Peer Reviewed Refereed 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.

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

Registered & Listed at: Index Copernicus Publishers Panel, Poland

Circulated all over the world & Google has verified that scholars of more than 1388 Cities in 138 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

www.ijrcm.org.in

CONTENTS

Sr. No.	TITLE & NAME OF THE AUTHOR (S)	Page No.
1.	PRICE EFFECT IN DHAKA STOCK EXCHANGE OF CROSS-LISTING IN CHITTAGONG STOCK EXCHANGE *MD. RAFIQUL MATIN & DR. JAWAD R ZAHID*	1
2.	STUDY OF SHOPPER'S ATTITUDE TOWARDS PRIVATE LABELS IN DUBAI *DR. TANMAY PANDA & K. TEJA PRIYANKA YADAV*	8
3.	FACTORS INFLUENCING INDIVIDUAL INTRANET USAGE: A LITERATURE REVIEW *MOHAMAD NOORMAN MASREK, DANG MERDUWATI HASHIM & MOHD SHARIF MOHD SAAD*	15
4.	THE BRANDING OF A COUNTRY AND THE NIGERIAN BRAND PROJECT *DR. ANTHONY .A. IJEWERE & E.C. GBANDI*	21
5.	THE RELATIONSHIP BETWEEN THE INTERNAL AUDIT FUNCTION AND CORPORATE GOVERNANCE: EVIDENCE FROM JORDAN *DR.YUSUF ALI KHALAF AL-HROOT*	27
6.	PROPOSED FRAMEWORK FOR IMPROVING THE PAYMENT SYSTEM IN GHANA USING MOBILE MONEY *MENSAH KWABENA PATRICK, DAVID SANKA LAAR & ALIRAH MICHAEL ADALIWEI*	33
7.	A COMPARATIVE STUDY ON PUBLIC SECTOR BANKS (VS) PRIVATE SECTOR BANKS (A CASE STUDY ON STATE BANK OF INDIA, CANARA BANK VS CITY BANK, ICICI BANK) *V. SRI HARI, DR. B. G SATYA PRASAD, VIKAS JAIN & DR. D. L. SREENIVAS.*	40
8.	DATA MINING APPLICATION IN TRANSPORT SECTOR WITH SPECIAL REFERENCE TO THE ROAD ACCIDENTS IN KERALA *DR. JOHN T. ABRAHAM & SWAPNA K. CHERIAN*	48
9.	RURAL MARKETS-A NEW FORCE FOR MODERN INDIA *RICHARD REMEDIOS*	51
10.	ASSESSMENT OF TRAINING NEEDS AND EVALUATION OF TRAINING EFFECTIVENESS IN EMPLOYEES OF SELECT ITes COMPANIES AT BANGALORE *DR. ANITHA H. S. & SOWMYA K. R.*	54
11.	JOB HOPPING AND EMPLOYEE TURNOVER IN THE TELECOM INDUSTRY IN THE STATE OF TAMIL NADU *L.R.K. KRISHNAN & DR. SETHURAMASUBBIAH*	59
12.	GROWTH AND RESPONSE OF AGRICULTURE TO TECHNOLOGY AND INVESTMENT IN INDIA (A STUDY OF POST GLOBALIZATION PERIOD) *SONALI JAIN, H.S. YADAV & TANIMA DUTTA*	80
13.	DAY OF THE WEEK EFFECT IN INTERNATIONAL MARKET: A CASE STUDY OF AMERICAN STOCK MARKET *DR. BAL KRISHAN & DR. REKHA GUPTA*	86
14.	STOCHASTIC BEHAVIOR OF A TWO UNIT SYSTEM WITH PARTIAL FAILURE AND FAULT DETECTION *VIKAS SHARMA, J P SINGH JOOREL, ANKUSH BHARTI & RAKESH CHIB*	90
15.	SURVEY OF NEWRENO AND SACK TCP TECHNIQUES PERFORMANCE IN PRESENCE OF ERRORS FOR HIGH SPEED NETWORK *MARGAM K.SUTHAR & ROHIT B. PATEL*	98
16.	A STUDY OF INDIAN BANKS WITH REFERENCE TO SERVICE QUALITY ATTRIBUTES AND CUSTOMER SATISFACTION *DR. ASHWIN G. MODI & KUNDAN M PATEL*	103
17.	PREDICTING CONSUMER BUYING BEHAVIOR USING A DATA MINING TECHNIQUE *ARATHI CHITLA*	108
18.	PERFORMANCE ANALYSIS OF VALUE STOCKS & EVIDENCE OF VALUE PREMIUM: A STUDY ON INDIAN EQUITY MARKET *RUBEENA BAJWA & DR. RAMESH CHANDER DALAL*	113
19.	STAR RATING FOR INDIAN BANKS WITH RESPECT TO CUSTOMER SERVICE *DR. M. S. JOHN XAVIER*	119
20.	ROUTING OF VLSI CIRCUITS USING ANT COLONY OPTIMISATION *A.R.RAMAKRISHNAN & V. RAJKUMAR*	123
21.	A STUDY ON INVESTORS' CONSCIOUSNESS AND INVESTMENT HABITS TOWARD MUTUAL FUNDS: - AN EXPLORATORY STUDY OF MEHSANA DISTRICT *ATUL PATEL, H. D. PAWAR & JAYSHRI DATTA*	127
22.	THE JIGSAW CAPTCHA *BALJIT SINGH SAINI*	134
23.	STUDY OF THE AWARENESS ABOUT THE SERVICES OFFERED BY THE DEPOSITORY PARTICIPANTS IN RAJASTHAN *DR. DHIRAJ JAIN & PREKSHA MEHTA*	137
24.	ATTACHMENT BETWEEEN STOCK INDICES FII, NSE AND BSE *P. KRISHNAVENI*	142
25.	UTILIZATION OF E-BANKING SERVICES BY THE CUSTOMERS OF ICICI BANK LIMITED *M. S. ANANTHI & DR. L. P. RAMALINGAM*	146
26.	A SYSTEM FOR EMBEDDING FIVE TYPES OF EMOTIONS IN SPEECH: USING TIME DOMAIN PITCH SYNCHRONIZATION OVERLAP AND ADD (TPSOLA) *MAMTA SHARMA & MADHU BALA*	153
27.	PERFORMANCE OF INDIAN SCHEDULED COMMERCIAL BANKS IN PRE AND POST GLOBAL CRISIS *PRABINA KUMAR PADHI & MADHUSMITA MISHRA*	159
28.	FOOD PROCESSING INDUSTRY: INDIA NEED FOR DOMINATING GLOBAL MARKETS *ALI LAGZI & R.THIMMARAYAPPA*	162
29.	ROLE OF BALANCED SCORECARD AS A COMMUNICATION TOOL *ANSHU*	167
30.	PERFORMANCE APPRAISAL OF INDIAN BANKING SECTOR: A COMPARATIVE STUDY OF SELECTED PRIVATE AND FOREIGN BANKS *SAHILA CHAUDHRY*	171
	REQUEST FOR FEEDBACK	181

CALL FOR MANUSCRIPTS

Weinvite unpublished novel, original, empirical and high quality research work pertaining to recent developments & practices in the area of Computer, Business, Finance, Marketing, Human Resource Management, General Management, Banking, Insurance, Corporate Governance and emerging paradigms in allied subjects like Accounting Education; 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; Monetary Policy; Portfolio & Security Analysis; Public Policy Economics; Real Estate; Regional Economics; Tax Accounting; Advertising & Promotion Management; Business Education; Management Information Systems (MIS); Business Law, Public Responsibility & Ethics; Communication; Direct Marketing; E-Commerce; Global Business; Health Care Administration; Labor 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; Public Administration; Purchasing/Materials Management; Retailing; Sales/Selling; Services; Small Business Entrepreneurship; Strategic Management Policy; Technology/Innovation; Tourism, Hospitality & Leisure; Transportation/Physical Distribution; Algorithms; Artificial Intelligence; Compilers & Translation; Computer Aided Design (CAD); Computer Aided Manufacturing; Computer Graphics; Computer Organization & Architecture; Database Structures & Systems; Digital Logic; Discrete Structures; Internet; Management Information Systems; Modeling & Simulation; Multimedia; Neural Systems/Neural Networks; Numerical Analysis/Scientific Computing; Object Oriented Programming; Operating Systems; Programming Languages; Robotics; Symbolic & Formal Logic and Web Design. The above mentioned tracks are only indicative, and not exhaustive.

Anybody can submit the soft copy of his/her manuscript **anytime** in M.S. Word format after preparing the same as per our submission guidelines duly available on our website under the heading guidelines for submission, at the email addresses: infoijrcm@gmail.comorinfo@ijrcm.org.in.

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 mention the 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, KurukshetraUniversity, Kurukshetra.

ONLINE RESOURCES

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

WEBSITE

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

GROWTH AND RESPONSE OF AGRICULTURE TO TECHNOLOGY AND INVESTMENT IN INDIA (A STUDY OF POST GLOBALIZATION PERIOD)

SONALI JAIN
ASST. PROFESSOR
DEPARTMENT OF HUMANITIES
MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY
BHOPAL

H.S. YADAV
PROFESSOR
DEPARTMENT OF REGIONAL PLANNING & ECONOMIC GROWTH
BARKATULLAH UNIVERSITY
BHOPAL

TANIMA DUTTA
ASST. PROFESSOR
CHITRANSH AD PG COLLEGE
BHOPAL

ABSTRACT

Agriculture plays the important role in the development of the country. A large number of studies reveal that the agricultural development during the post independence period has not been very smooth rather it has been highly variable in terms of growth of output and its contribution to the national income. The variability is attributed to a large number of factors. The factors which have been identified for agricultural growth mostly related to the policies with reference to investment and technology. The growth and response of agricultural variables of yield, production and contribution to GDP are analyzed with linear and exponential growth measures and the use of production function taking bivariate and stepwise regression analysis. The results show that there is an increase during the period with a declining rate. The three variables respond significantly i.e., irrigation, power consumption and fertilizer used to agricultural GDP, production and yield.

KEYWORDS

Agriculture, Growth, Response, Deceleration.

INTRODUCTION

Agriculture sector has played pivotal role in the process of economic development and hence Indian planners have emphasized on the development of agricultural and allied sector right from the beginning of the economic planning process (Manoj Kamat et. al., 2007). As a result though it witnessed more than four fold increase in foodgrains production over time, but gradually in the general economic development process the sector lost its focus due to it's corroding contribution in the national income (Lewis, 1954 and Syrgnin, 1988). The share of agriculture to Gross Domestic Product in India declined from 55 percent in 1951 to the level of 13.52 percent in 2007-08 but employment in the sector remained unchanged. New economic policy of 1991 followed by the compulsions of WTO brought further structural changes in the Indian agriculture. The performance of the economy is though crucially depended on agriculture but the sector experienced the sharp deceleration in terms growth terms in recent past.

REVIEW OF LITRATURE

Tripathi and Prasad (2009) showed that growth of agriculture and its sub sectors except forestry have experienced continuous decline during the post – WTO period. Similar results of declining growth rate in Indian agriculture were observed by other agriculture economists since the 1990s, especially during the last several years (Alagh 2004; Bhalla 2004; and Gulati 2004), and agricultural production has started experiencing a decline in recent years (Bhalla 2006 and Vaidyanathan 2010). Bhalla (2007), Suri (2006) and Jayati Ghose (2001) found in their empirical studies that the most important reason for the deceleration in the growth of agriculture during the 1990s is decline in the public and overall investment in agriculture and withdrawal of subsidies from increasing the charges of water, electricity, fertilizer and other farming inputs. Kalirajan et.al. (2001) give two other important reasons for the slowing the output growth are there was no major breakthrough new high yielding variety seeds and decline in the environmental quality of land which reduced the marginal productivity of the modern inputs.

The share of gross capital formation in agriculture has also declined. The study of Biswajit Dhar and Murli Kallumal (2004) concluded that the through out the 1990s the share of agriculture in Gross Capital Formation has remained in single digits, which explains the slacking of growth momentum during the past decades.

OBJECTIVE OF THE STUDY

The declining contribution of agriculture and stagnating foodgrains production are the cause of concern to the agricultural economists. Present paper intends to explore the growth trends in agriculture and the general response to agricultural technology and investment in agriculture sector. The main objectives of the present study are:

- To measure the growth trends of foodgrains production and yield after the globalization and
- To estimate the responsiveness of agricultural GDP, foodgrains production and yield to technology and investment.

RESEARCH METHODOLOGY

The study is based on secondary data, obtained from the handbook on Indian Statistics published by Reserve Bank of India and the Ministry of Agriculture, for the period of 1990-91 to 2007-08. The growth rates are estimated with the help of linear, exponential and quadratic functions. Modified Cob Douglas production function is used for the measurement of responsiveness like other studies of Kata (1990), Chadha (1978), Bagi (1980), Mathur, Pattnayak and Nayak (2005), Das and Sircar (2006) and M.K. Sekhon *et. al.* (2010).

RESULTS & DISCUSSION

GROWTH OF PRODUCTION OF FOODGRAINS

The production of foodgrains in India was 50 million tons in 1950 and faced acute shortage of foodgrains until mid – sixties. It is the Green Revolution during sixties only which brought foodgrains situation to a comfortable level but the growth gradually slowed down. The foodgrains production is increased during the post globalisation period but the pace of growth declined. The production of foodgrains was 168.38 million tons in 1991-92 which increased and reached the level of 199.44 in 1996-1997. In the ninth five year plan (1997 – 2002) government emphasized on building of the food stock to meet the increasing the demand and succeeded to increase but the production of foodgrains from 192.96 million tons at beginning and reached to 212.85 million tons at the end of the plan. In the next five year foodgrains production constantly increased to reach 230.78 million tons in 2007 – 08. The table gives the production of major crops.

TABLE 1: PRODUCTION OF MAJOR CROPS FROM 1990-91 TO 2007-08 (In million tons)

Year	Paddy	Wheat	Coarse Cereals	Total Cereals	Pluses	Oilseeds	Foodgrains
1990-91	74.29	55.14	32.70	162.13	14.26	18.61	176.39
1991-92	74.68	55.69	25.99	156.36	12.02	18.60	168.38
1992-93	72.86	57.21	36.59	166.66	12.82	20.11	179.48
1993-94	80.30	59.84	30.82	170.96	13.30	21.50	184.26
1994-95	81.81	65.77	29.88	177.46	14.04	21.34	191.50
1995-96	76.98	62.10	29.03	168.11	12.31	22.11	180.42
1996-97	81.74	69.35	34.10	185.19	14.24	24.38	199.44
1997-98	82.53	66.35	30.40	179.29	12.98	21.32	192.26
1998-99	86.08	71.29	31.34	188.70	14.91	24.75	203.61
1999-00	89.68	76.37	30.33	196.39	13.42	20.72	209.80
2000-01	84.98	69.68	31.08	185.74	11.08	18.44	196.81
2001-02	93.34	72.77	33.38	199.48	13.37	20.66	212.85
2002-03	71.82	65.76	26.07	163.65	11.13	14.84	174.77
2003-04	88.53	72.16	37.60	198.28	14.91	25.19	213.19
2004-05	83.13	68.64	33.47	185.23	13.13	24.35	198.36
2005-06	91.79	69.35	34.07	195.20	13.39	27.98	208.60
2006-07	93.35	75.80	33.92	203.08	14.20	24.29	217.28
2007-08	96.69	78.57	40.75	216.02	14.76	28.83	230.78

Source: Agricultural Statistics at a Glance 2010, Department of Agriculture & Cooperation, Ministry of Agriculture, Government of India.

TABLE 2: GROWTH RATE OF PRODUCTION OF MAJOR CROPS

Crops	Equations	b_0	b_1	b_2	R^2
Rice	Linear	98.9033 (20.35)	1.4329		0.560
	Quadratic	98.8544 (9.54)	1.4476	-0.0008	0.560
	Exponential	99.4127 (19.20)	0.0126		0.545
Wheat	Linear	103.073 (37.96)	2.0025		0.703
	Quadratic	94.8813 (24.56)	4.4599	-0.1293	0.766
	Exponential	103.463 (38.74)	0.0169		0.708
Coarse Cereals	Linear	89.8559 (3.84)	0.9410		0.194
	Quadratic	100.565 (3.64)	-2.2717	0.1691	0.327
	Exponential	89.9301 (3.59)	0.0092		0.183
Cereals	Linear	98.4960 (29.68)	1.5276		0.650
	Quadratic	97.8485 (13.95)	1.7218	-0.0102	0.650
	Exponential	99.0444 (29.08)	0.0135		0.645
Pulses	Linear	91.7174 (0.38)	0.2330		0.023
	Quadratic	95.9239 (0.50)	-1.0289	0.0664	0.063
	Exponential	91.5303 (0.31)	0.0023		0.019
Oilseeds	Linear	100.075 (6.83)	2.0020		0.299
	Quadratic	112.097 (4.15)	-1.6046	0.1898	0.356
	Exponential	101.580 (5.14)	0.0154		0.243
Foodgrains	Linear	97.9469 (25.87)	1.4230		0.618
	Quadratic	97.6937 (12.13)	1.4989	-0.0040	0.618
	Exponential	98.4362 (25.13)	0.0127		0.611

Value in bracket is 'F' value

The growth trends show higher growth rates in superior crops compared to coarse grains. The production of pluses and oilseeds has increased marginally with high fluctuations during the study period. The growth rates of the production of superior crops are statistically significant. The growth rate of pluses and oilseeds are not significant. The quadratic function shows the deceleration trends for the production of all major crops.

GROWTH OF YIELD OF FOODGRAINS

The increase in production of agriculture depends only on the growth in the yield because the other two factors i.e.; land availability and multiple utilization of land are mostly constant. The yield of crops radically changed and increased many folds in the post green revolution period with the introduction of chemical fertilizer, and high yielding variety seeds.

The general conclusion about the yield of different crop is that it has not changed significantly during the post globalisation period. In 1991 the average yield of foodgrains was 1380 Kg per hectare that increased marginally only to the level of 1854 Kg. per hectare in 2007 -08 despite the several efforts. The close look at the yield of different crops shows that there is a significant change in yield of wheat and rice but the yield of coarse grains, pluses and oilseeds have almost remained unchanged.

TABLE 3: YIELD OF MAJOR CROPS AND TOTAL FOODGRAINS (Kg./hectare)

Year	Rice	Wheat	Coarse Cereals	Total Cereals	Pulses	Oilseeds	Total Foodgrains
1990-91	1740	2281	900	1571	578	771	1380
1991-92	1751	2394	778	1574	533	719	1382
1992-93	1744	2327	1063	1654	573	797	1457
1993-94	1888	2380	939	1701	598	799	1501
1994-95	1911	2559	929	1763	610	843	1546
1995-96	1797	2483	940	1703	552	851	1491
1996-97	1882	2679	1072	1831	635	926	1614
1997-98	1900	2485	986	1775	567	816	1552
1998-99	1921	2590	1068	1856	634	944	1627
1999-00	1986	2778	1034	1925	635	853	1704
2000-01	1901	2708	1027	1844	544	810	1626
2001-02	2079	2762	1131	1980	607	913	1734
2002-03	1744	2610	966	1753	543	691	1535
2003-04	2077	2713	1221	1983	635	1064	1727
2004-05	1984	2602	1153	1903	577	885	1652
2005-06	2102	2619	1172	1968	598	1004	1715
2006-07	2131	2708	1182	2020	612	916	1756
2007-08	2203	2785	1415	2146	638	1086	1854

Source: Agricultural Statistics at a Glance 2010, Department of Agriculture & Cooperation, Ministry of Agriculture, Government of India.

TABLE 4: GROWTH RATE OF YIELD OF MAJOR CROPS

Crops	Equations	b_0	b_1	b_2	R^2
Rice	Linear	98.8346 (32.18)	1.2724		0.668
	Quadratic	101.007 (15.81)	0.6206	0.0343	0.678
	Exponential	99.3201 (31.14)	0.0114		0.661
Wheat	Linear	103.252 (29.27)	1.0435		0.647
	Quadratic	97.4040 (23.05)	2.7979	-0.0923	0.755
	Exponential	103.303 (29.81)	0.0094		0.651
Coarse Cereals	Linear	93.4090 (33.96)	2.4975		.680
	Quadratic	100.322 (18.14)	0.4234	0.1092	.707
	Exponential	94.9612 (34.45)	0.0212		.683
Cereals	Linear	100.220 (76.22)	1.7159		0.826
	Quadratic	99.0342 (36.26)	2.0715	-0.0187	0.829
	Exponential	100.878 (77.14)	0.0148		0.828
Pulses	Linear	98.7245 (2.20)	0.4023		0.121
	Quadratic	97.9922 (1.05)	0.6220	-0.0116	0.123
	Exponential	98.6132 (2.18)	0.0039		0.120
Oilseeds	Linear	96.9673 (11.43)	1.6922		0.417
	Quadratic	100.154 (5.53)	0.7361	0.0503	0.425
	Exponential	97.8201 (10.54)	0.0145		0.397
Foodgrains	Linear	100.866 (64.04)	1.6094		0.800
	Quadratic	98.7326 (31.48)	2.2495	-0.0337	0.808
	Exponential	101.393 (64.10)	0.0140		0.800

Value in bracket is 'F' value

The growth rates calculated for the yield of crops show similar trends to that of production of the crops. The growth rates of pluses and oilseeds are not significant rather they show deceleration in yield over time.

RESPONSE TO TECHNOLOGY AND INVESTMENT

Development of agriculture depends on a prevailing economic, demographic, technological conditions and policies pursued by state. The growth of agriculture is not only depends on irrigation and fertilizer but it is also the combination of the other factors (A. Vadhiyanathan, 2010). The declining contribution of agriculture to GDP and stagnating yield and production of foodgrains are attributed to a large number of factors but investment is the prime factor which affects the technological use of inputs in agriculture. The post globalization period is said to be characterized by both the conditions and therefore, the conditions of marginalization are observed. The response of agricultural GDP, yield and production of foodgrains towards investment and technology are estimated with the help of bivariate and stepwise regression model.

TABLE 5: BIVARIATE REGRESSION ANALYSIS OF AGRICULTURAL GDP

Name of independent variable	α	β	t	R^2
Gross irrigated Area	- 7.590	4.80*	15.55	0.937
Fertilizer consumption	- 2.397	2.27*	11.74	0.895
Electricity consumption	- 2.514	2.22*	7.92	0.797
High yielding variety seeds	- 0.427	1.259*	11.85	0.897
Capital formation	- 2.328	2.27*	8.74	0.826
Investment	0.275	0.911*	12.44	0.906
Plan outlays	0.955	0.606*	12.45	0.906

*1 percent level of significant

The bivariate production function for the agricultural GDP shows positive response to technological and investment variables. Technological variables namely irrigation, consumption of fertilizer, consumption of electricity and High Yielding Variety seeds show the positive relationship with the agricultural GDP and also significant at 1 percent level of significance. Of these variables gross irrigated area shows the highest elasticity (β = 4.80) and the consumption of fertilizer and High yielding variety seeds give the 89 percent explanation to the total variance but fertilizer consumption have higher level of elasticity (β = 2.27) in comparison to High Yielding Variety seeds (β= 1.259). Although the consumption of electricity has lower level of explanation but it has high response (β = 2.22) to the agricultural GDP. The macro economic variables which are government plan expenditure and investment explain 90 percent of the total variance with relatively low level of the β coefficient. The β coefficients for both the variables are 0.606 and 0.911 respectively. Though the capital formation only explain the 82 percent of the total variance but it has the higher level of elasticity (β= 2.27). The result of the analysis indicates that proper investment in the agriculture sector with optimum utilization of the technology will give higher level of returns and growth to agriculture.

TABLE 6: STEPWISE REGRESSION ANALYSIS OF AGRICULTURAL GDP

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.967(a)	.934	.930	.05311
2	.984(b)	.968	.964	.03806
3	.995(c)	.991	.989	.02131
4	.995(d)	.990	.989	.02157

a Predictors: (Constant), gia

b Predictors: (Constant), gia, capital formation

c Predictors: (Constant), gia, capital formation, electricity consumption

d Predictors: (Constant), capital formation, electricity consumption

COEFFICIENTS (a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-7.486	.654		-11.446	.000
	gia	4.757	.315	.967	15.104	.000
2	(Constant)	-4.171	.949		-4.397	.001
	gia	2.847	.526	.579	5.413	.000
	capital formation	.275	.068	.430	4.020	.001
3	(Constant)	-1.684	.682		-2.469	.027
	gia	.574	.489	.117	1.172	.261
	capital formation	.375	.042	.587	8.937	.000
	electricity consumption	.903	.155	.359	5.817	.000
4	(Constant)	-.910	.172		-5.276	.000
	capital formation	.416	.024	.650	17.274	.000
	electricity consumption	1.048	.095	.417	11.083	.000

a Dependent Variable: agri GDP

To avoid the problems of collinearity stepwise regression analysis is carried out to find out the core variables which affect the growth of agricultural gross domestic product. The result of the stepwise analysis shows that the gross irrigated area, capital formation and consumption of electricity for the purpose of agriculture are the most important variable for the growth of agricultural GDP. All these variables together explain 99.1 percent of the total variance. It clearly indicates that withdrawal of governmental investment will adversely affect the agricultural output.

The growth of gross value of agricultural output is the result of the increasing yield per hectare and contribution of foodgrains to the total output of agriculture covers major part of it. Though the yield of different crops vary significantly between the superior and course grain. Yet, it is assumed that the average yield of the foodgrains is also the result of aggregate technological inputs and investment in agriculture sector. The log linear bivariate regression analysis results reveal that the technological variable such as irrigation, fertilizer consumption, electricity and the coverage of high yielding variety seeds have the positive bearing and elasticities provide high level of explanation to the variability in the yield of foodgrains. Irrigation emerges as highest explanatory variable followed by fertilizer consumption and high yielding variety seeds. The bearing of investment in agriculture and plan outlays also shows high level explanation to the yield. The coefficients of (R^2) and 't' values also confirm the significant relationship.

TABLE 7: BIVARIATE REGRESSION ANALYSIS OF YIELD OF FOODGRAINS

Name of the independent variable	α	β	t	R^2
Gross irrigated Area	0.298	0.850*	12.136	0.902
Fertilizer consumption	1.242	0.390*	8.263	0.810
Electricity consumption	1.244	0.370*	5.880	0.683
High yielding variety seeds	1.587	0.212*	7.732	0.788
Capital formation	1.822	0.102*	7.712	0.788
Investment	1.273	0.380*	6.301	0.712
Plan outlays	1.698	0.157*	8.799	0.828

*1 percent level of significance

In the stepwise regression irrigation emerge as a sole variable which affect the yield of the foodgrains. It means that irrigation is the most important variable for increasing the yield of the foodgrains. It explains the 85 percent of the total variance and regression coefficient is significant at 1 percent level of significance. The production of foodgrains also reveals similar result. The increase in yield per hectare is directly related to increasing foodgrains output because the area under cultivation and double cropped area have remained constant during this period.

TABLE 8: BIVARIATE REGRESSION ANALYSIS OF PRODUCTION OF FOODGRAINS

Name of the independent variable	α	β	t	R^2
Gross irrigated Area	0.318	0.831	7.89*	0.795
Fertilizer consumption	1.247	0.379	6.201*	0.706
Electricity consumption	1.282	0.345	4.395*	0.547
High yielding variety seeds	1.597	0.200	5.354*	0.641
Capital formation	1.823	0.093	5.047*	0.614
Investment	1.310	0.353	4.589*	0.568
Plan outlays	1.696	0.150	6.112*	0.70

* 1 percent level of significance

The bivariate regression analysis results confirms the fact that the technological and investment variables have positive bearing on the increasing foodgrains output. The close examination of the results reveals that the coefficients of foodgrains production come out to be lower than the coefficient of yield. The variance explained individually by all the variables varies between 50 to 80 percent, though the order of explanation remains mostly unchanged. The core variable for the production and yield of foodgrains is gross irrigated area in stepwise regression and it gives same level of explanation to bivariate regression analysis.

CONCLUSION

The post globalization period is marked with the deceleration in agricultural growth foodgrains production, contribution to GDP, yield of different crops. Oilseeds and pluses show no change in terms of yield and production. The technological and investment variables show a positive bearing on the foodgrains production with significant response. Bhalla and Singh (2001) have also noted that the investment in irrigation and tubewells, and additional use of fertilizers and HYV seeds have helped in raising the productivity. They also found higher production elasticities to fertilizers, tubewells, tractors and irrigation. Desai and Namboodiri (1997) have also found that factors like HYV seeds and fertilizer have greater influence on the growth of agricultural productivity in India**.** Mathur and Das (2006) also concluded that the investment by government in agriculture sector, subsidy, agricultural prices and usage of electricity are the significant factors that decide the production flow of Indian agriculture. The results of the present analysis identify the irrigation; fertilizer and power consumption are the most important variables to which agriculture responds in India.

REFERENCES

BOOKS

1. Bhalla, G. S. and Singh, G. (2001), 'Indian Agriculture: Four Decades of Development', Sage Publications, New Delhi.
2. Kalirajan, K.P., G. Mythili and U. Sankar (2001), 'Accelerating Growth through Globalization of Indian Agriculture', Macmilan, India.
3. Kata Venkata Reddy (1990), 'Agricultural Production Function: An Appraisal', South Asia Books, Columbia.
4. Lewis, W. A. (1954), 'Economic Development with Unlimited Supplies of Labour', Manchester School of Economics and Social Studies, 22.
5. Vadhiyanathan A., (2010), 'Agricultural Growth in India: Role of Technology, Incentives, and Institutions', Oxford University Press, New Delhi.

CONTRIBUTIONS TO BOOKS

6. Syrquin, M. (1988), 'Pattern of Structural Change' in Hollis Chenery and T.S. Srinivasan (eds), Handbook of Development Economics, Vol, I, Elesevier Science Publishers, Amesterdam.

JOURNAL AND OTHER ARTICALS

7. Bagi, F.S. (1980),"Irrigation, Farm Size, and Economic Efficiency: An Analysis of Farm level Data in Haryana (India) Agriculture," Artha Vijnana, v.24 December, pp.513-523.
8. Chadha, G.K. (1978), 'Farm size productivity re-visited: Some notes from recent experiences form Punjab', Economic and Political Weekly, 13 (9): A87- A96.
9. Desai, B.M. and Namboodiri, N.V. (1997), 'Determinants of total factor productivity in Indian agriculture', Economic and Political Weekly, 37(53): A165-171.
10. Kamat, Manoj S, Sanjay N Tupe and Manasvi Kamat (2007), "Indian Agricuture in the New Economic Regime, 1971-2003: Empirics based on Cobb Douglas Production Function," Mumbai.
11. M.K. Sekhon, Amrit Kaur Mahal, Manjeet Kaur and M.S. Sidhu (2010), "Technical Efficiency in Crop Production: A Region-wise Analysis", Agricultural Economics Research Review, Vol. 23 July-December 2010 pp 367-374.
12. Mathur, A. S., Das Surjit and et al (2006), 'Status of Agriculture in India: Trends and Prospects', Economic and Political Weekly, Pp 5327-5336.
13. Sircar Subhalakshmi, Das Surajit and Mathur Archana S (2006), 'Status of Agriculture in India: Trends and Prospects', Economic and Political Weekly, Pp 5327-5336.
14. Suri K C (2006) "Political Economy of Agrarian Distress" Economic and Political Weekly, April 22, pp 1525-1526.
15. Tripathi Amaranth and A. R. Prasad (2009), "Agricultural development in India since independence: A study on progress, performance and determinants", Journal of Emerging Knowledge on Emerging Markets, Volume 1 Issue 1 November.

CONFERENCE PAPERS

16. Alagh, Y.K. (2004), "Agricultural policy in an open economy" in India's economic and social development: National and international perspective, International conference in Honour of Professor C.H. Hanumantha Rao, 16- 17 November. Hyderabad: Administrative Staff College of India and Centre for Economic and Social Studies.
17. Bhalla, G.S. (2006), 'Agricultural growth and regional variations, in India in a Globalizing World: Some Aspects of Macro economy, Agriculture and Poverty', Essays in honour of Prof. C.H. Hanumantha Rao, Eds: R. Radhakrishna, S.K. Rao, S. Mahendra Dev and K. Subbarao, Academic Foundation, New Delhi.

18. Bhalla, G.S. (2004), 'Agricultural growth and regional variations' in India's economic and social development: National and international perspective, International conference in Honour of Professor C.H. Hanumantha Rao, 16-17 November. Hyderabad: Administrative Staff College of India and Centre for Economic and Social Studies.
19. Gulati, A. (2004), 'Trade policies, incentives, investments and Institutions in Indian agriculture' in India's economic and social development: National and international perspective, International conference in Honour of Professor C.H. Hanumantha Rao, 16-17 November. Hyderabad: Administrative Staff College of India and Centre for Economic and Social Studies.
20. Patnayak M., and Nayak B.P. (2005), 'Performance of Agriculture in the Changing Structure of the Orissa Economy: Issues Revisited', Paper presented at 40th Annual Conference of the Indian Econometric Society of India, Pp 1-23.

WEBSITE

21. Dhar, Biswajit and Kallumal Murali (2004) "Trade Liberalization and Agriculture: Challenges before India". http://www.macroscan.org/fet/jul04/print/prnt050704Trade_Liberalization.htm

REQUEST FOR FEEDBACK

Dear Readers

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

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

If you have 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

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