

# Nano- and Microscale Drug Delivery Systems

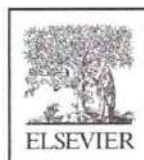
## Design and Fabrication

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Edited by

**Alexandru Mihai Grumezescu**

University Politehnica of Bucharest,  
Department of Science and Engineering of Oxide Materials and Nanomaterials,  
Faculty of Applied Chemistry and Materials Science, Bucharest, Romania



Elsevier

Radarweg 29, PO Box 211, 1000 AE Amsterdam, Netherlands  
The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, United Kingdom  
50 Hampshire Street, 5th Floor, Cambridge, MA 02139, United States

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#### Library of Congress Cataloging-in-Publication Data

A catalog record for this book is available from the Library of Congress

#### British Library Cataloguing-in-Publication Data

A catalogue record for this book is available from the British Library

ISBN: 978-0-323-52727-9

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*Publisher:* Matthew Deans

*Acquisition Editor:* Simon Holt

*Editorial Project Manager:* Andrac Akch

*Production Project Manager:* Caroline Johnson

*Designer:* Greg Harris

Typeset by Thomson Digital



## Chapter 21

# Nanostructures for Curcumin Delivery: Possibilities and Challenges

Parasuraman A. Subramani<sup>\*,†</sup>, Kalpana Panati<sup>\*\*</sup>, Veeranjaneya R. Lebaka<sup>‡</sup>, Dharaneeswara D. Reddy<sup>†</sup>, Venkata Ramireddy Narala<sup>\*</sup>

<sup>\*</sup>Yogi Vemana University, Kadapa, Andhra Pradesh, India; <sup>\*\*</sup>Government College for Men, Kadapa, Andhra Pradesh, India; <sup>†</sup>Micco Laboratories Private Limited, Tirupati, Andhra Pradesh, India;

<sup>‡</sup>Center for Fish Immunology, Vels Institute for Science, Technology and Advanced Studies (VISTAS), Chennai, Tamil Nadu, India

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## 1 INTRODUCTION AND BACKGROUND OF CURCUMIN

*Curcuma longa* L. is a stemless rhizomatous herb with rhizome that is fleshy, many branched, bright yellow within, and scented. Linnaeus first described it and its taxonomic position is: class—Liliopsida; subclass—Commenlinids; order—Zingiberales; family—Zingiberaceae; genus—*Curcuma*; and species—*longa*. Curcumin is the major constituent of *C. longa*. It is a yellow polyphenol compound that was first isolated from the extracts of rhizomes of *C. longa* L. in 1815 (Vogel and Pelletier, 1815).

The yellow color of turmeric is mainly due to the presence of polyphenolic curcuminoids, which constitute approximately 3%–5% of most turmeric preparations. The alcoholic extract of turmeric mainly consists of three curcuminoids (Fig. 21.1), such as diferuloylmethane (94%), desmethoxycurcumin (6%), and bisdesmethoxycurcumin (0.3%) (Chattopadhyay et al., 2004). Turmeric powder also contains 6.3% of protein, 5.1% of fat, 3.5% of minerals, 13.1% of moisture, and 69.4% of carbohydrates.



# VISUAL ART OF MEDIEVAL INDIA WITH SPECIAL REFERENCE TO JAMMALAMADUGU IN KADAPA DISTRICT OF ANDHRA PRADESH

Y. Ramaiah  
Kadapa

Dr. S. Govardhana Naidu  
Kadapa

The Deccan and Tamil Nadu witnessed an important outburst of sculptural art in the early medieval period, clearly indicating a heightened aesthetic consciousness of the people. The Chola period of South Indian history, from the 10th to the middle of the 13th centuries, is regarded as the golden epoch of medieval times. It was the period of political stability and economic prosperity as also of the culmination of artistic endeavors in South India. The Sculptures of the period from A.D. 1206 to 1761 continues the elegance and grace of the early medieval tradition in the massive monumentality of the mid-medieval phase and the 'baroque' splendor of the late medieval centuries.

The late medieval phase of sculpture in Kalinga is represented by such magnificent monuments as those at Bhubaneswar, Puri, Konark, Jaipur. According to Gary Michael<sup>1</sup>, "The evidence of the Early Chalukya region strongly supports the view that from their earliest survivals in stone South Indian temples were intended to incorporate superstructures. Although the Chalukya temples are the earliest stone structures in South India and in the Dravidian style, the Pallava structures of the Tamil region show equivalent development. The Chalukyan temples of the later phase in the Karnataka region are characterized by a profusion of

decoration, almost subduing the main figures and motifs adorning the monuments of the period. The dress, ornaments, coiffure, floral canopy, clouds, animals and birds with floriated tails and the tapir-like makara are all very characteristic of this phase of art. The most remarkable monuments presenting a wealth of iconography, unsurpassed anywhere, is the group of temples built by the Chandelas at Khajuraho during the 10th - 12th centuries AD

Many of the scenes portrayed in the sculptures at Khajurajo are frankly erotic, showing lovers performing the sex act in various positions many of which are described in the famous Hindu manual of love, the Kama Sutra.<sup>2</sup> Some of the sculptures are inscribed. The greatest builders in the South were undoubtedly the Cholas. The stupendous temple at Gangaikonda cholapuram contains one of the most important sculptures of the Chola period. The masterpiece among Pallava creations is the gigantic tableau carved at Mahabalipuram". "Few Indian rulers matched the Chola kings in their political use or art".<sup>3</sup> They used their temples to make unequivocal statements about political hegemony.

In Karnataka, the Hoysalas who ruled in the 12th-13th centuries created noteworthy temple, like Belur and Halibid



## CAPTURING THE CONVERGENCE OF DIVERGING FAITHS : SCULPTURE OF SRI ULLANGESHWARA TEMPLE IN KADPA DISTRICT

Dr. G. Parvathi, Dr. P. Padma

Kadapa

Fine Arts are renowned for their astonishing capacity to soften even the toughest of the hearts. Melodies melt the hearts; noble verses fills the thoughts with sublime ideas; beautifully painted pictures rejuvenate body and mind, so do the beauty of the sculpture, which ideologies a physical model of the living creatures in our minds. The architecture besides filling our hearts with mirth, reveal the artistic skill of the sculptor and aesthetic sense of the patronisers. But, more than music, poetry and painting, it is sculpture which lasts longer as the testimony of the times to give us a vivid picture of the social, economical, political and cultural trends of the contemporary times.

While weaving and handicrafts dominated the eastern end of India, painting dominated the Western end, the North-East was constantly influenced by Persian Arts and Islamic arts, the Southern India was a treasure house of the sculpture reflecting more of the native flora, fauna, customs and traditions of the Medieval India. In the present paper an attempt is made to study the treasure of sculpture displayed by the architecture of Sri Ullangeswara temple at Nandalur mandal in Kadapa district. This throws light on the distinguished life in the medieval times.

Located fifty kilometres away from the district head quarters on the Kadapa to

Chennai highway, is Nandalur with the splendour of the architecture revealed through its ancient temples. The main focus of our study, the temple of Shiva is located besides the popular Vishnavalayam, Sri Soumyanatha temple, which posses a replica of the Lord Balaji of Tirumala Devasthanam. Near to it is again the popular temple od Kodanda Rama (Sri Rama, as Vishnu incarnation) temple in Ontimitta. It is one of the ancient temples of the area build in around tenth century A.D before the rule of Mattirajula period and is a hundred years older than Sri Sowmyanatha temple.

The old temples laid down during the period have edicts with inscription in Tamil , revealing that the area was basically inhabited more by the Tamil speaking people between 4<sup>th</sup> century and 10<sup>th</sup> century A.D or may be the area was ruled by Tamil rules. Hence, the impact of Tamil culture was dominant in this area. In fact the word, 'Ullangam' in Tamil stands for 'the Universe' and Shiva is God of the Universe. Critics conclude that the word has its roots in the Sanskrit language 'Lokeshwara'.

This visible beauty of the sculpture is generally displayed on the towers of the inner temples, on the walls of the temple and the roofs as well. Of course, Pillars and idols have their unique utility and identity. It is Shiva temple, idol of shiva was shown



# INFLUENCE OF ISLAM ON INDIAN ARCHITECTURAL STYLES

*Dr. Prameela Margaret*  
Kadapa

Art and Architecture are true manifestations of the culture of a period as they reflect the mind and approach of that society. It is here that the ideas and techniques of a society find visual expression.

The coming of the Turks inaugurated a new era in the history of Indian architecture, the Turks brought with them architectural ideas developed in Persia, Arabia and Central Asia. They came into contact with the traditions that had already been developed in India. The interaction of these two traditions resulted in a new synthesis of architectural styles. Indo-Islamic Architecture refers to the art of Indian Architecture that resulted from the cultural intermingling after the advent of Muslim rulers into the Indian sub-continent. The most important innovation that the Turkish rulers introduced was the use of the arch and the dome on a larger scale. The Arabs had borrowed this from the eastern Roman Empire at Byzantium. The new architectural form, made possible by mortar of a superior kind used geometrical and floral decorative designs which were partly derived from an established tradition of indigenous architecture. The Muslim rulers however, did not decorate their buildings with human and animal figures and filled the panels with inscriptions of Quranic verses. The rulers of the Sultanate were great patrons of architecture and under them the process of synthesis started. It continued with many regional variations in the

different kingdoms. During the Mughal period the flowering of this synthesis took place and some of the greatest monuments of India were built. The Indo-Islamic style was neither strictly Islamic nor strictly Hindu. The architecture of the medieval period can be divided into two main categories. They are the Delhi or the Imperial Style and the Mughal Architecture. Based on the interaction of the two traditions a unique Indian style of architecture was developed in this period.

The Islamic architecture in itself was not completely Islamic. It has borrowed various architectural styles from various countries like regions and countries like Arabia Persia (Iran), Iraq, Egypt, Afghanistan, central Africa etc. The striking features of Islamic architecture were stiffness and simplicity. On the other hand Indian architecture was very complex and much emphasis was given to decoration. The synthesis of these styles of architecture resulted in lessening the stiffness of Muslim architecture and also helped in simplifying the complex decorative styles of Indian architecture. Though the religions of Hinduism and Islam failed to integrate completely their respective architectural styles were completely integrated to a very great extent.

The Islamic rule in India saw the introduction of many new elements in the building styles also. This was very much distinct from the already prevailing building style adopted in the construction of temples



# Environmental Communication through Visual Art - A Study of Mughal Paintings

**T. Shyam Swaroop, K. Swapna Kumari**  
Kadapa, Andhra Pradesh

## Introduction:

The ecological history of India has been documented only from the past two centuries especially from the British rule. But the information from the historiography accounts points out to the rich and varied ecological base of pre-colonial India. Research works of **Dharampal (1971, 1983)** and **Shiva (1988)** on ecological resource regenerative regime before 18<sup>th</sup> century, **Gadgil and Guha (1992)** on ecological conservation regimes of pre-colonial India, and most recent collections and anthologies of **Mahesh Rangarajan & K.Sivaramakrisnan (2012)** have shed light on the different and varied concepts like role of State and self governing local communities as powerful actors in ecological change. This premise brings into the field the various factors of the State like conflicts, administration mechanisms, and their legal & authoritative custodianship on the ecological resources as important indicators of the ecological conservation mechanisms. In this backdrop the visual art forms patronized and supported by the State can give a logical clue to the issue. The Medieval India is the part of Indian history between the 8<sup>th</sup> century and the 18<sup>th</sup> century A.D. During Medieval period, India witnessed significant growth in the art of painting. The Sultanate Period and Mughal Regime (13<sup>th</sup> -18<sup>th</sup> century) witnessed diverse development in the field of Painting like the introduction of Miniature Paintings. These paintings can provide various

insights into the ecological communication modes used in that period.

The growth and development of paintings as a medium of communication indicates the mastery over communication systems used for information storage, exchange and dissemination of ideas. The Increase in communication ability or the "communication competence" has been one of the critical factors for flourishing of civilization. The development of the art of painting is regarded as an inclusive phase represented in the "Theory of transitions" which starts with the age of signs and signals followed by age of speech and language and age of writing etc. (**W.W. Howells**). Thus the depiction and representation of various images of forest fiction, water disputes, contests & conflicts over urban - rural spaces, claims on land, animal, plant and other ecological resources in the paintings of medieval times have refocused the need to re-interrogate the ecological and environmental history especially that of pre-colonial India.

## Development of Art of Painting in Mughal Period:

The art of painting in Mughal period developed as a blend of Persian and Indian styles. The period witnessed various onslaughts of foreign invasions thereby creating flux in the local cultural patterns. The local style of paintings was mixed with the foreign culture especially that of Persian culture thereby creating a new style. Mughal rulers especially Akbar, Jahangir



# MIRRORING THE SPLENDOUR OF INDIAN MEDIEVAL ARCHITECTURE : A STUDY OF SELECT POEMS IN TELUGU LITERATURE

**Dr. N. Eswar Reddy**  
Kadapa

**Dr. P. Padma**  
Kadapa

Art is one of the most dynamic social forces of human expression and behaviour. Fine arts create communal spaces to imagine, create, experiment and to establish a set of values to be passed to the future generations. It has capacity to teach better than politicians or analysts. Society needs to focus on the world of art and culture as vital sources for finding solutions to sustain the diminishing values of life, to make it life worthy and to feel the fullness of the life. Life without art is an empty lake. Art speaks volumes about human civilizations from the ancient times to the modern days. It is democratic way of expression, which can bridge the ages, nations and develops dialogues between them and fosters relationships.

In India, there is a popular old saying that arts are sixty four in number and the fine arts are distinguished from the professional arts. Now-a-days the number cannot be specified as they are growing rapidly in number, but, however the enthusiasm of the people has not diminished. Universally appreciated great fine arts—painting, sculpture, music, dance and literature comprise the most expressive forms of art. Literature documents the arts and as such the Telugu poetry has documented and preserved the great tradition of Indian sculpture from the days

of Nannaya. Poetry brings life to the statues carved and present before us with equal skill as the imaginative sculptor himself. The present paper is focused on Puttaparthi Narayanacharyulu's *Penugonda Lakshmi* and, Gurram Jashua's *Muntaj Mahal*—the poems, which mirror the splendour of the medieval Indian sculpture.

If the fort of Penugonda of Anantapur district stands as a testimony of the splendour of architecture during the reign of Sri Krishna Devaraya, the learned scholar, Puttaparthi Narayanacharyulu mirrored a perfect image of it with his aesthetic skills in his poetic monument, *Penugonda Lakshmi*. Another masterpiece of medieval Indian sculpture, Taj Mahal which has earned its distinguished position among the seven wonders of the world is also a melodious love lyric spreading the warm message of love of a husband to his wife, when looked from the eyes of the Padma Bhushan, Gurram Jashua: though it may appear as a mere tomb to the modern man without aesthetic soul.

Watching the sculptural remains of today, Puttaparthi marches behind into the time- past, when it was constructed. Joushua on the other hand marches into the historical past to pass the message of love to the modern generation. The sculpture shapes the creative imaginations of these



## **Initiation of Gold Plating and Renovation of Anandanilaya Vimana of Tiruvengadanatha**

**Dr. Vellore Ramabrahmam**

Kadapa

**Mr. S. Somasekhar**

Narasapur

### **Introduction**

It is the Universal belief that Vengadam with the Lord Venkateswara has existed from times immemorial and that the deity is a self-created as a 'Svayambhu' one. The term 'Vengadam' meaning the name of the hill is found in the ancient Tamil grammar Tolkappiyam composed by about the 1<sup>st</sup> century A.D. also calls the hill by the same name and gives a vivid description of the fairs and festivals held there. These two do not specifically mention the temple. The famous Tamil classic 'Silappadikaram' of the 1<sup>st</sup> century A.D. makes a clear reference to the Deity and the Hill.<sup>1</sup>

During the period of Asoka the word 'Vimana' was used to denote the car of the Gods. There are many works in Sanskrit which deal with temple construction, idol worship, Iconography and such other topics. The word 'Manasara' is the Science of the essence of temple construction measurements. The class of people who exclusively practice silpa sastra claim Viswakarma, the divine architect, as their ancestor. Manasara Silpa Sastra discusses the construction of Vimanas and Gopuras in temples. While discussing the temple architecture, it states the gopura; the Vimana and the Dwaja Stambha are to be constructed in such a way that all these lie in one line. It draws the distinction between the gopura and the Vimana. Vimana is the

small tower usually built over the Garbha Griha whether big or small, all temples will have Vimanas and they vary from temple to temple.

There are many references to the vimana in the epics, puranas, agamas etc. Among the 108 Vaishnavite centres, Tiurvengadam or Tirumala is an important pilgrimage centre and the presiding deity Lord Srinivasa in his standing posture invites the Bhaktas and by placing his left hand at the waist signifies that the ocean of samsara is only waist deep and by his Vaikunta Hasta directed towards His feet tells them, that Moksha lies at his feet. The entire surrounding is saturated with divinity and joy and the dome over the Garbhagriha is rightly called as Ananda Nilaya Vimana.<sup>2</sup>

### **Legends of Tiruamala**

According to legends the Tirumala temple was first built by King Thondaman at the order of Lord Srinivasa. It is believed lord was standing in open with sky as umbrella for a long time. Thondaman built the basic temple. Garbhalaya is called as Anandanilayam...the one that gives enormous joy to devotees...it is the place which gives a devotee infinite happiness.

**The Supreme Lord Venkateswara or Tiruvengadanatha manifests in five aspects.**

Lord Sri Venkateswara is swayambhu, self-manifest. Lord's image is



## LEATHER PUPPETS : THE ROBOTS OF MEDIEVAL ANDHRA

*Dr. K. Gangaiah*

Kadapa

*Dr. R.N. Ravi Kumar*

Penugonda

**Introduction :** Puppet is an inanimate object animated by a entertainer (Puppeteer). The art of puppetry is a combination of different art forms like drawing, painting, sculpture, music, dance and drama etc. Right from the beginning when the puppets are made, the art of extracting the skin from the animal and tanning or cutting the wood, drawing and cutting of the puppet's shape and painting and decoration of the figure like this every step of this process demands a lot of patience and imaginative skills. Commonly puppet figure are prepared by tracing the design on the animal skin, cutting the out lines of the puppets.

Puppetry is the most vibrating and popular theatrical form of India. The origin was traced in India and other places across the world. Some scholars cited the dating of puppetry was found 3000 B.C ago. The Egyptian script "Hieroglyphics" on the Egyptian tablets described "walking statues [1]" were being used in ancient Egyptian religious dramas. In the primitive period of the human society the Puppetry was used to drive away the evil spirits or to cure the patient's mental depression[2]. According to Indian legend that the origin of the puppetry is attributed to Brahma the creator of the Universe, created the first puppeteer Nat, then he created puppet and again he created Bhutt to manipulate for the entertainment of his consort Saraswathi[3]

According to Koomara Swamy, Panini, the Sanskrit poet and grammarian of 4<sup>th</sup> century B.C and Patanjali the author of yoga sutra dated 2<sup>nd</sup> century B.C, Bharatha, the author of Natya sastra also discussed about the Puppetry. The Kamasutra of Vatsayana has discussed various types of Puppets. Vatsayan also mentioned for the first time about the manipulation of the puppets not only by strings but also by "yanthras". So that puppet could be animated with inbuilt mechanism which might prone the idea of "Robot" to science and technology[4]. The puppetry was cited in great epic Mahabharatha. The great Sanskrit poet and Play writer Kalidasa had discussed of Puppets in his Abhignana Shakuntalam. The Bala Ramayana by Rajasekhara around 10<sup>th</sup> century A.D mentioned two wooden puppets of Rama, Sita. The famous King Bhoja whose throne carried by 32 statues of wooden dolls resembles the Puppets.

The Puppeteer does not have any restriction on impersonating a member of any caste, culls from the general characteristics with adoption of the immediate surroundings[5]. Depends upon the context and availability of material and necessity, the puppets can be divided into Four types. They are 1. Glove Puppet 2. Rod Puppet 3. String Puppet 4. Shadow Puppet.



## THE IMPACT OF ISLAM ON MEDIEVAL INDIAN ART

Prof. G. Gulam Tariq

Kodapa

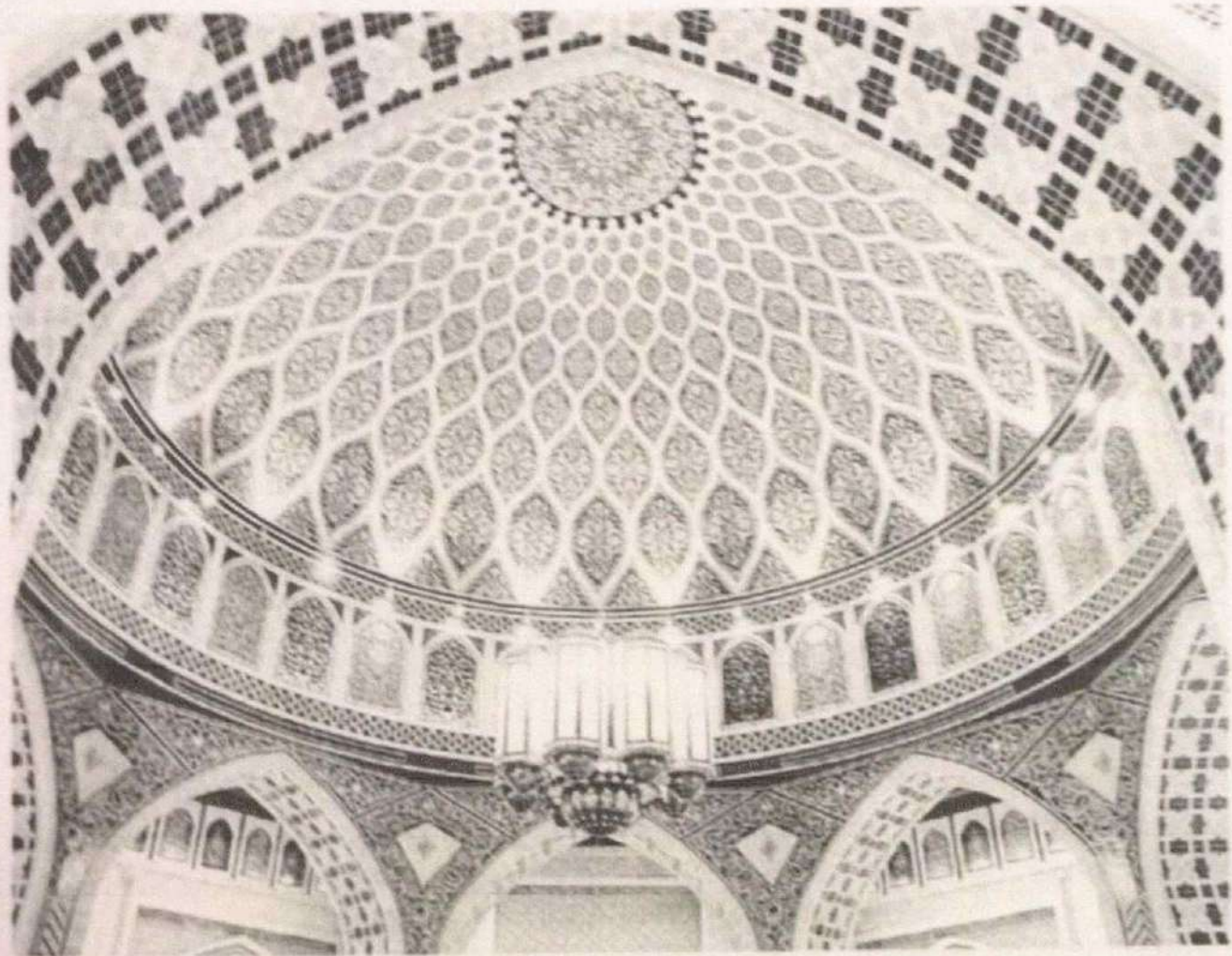
The term "Islamic Art" refers to the visual arts produced by Muslim artists during the Muslim rule in India. It refers to all forms of art—such as architecture, architectural decoration, ceramic art, mosaics, lustre-ware, relief sculpture, wood and ivory carving, drawings, paintings, sculpturing, calligraphy, manuscript illumination, textile design, metal working, goldsmithing, gemstone carving etc.

### The Evolution of Islamic Art:

Historically, Islamic art has developed from a wide variety of different sources. It is not the art of a particular

country or a particular people. This art was developed on the basis of pre-Islamic tradition in the various countries conquered and a closely integrated blend of Arab, Turkish and Persian traditions all brought together in all parts of Muslim empire.

The Arab influence is probably the most important on Islamic art. It contributed to the basis for the development of Islamic art with the message of Islam, the language of the holy book, *The Quran*. The Turkish influence on Islamic art is significant as it was both figurative and non-figurative design. The art of the Islamic world owes to Turkish dynasties and the





## THE VISUAL ASPECTS OF INDIAN MINIATURE PAINTING

**K. Mrutyunjaya Rao**

Kadapa, Andhra Pradesh

### Introduction:

Art is an icon of any nation and rich cultural heritage. From ancient days the visual art forms were practised and executed in serene conditions in India. The medieval India was affected by iconoclastic depredations of nomadic invaders from Central Asia for several times. The felonious invader robbed the physical riches and uprooted the native Indian cultural patterns. Causing disturbance for an interim period. But India never lost its artistic charm. Apart from that Indian art imbibed the rich cultural influences from the far. The art connoisseurs and artists were very clever in preserving the art and culture in alternative ways as their legacy for the future generations. The Miniature painting tradition is one of the best exemplified form of such tradition.

### Brief History of Miniature Tradition:

Pala painting tradition said to be the earliest tradition of 9<sup>th</sup> century A.D.[1] Palm leaves were used to prepare the manuscript illustrations. All these folios were covered with the wooden covers. Tiny illustrations were used to decorate them with flat colors and bold lines stood in secondary position to enrich the text. Due to the introduction of paper, the proportions of the illustration varied with the limited palette and angularity in lines. In later period the format has been changed with multi perspective images and rich colour was introduced the western Indian tradition

(Jain miniatures) and flourished at various centers.

The son of Babur, Humayun took shelter in his exile at court of Persian King Shah-Tahmasp where he came in to contact with the tinge of art of Persia and artists. While in return from exile, after gaining his throne, he brought two Persian masters Mir syed Ali, and "Qhwaza" Abdu's Samad[2]. Under their direction of these two masters, Humayun established art ateliers and employed several local artists. His successor Akbar encouraged the court painting. He employed several local artist and commissioned many manuscript illustrations. Painter adopted the advantage of size of the format of the paper size for vertical direction. The surface of the illustration was drawn into three zones. Due to the influence of European paintings prints, Mughal artist adopted their technical aspects of European painting. Due to their influence, Jahangir, encouraged the individual artists started, to sign on paintings. Painters achieved the perfectness in portraiture and study of botany and birds, animals. He asked his court painters to document the 52 medicinal plants in meticulous details[3]. Later this tradition was less patronized by Shahajahan and Aurangazeb., During these days the painting at Deccan flourished chiefly at three centers; they are Ahamadnagar, Bijapur and Golconda, in these centers, fusion of Persian and art of Vijayanagara styles can be observed.



## Art and Beauty as reflected in Anand Coomorswamy's The Dance of Shiva

Dr. R. V. Jayanth Kasyap

Kadapa

'An Architecture is what you do it when you look upon it' – Walt Whitman

Many historians, thinkers and intellectuals through their writings have glorified Indian civilization, culture, art, literature, tradition, rituals and customs. India is replica of the artistic glory for it witnessed in its long history numerous achievements. It attracted the attention of foreign thinkers such as Romain Rolland and Pearl S. Buck who in their writings have showered lavish praise on Indian civilization and its traditional legacy. Anand Coomaraswamy a Ceylonese Philosopher, metaphysician, historian and shrewd interpreter of Indian Art and culture in his significant work *The Dance of Shiva* deals with the uniqueness of Indian past and its magnificence. He cites the images collected from different spots and comments on the sculptural and architectural aspects. In his opinion the relics of India not only reflect the architectural beauty but express the typical Indian ethos. Further the work provides a vivid representation of the opinions and attitudes held by intellectuals during the British period. The present paper titled **Architectural Beauty as reflected in Anand Coomorswamy's *The Dance of Shiva*** makes an endeavor to critique the writer's perception of beauty.

In the compendium of Fourteen Essays, Coomaraswamy takes a look at some of the Indian sculptures and presents the facts about the classification of stone

cultures characteristic of a particular period. In the essay *The Hindu View of Art* he puts forth the popular Hindu concept of **Art is divine**. He refers to various paintings and sculpture and comments on their aesthetic aspects. He gives the details of two figures carved on plates which are as follows.

- a. *Avalokitesvara, Bodhisattva, Buddhist bronze, 8<sup>th</sup> century, museum of Fine Arts, Boston*
- b. *Siva and Parvathi on Mount Kailasa, Bramhanical Stone sculpture, Elura 8<sup>th</sup> century.*

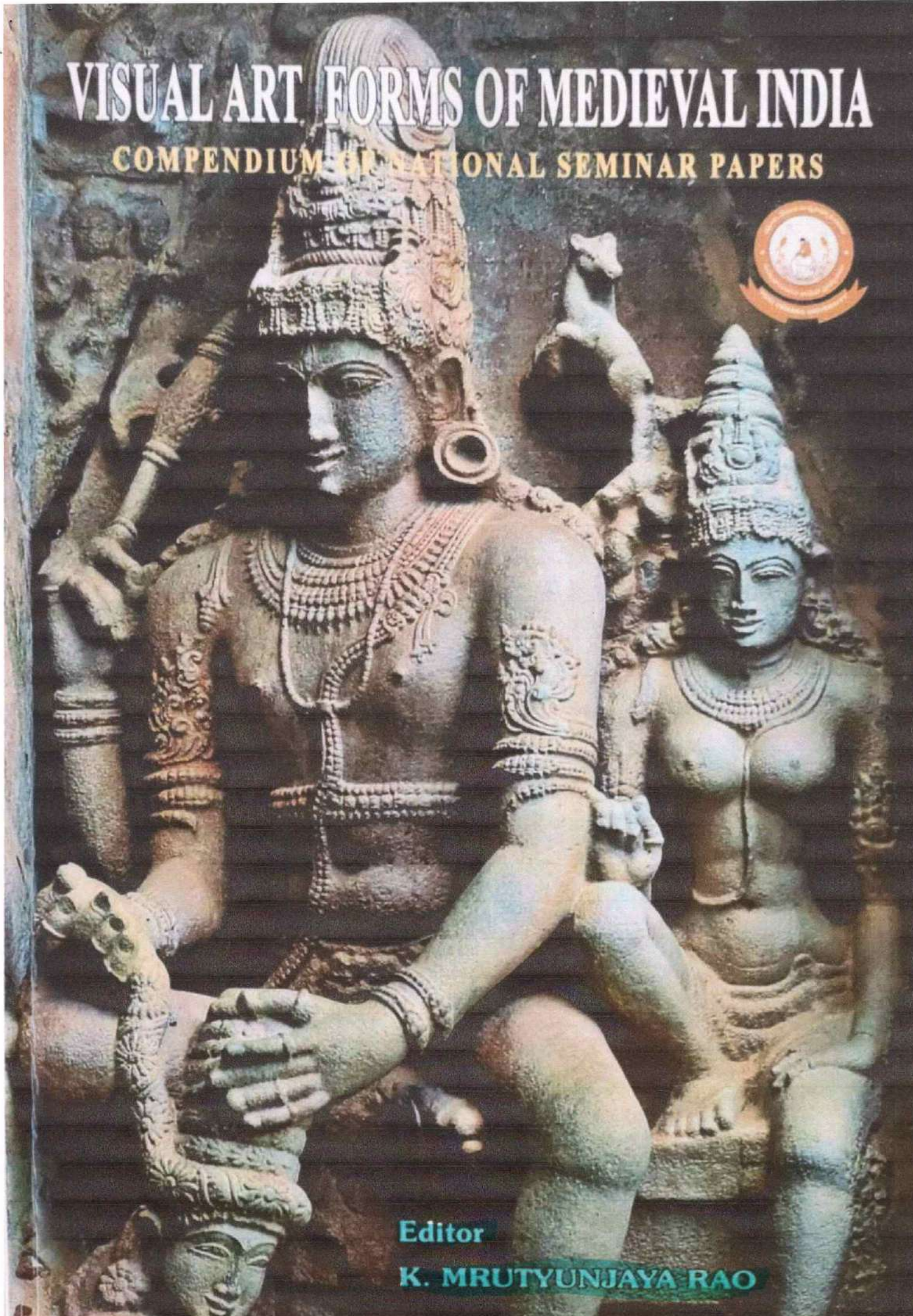
According to Coomaraswamy the imager was neither obsessed with self-expression of beauty. He opines that the





# VISUAL ART FORMS OF MEDIEVAL INDIA

COMPENDIUM OF NATIONAL SEMINAR PAPERS



Editor

K. MRUTYUNJAYA RAO



**Compendium of the articles of the National Seminar**

“Visual Art forms of Medieval India” Jointly organized by  
Department of Fine Arts, Yogi Vemana University, Kadapa-516003, Andhra Pradesh  
Department of Language & Culture, Government of Andhra Pradesh,  
Lalit Kala Akademi, New Delhi, Amaravathi Visual Art Society, Vijayawada.  
On 04-06<sup>th</sup> March 2016.

**Copies: 150**

**Price : 950**

The publication of the proceedings are financially supported by  
Department of Culture, Govt. of Andhra Pradesh.

The responsibility of the fact stated, opinions expressed, or conclusions reached is the that  
of the authors of the articles. Convener of the Seminar, Department of Fine Arts,  
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**Editor:**

**K.Mrutyunjaya Rao,**  
Coordinator, Department of Fine Arts,  
Yogi Vemana University, Kadapa-516003  
09492345419

**ISBN 978 -93 – 5254 – 229 – 1**

Published on behalf the Department of Fine Arts by

**The Registrar,**  
**Yogi Vemana University,**  
**Kadapa-516003**

March 2016

Cover Design : K.Mrutyunjaya Rao

Acknowledgements: *Cover Design Photograph* by Sri Madhu Jagdeesh,  
Mahalinga Puram, Pollachi -642002 Tamilnadu.

Back cover page image from <https://en.wikipedia.org/wiki/Vontimitta>

*Printing:*

**Konduru Janardhana Raju**  
**R.K. Graphics,**  
**Kadapa - 516 001.**



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# INDIGENOUS ALCOHOLIC BEVERAGES OF SOUTH ASIA

ANILA KUMARI, ANITA PANDEY, ANTON ANN,  
 ANUP RAJ, ANUPAMA GUPTA, ARJUN CHAUHAN,  
 ARUN SHARMA, ARUP JYOTI DAS,  
 ASHWANI KUMAR, B.L. ATTRI, BHANU NEOPANY,  
 CHAMGONGLIU PANMEI, DEEPA H. DIWEDI,  
 DORJEY ANGCHOK, FOOK YEE CHYE,  
 GEORGE F. RAPSANG, GITANJALI VYAS,  
 GURU ARIBAM SHANTIBALA DEVI, IDAHUN BAREH,  
 JAHANGIR KABIR, JAYASREE CHAKRABARTY,  
 KHENG YUEN SIM, KONCHOK TARGAIS,  
 KUNZES ANGMO, L.V.A. REDDY, LOK MAN S. PALNI,  
 M. PREEMA DEVI, MANAS R. SWAIN,  
 MONIKA, NAVEEN KUMAR, NEELIMA GARG,  
 NINGTHOUJAM SANJOY SINGH, NIVEDITA SHARMA,  
 PREETI YADAV, RAMESH C. RAY, S.S. THORAT,  
 SANKAR CHANDRA DEKA, SATYENDRA GAUTAM,  
 SAVITRI, SHARMILA THOKCHOM, S.R. JOSHI,  
 SURESH KUMAR, SUSHMA KHOMDRAM,  
 TEK CHAND BHALLA, TSERING STOB DAN,  
 V.K. JOSHI, VANDITA CHAUHAN,  
 AND VIDHAN JAISWAL

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# INDIGENOUS FERMENTED FOODS INVOLVING ACID FERMENTATION

A.K. SENAPATI, ANITA PANDEY,  
ANTON ANN, ANOOP RAJ, ANUPAMA GUPTA,  
ARUP JYOTI DAS, B. RENUKA, BHANU NEOPANY,  
DEV RAJ, DORJEY ANGCHOK, FOOK YEE CHYE,  
GITANJALI VYAS, J.P. PRAJAPATI,  
JAHANGIR KABIR, JARUWAN MANEESRI,  
K.S. SANDHU, KHENG YUEN SIM,  
KONCHOK TARGAIS, L.V.A. REDDY,  
LAXMIKANT S. BADWAIK, LOK MAN S. PALNI,  
M. PREEMA DEVI, MANAS R. SWAIN,  
MD. SHAHEED REZA, NIVEDITA SHARMA,  
PALLAB KUMAR BORAH, RAMESH C. RAY,  
S.G. PRAPULLA, S.V. PINTO, SANKAR CHANDRA  
DEKA, SOMESH SHARMA, SURESH KUMAR,  
TSERING STOB DAN, AND V.K. JOSHI

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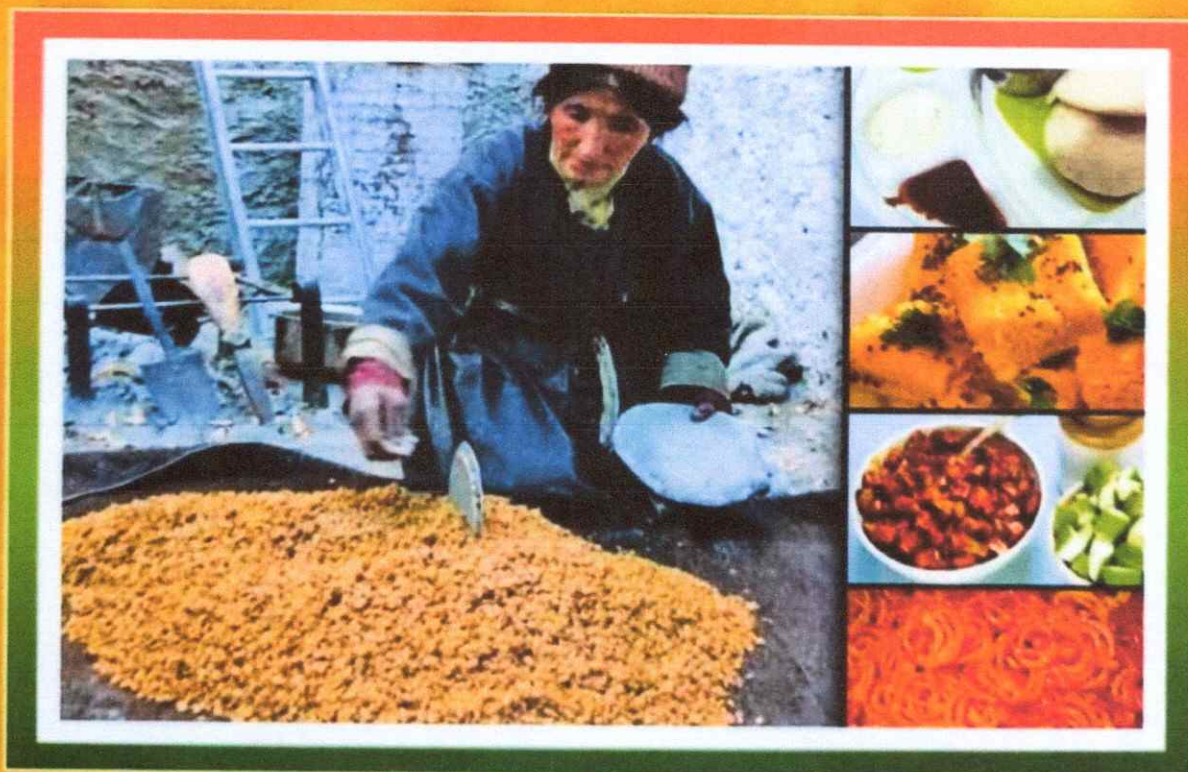


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Fermented Foods and Beverages Series

# Indigenous Fermented Foods of South Asia

*Edited by* **V.K. Joshi**



CRC Press  
Taylor & Francis Group



CRC Press  
Taylor & Francis Group  
6000 Broken Sound Parkway NW, Suite 300  
Boca Raton, FL 33487-2742

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Printed on acid-free paper  
Version Date: 20151027

International Standard Book Number-13: 978-1-4398-8783-7 (Hardback)

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# DIVERSITY OF INDIGENOUS FERMENTED FOODS AND BEVERAGES OF SOUTH ASIA

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## 2.1 Introduction

A large variety of foods (baked products, alcoholic beverages, yoghurt, cheese, soy, fish and meat products, and many others) are derived from food fermentation, not only in households, but also on small-scale as well as large-scale commercial enterprises and food industries. Fermented foods make a major contribution to the human diet all over the world. Fermentation has been a popular method to preserve food since ancient times. Some practices have recently been improved by more modern technology in the developed countries, with the growth of many sophisticated industries. Food fermentation became popular in many civilizations because it not only extended the shelf-life of food, but it also provided a variety of forms, flavors, and other sensory experiences. The primary purpose of fermenting food substrate is to preserve foods that are susceptible to spoilage due to undesirable environment or climate conditions. Traditional fermentation serves as a low cost food processing technique producing desirable products with special characteristics, which develop due to the biochemical reactions of the microorganisms or the enzymes in the food substrates (Fellows,





# SERVICE QUALITY MANAGEMENT

Talluru Sreenivas





## SERVICE QUALITY MANAGEMENT

Quality initiatives practised in various services sector activities constitute the focus of the volume. The book covers 37 papers including 17 case studies dealing with quality initiatives in services sector, with focus on the changing scenario. There are conceptual papers in relation to specific sectors, and case studies presenting field level experiences of implementation of quality initiatives. Application of total quality management (TQM) techniques in a variety of fields is discussed. The sectors covered are: (a) banking, (b) good governance, manufacturing, services, and retailing, and (c) healthcare, and transport. Services sector being the theme of the volume, its characteristics, contribution, and the changing scenario of application of quality initiatives are covered in depth from a number of angles, depending upon the coverage of each paper. There are two lead papers highlighting the status of services sector and its attributes, along with a paper presenting highlights of the entire volume. TQM is the key mantra for intense customer-oriented service enterprises. The TQM challenge lies in establishing smooth connectivity between business processes so as to retain existing customers, and make the business transaction attractive to prospective customers. TQM is, thus, an integrated organizational approach in delighting customers by meeting their expectations on a continuous basis in the dynamic business scenario. The publication is a collection of rich research-based articles. A number of them deal with services sector environment in Andhra Pradesh, and a few neighbouring States. The volume will be highly useful for faculty and researchers engaged in or interested in pursuing socio-economic research. This is of immense value to researchers in management, in particular.

### THE EDITOR

**Dr. Talluru Sreenivas** (born 1967) is Professor in the Department of Business Management. Presently, he is Dean, Faculty of Commerce and Management and also Chairman, Board of Studies (PG) in Management in Yogi Vemana University, Kadapa (Andhra Pradesh). Earlier, he served the RVR & JC College of Engineering, Guntur (Andhra Pradesh) in the Department of Management Sciences in various capacities. In his two-decade long academic career, he has many accomplishments in teaching, research, and allied academic pursuits. He was awarded Ph.D. by Acharya Nagarjuna University, Guntur in the Faculty of Management for his work on Management of Hospitals. After completion of his post-graduation, he secured M.Phil. from Central University of Pondicherry, Pondicherry. He has to his credit many post-graduate degrees and diplomas in management including M.Com., MBA and MHRM. He has participated in a series of Faculty Development Programmes on Strategic Management, organised by the Strategic Management Forum of India over a period of eight weeks, and conducted by the leading Indian Institutes of Management (IIMs), and All India Management Institutes.



He visited USA under the Group Study Exchange Programme sponsored by Rotary International during February - March 2007 which gave him an opportunity to visit a few leading Business Schools in USA, and get acquainted with their working. Harvard Business School, Massachusetts Institute of Technology (MIT), Boston Business School, and Salem School of Management were covered in this visit. He has to his credit a number of published books and articles on different aspects of management. At present his areas of interest and involvement are: organisational behaviour, hospital management, strategic management, and change management.



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Tel.: +91-11-23279245/43596064/43596065; Fax.: +91-11-23253475  
E-mail: [discoverypublishinghouse@gmail.com](mailto:discoverypublishinghouse@gmail.com)  
[sales@discoverypublishinggroup.com](mailto:sales@discoverypublishinggroup.com)  
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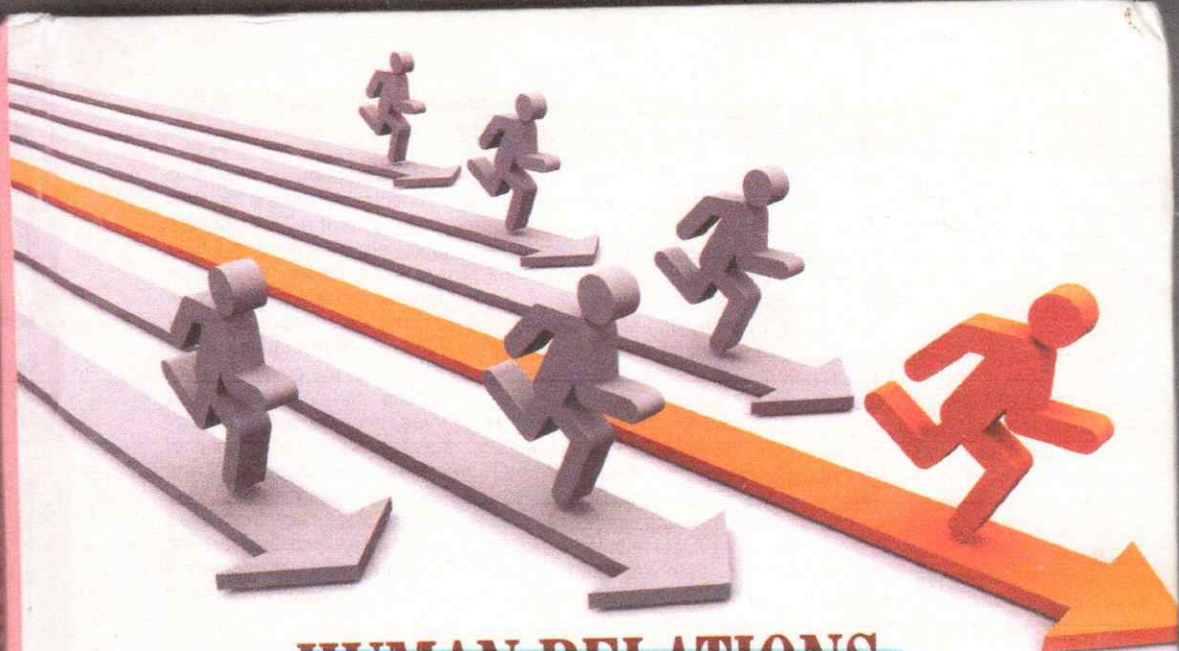
ISBN: 978-93-5056-804-0



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**HUMAN RELATIONS  
MANAGEMENT  
IN  
COMPETITIVE ENVIRONMENT**

**Talluru Sreenivas**





## HUMAN RELATIONS MANAGEMENT IN COMPETITIVE ENVIRONMENT

Human resource is a vital factor in the economic development of a nation. People not only contribute to production as one of the important factors stimulating growth, they are also consumers, and the focus of economic development is to maximize people's welfare. Human Resource Development (HRD) includes three basic strategies: (a) developing HR through education and training, (b) deploying HR, and (c) providing incentives to ensure that they are productively employed. The new HR Management (HRM) perspective requires Human Relations personnel to be strategic partners of the organization that coordinates all functions and supports the strategies by attracting and retaining the talented personnel who have substantially contributed to the growth of the organization. The volume on Dynamics of Human Relations Management in Competitive Environment contains 34 articles, including Highlights of the coverage of all articles. The broad heads covering these articles are: (a) Human Relations and the Competitive Environment, (b) Manufacturing, Services, and Power, (c) Banking, Healthcare, Information Technology (IT), and Entertainment. The first section deals with developments in recent years in the context of globalization. The other two refer specifically to Human Relations, and Human Resource Development and Management strategies in individual sectors. The papers include 17 case studies, presenting field level experiences. The environment covered in the case studies is of Andhra Pradesh and neighbouring States. One empirical study on leadership styles is on private enterprises in Papua New Guinea, and another is on talent - management and work - life balance strategies. The publication is a collection of rich research - based articles. These provide guidance to faculty and researchers engaged in or interested in pursuing socio-economic research, and in particular, management.

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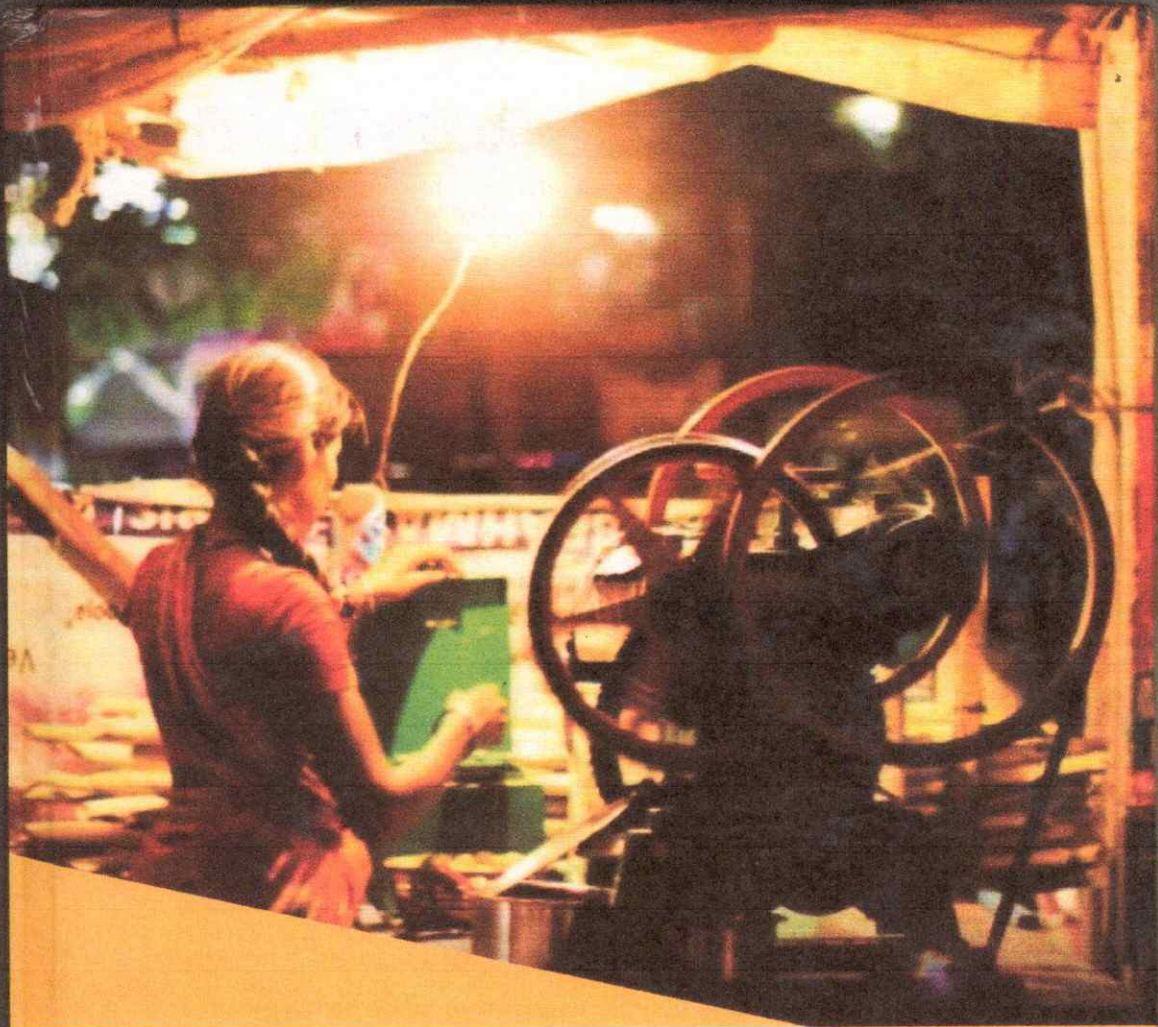
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E-mail: [discoverypublishinghouse@gmail.com](mailto:discoverypublishinghouse@gmail.com)  
[sales@discoverypublishinggroup.com](mailto:sales@discoverypublishinggroup.com)  
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ISBN: 978-93-5056-805-7



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**Talluru Sreenivas**



## ECONOMIC AND SOCIAL EMPOWERMENT

The volume on Economic and Social Empowerment deals with empowering people in various services sectors. The sectors covered in different sections are: (a) Education, (b) Women Empowerment, and (c) Insurance, Telecommunications, and Tourism. The publication presents 42 articles, along with highlights of the coverage of the entire volume presented in section I - 22 articles deal with primary, secondary and tertiary/higher education, including management education, and education sector - an overview; 10 articles cover women empowerment through a number of programmes; and 10 articles discuss insurance, telecommunications and tourism sectors. One important theme covered in depth in a number of papers is implementation of total quality management (TQM) techniques in each sector. TQM is an integrated organizational approach in delighting customers by meeting their expectations on a continuous basis in the dynamic business scenario. In education, role of HRD, HRM and training in different levels of educational institutions has been discussed. The aspects covered in Women Empowerment include entrepreneurship for micro and small enterprises, women workers, human resource management, literacy, education, training and capacity building, and self help group (SHG) approach. There are 14 case studies analyzing field level experiences in the implementation of programmes. The publication is a collection of rich research - based articles. A number of them deal with the environment in Andhra Pradesh and a few neighbouring States. The volume will be highly useful for faculty and researchers engaged in or interested in pursuing socio-economic research. This is of immense value to researchers in management, in particular.

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E-mail: [discoverypublishinghouse@gmail.com](mailto:discoverypublishinghouse@gmail.com)  
[sales@discoverypublishinggroup.com](mailto:sales@discoverypublishinggroup.com)  
Website: [www.discoverypublishinggroup.com](http://www.discoverypublishinggroup.com)

ISBN: 978-93-5056-806-4



2800/-



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 Website: [www.discoverypublishinggroup.com](http://www.discoverypublishinggroup.com)

ISBN: 978-93-5056-806-4



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**ECONOMIC AND SOCIAL EMPOWERMENT****Edited by: Dr. Talluru Sreenivas****ISBN: 978-93-5056-806-4****Edition: 2016****Published by: Discovery Publishing House Pvt. Ltd., New Delhi (India)****10****Role of Management Education for  
Improving the Quality of Human Life  
An Outlook****P. Saritha\***; K. Lavanya Latha\*\* & P. Mohan Reddy\*\*\*

*In the modern economic scenario all over the world, 'Management' as a stream of education and training has acquired new dimensions. Management is an exciting field where the person can have an immediate impact on the operations of any business. The field of Management is dynamic in nature. New tools and techniques are continually being introduced to improve the quality, efficiency, productivity and profitability of any organization. All organizations and their departments, functions, or groups use Management methodologies, which include problem-solving techniques and guidelines for various related activities. In a business scenario also the person has to do things, take decisions, take actions and monitor results. A person cannot operate any business by just planning what to do on paper. Planning is, though an important step in the process, there are many examples of businesses with excellent plans having failed because of non-implementation of proper ideas. Management education should actually supplement on the job training being given by the companies to the management trainees. It should also develop the analytical skill and improve the ability to assimilate complex external and internal factors influencing an organization.*

*Future would be a technologically dominant economy with limited direct human interface, developing systems and standards to deal with human limitations, with leaner organizations. With increasing collaboration of universities across the globe, management education could have a huge prospect of dissemination through satellite intervention across countries. It would play a vital role in enabling students to opt for affordable higher education within the country as well. The requirement of manpower in management by 2020 could be gauged by the potential of growth and development of the sectors mentioned in the paper. Huge entrepreneurial push and*

\* Assistant Professor, Department of Business Management, Yogi Vemana University, Vemanapuram, Kadapa - 516003.

\*\* Assistant Professor, Department of Business Management, School of Management, Pondicherry University, Kalapet, Puducherry - 605014.

\*\*\* Professor, Department of Commerce, Sri Venkateswara University, Tirupati - 517502.



SERVICE QUALITY MANAGEMENT

Quality initiatives practised in various services sector activities constitute the focus of the volume. The book covers 37 papers including 17 case studies dealing with quality initiatives in services sector, with focus on the changing scenario. There are conceptual papers in relation to specific sectors, and case studies presenting field level experiences of implementation of quality initiatives. Application of total quality management (TQM) techniques in a variety of fields is discussed. The sectors covered are: (a) banking, (b) good governance, manufacturing, services, and retailing, and (c) healthcare, and transport. Services sector being the theme of the volume, its characteristics, contribution, and the changing scenario of application of quality initiatives are covered in depth from a number of angles, depending upon the coverage of each paper. There are two lead papers highlighting the status of services sector and its attributes, along with a paper presenting highlights of the entire volume. TQM is the key mantra for intense customer-oriented service enterprises. The TQM challenge lies in establishing smooth connectivity between business processes so as to retain existing customers, and make the business transaction attractive to prospective customers. TQM is, thus, an integrated organizational approach in delighting customers by meeting their expectations on a continuous basis in the dynamic business scenario. The publication is a collection of rich research-based articles. A number of them deal with services sector environment in Andhra Pradesh, and a few neighbouring States. The volume will be highly useful for faculty and researchers engaged in or interested in pursuing socio-economic research. This is of immense value to researchers in management, in particular.

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Website: [www.discoverypublishinggroup.com](http://www.discoverypublishinggroup.com)

ISBN: 978-93-5056-804-0



₹ 3000/-



ent of Discovery Publishing  
elegantly in a record time  
a great deal, and patiently  
a varied academic activities  
vey my appreciation to all

T. Sreenivas  
Editor

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## SERVICE QUALITY MANAGEMENT

Edited by: T. Sreenivas

ISBN: 978-93-5056-804-0

Edition: 2016

Published by: Discovery Publishing House Pvt. Ltd., New Delhi (India)

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### Customer Relationship Management for Improving Quality in Banking Services A View

—P. Saritha, B.S.R.S. Sarma and P. Mohan Reddy

CRM is the marketing concept. Marketing in terms of banking can be defined as the creation and delivery of consumer satisfying products at a profit to a bank. CRM in banks can be defined as the ability to understand, anticipate and manage the needs of the customers, interaction and relationship resulting in increased profitability through revenue and marginal growth and operational efficiencies. CRM consists of three things: Customer, Relationship and Management. CRM covers a wide range of products and interfaces such as marketing automation, sales force automation, quality circles for customer service, data warehousing and data mining which focus on decision making. CRM follows both business and technology trend. Therefore, whether a bank is going to succeed or fail in its trade area is determined largely by how well the needs of its customers have been understood and satisfied. Customer Relationship Management is found to be implemented effectively in commercial banks. Under this technique, both select public and private sector commercial banks have provided various services like community service banking, multi-city cheques, western union money transfers, customer service committee, certified insurance facilitators and single window operations. Certain CRM initiatives of SBI are ineffective. Large number of transactions/customers per branch is resulting in long queues and thus, delays in service. Customer feels neglected and employees feel irritative due to pressure of work. CRM techniques are also implemented to improve bank-customer relations in INGV Bank with relatively better performance compared to SBI, because of the initiatives taken by the bank, and also owing to the small size of its operations.

#### INTRODUCTION

A customer is the most important visitor in any business. He is not dependent on business. Customer Relationship Management (CRM) is gaining importance in corporate circles in recent years. It is emerging as the business theme for the 21<sup>st</sup> century. Enhancing lifetime value of customers and developing a relationship with profitable customers has become the central focus of companies' strategy. A very important aspect of bank marketing is Relationship Management, which

Dr. P. Saritha, Assistant Professor & Dr. B.S.R.S. Sarma, Academic Consultant, Department of Business Management, Yogi Vemana University, Vemanapuram, Kadapa - 516003.

Dr. P. Mohan Reddy, Professor, Department of Commerce, Sri Venkateswara University, Tirupati - 517 502.



## HUMAN RELATIONS MANAGEMENT IN COMPETITIVE ENVIRONMENT

Human resource is a vital factor in the economic development of a nation. People not only contribute to production as one of the important factors stimulating growth, they are also consumers, and the focus of economic development is to maximize people's welfare. Human Resource Development (HRD) includes three basic strategies: (a) developing HR through education and training, (b) deploying HR, and (c) providing incentives to ensure that they are productively employed. The new HR Management (HRM) perspective requires Human Relations personnel to be strategic partners of the organization that coordinates all functions and supports the strategies by attracting and retaining the talented personnel who have substantially contributed to the growth of the organization. The volume on Dynamics of Human Relations Management in Competitive Environment contains 34 articles, including Highlights of the coverage of all articles. The broad heads covering these articles are: (a) Human Relations and the Competitive Environment, (b) Manufacturing, Services, and Power, (c) Banking, Healthcare, Information Technology (IT), and Entertainment. The first section deals with developments in recent years in the context of globalization. The other two refer specifically to Human Relations, and Human Resource Development and Management strategies in individual sectors. The papers include 17 case studies, presenting field level experiences. The environment covered in the case studies is of Andhra Pradesh and neighbouring States. One empirical study on leadership styles is on private enterprises in Papua New Guinea, and another is on talent - management and work - life balance strategies. The publication is a collection of rich research - based articles. These provide guidance to faculty and researchers engaged in or interested in pursuing socio-economic research, and in particular, management.

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Website: [www.discoverypublishinggroup.com](http://www.discoverypublishinggroup.com)

ISBN: 978-93-5056-805-7



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*Edited by: Dr. Talluru Sreenivas*

**ISBN: 978-93-5056-805-7**

*Edition: 2016*

*Published by: Discovery Publishing House Pvt. Ltd., New Delhi (India)*

**Human Resource Development Practices  
An Overview of Manufacturing Industries in India**

**P. Saritha; K. Sajeela Bhanu & K. Lavanya Latha**

Human Resource is a term used to describe the individuals who comprise the workforce of an organization, although it is also applied in labour economics too, for example, business or even whole nations. Human resources is also the name of the function within an organization charged with the overall responsibility for implementing strategies and policies relating to the management of individuals (i.e., the human resources). This function title is often abbreviated to the initials 'HR'. In simple terms, an organization's human resource management should maximize return on investment in the organization's human capital and minimize financial risk. Human Resources seek to achieve this by aligning the supply of skilled and qualified individuals and the capabilities of the current workforce, with the organization's long-term future business plans and requirements to maximize return on investment and secure long-term survival and success. In ensuring such objectives are achieved, the human resource function's purpose in this context is to implement the organization's human resource requirements effectively but also pragmatically, taking account of legal, ethical and as far as is practical in a manner that retains the support and respect of the workforce.

In manufacturing industries, there is a strong presence of unions. This makes it very important for the HR to know the various union policies and rules that the company must adhere to so that the workers don't go on strike. The rules and regulations in a manufacturing industry, including the remuneration and taxes are different which the HR must be aware of. The requirements of an employee are much specialised and the interview process should be very different and so must be the training activity. The insurance and safety of all the workers must be taken care of. The communication to the employees is very much different and must be made in a specialised manner. The existence of unions and employee leaders and the internal politics must be taken good care of. Most of the jobs are blue collar jobs, and the employees must be kept happy on the job, which in itself is a challenge to the HRM. The vacancies should be filled up with the person with suitable skills and experience which is scarce to find. The management and employee relations are always hanging by the thread, and so a good communication must be mentioned and the sentiments of both the parties must be taken care of. Attrition rate is also an issue for the HR in manufacturing. The main aim of the paper is to study the human resource strategies in different manufacturing sectors throughout India.



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 Website: [www.discoverypublishinggroup.com](http://www.discoverypublishinggroup.com)

ISBN: 978-93-5056-806-4



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Publishing House  
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and patiently borne the  
times, including releasing  
them for their silent and

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*Preface*  
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**ECONOMIC AND SOCIAL EMPOWERMENT**

Edited by: Dr. Talluru Sreenivas

ISBN: 978-93-5056-806-4

Edition: 2016

Published by: Discovery Publishing House Pvt. Ltd., New Delhi (India)

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**Management Education in Training  
the Students as Human Resources  
An Outlook on Techniques and Methods**

P. Saritha\*, K.Srinivasa Rao\*\* & P. Mohan Reddy\*\*\*

When we talk of management education, we are basically referring to shaping up the students, aimed towards developing their competency and capability either as a manager fit to join an organization and help it to grow or as an entrepreneur, to establish and develop one's own business. This capability does not come from possessing a management diploma or degree, but also requires developing in the students the will and skill to contribute for self-sustenance and nation building. Presently it is seen, that there is a wide gap existing between the type of management education imparted in MBA colleges and what is there in real life management in business organizations. In order to make management education more realistic and useful for the industry, certain key areas need to be identified. These could be:

- Benchmarking quality management education to create an enduring quality managers and entrepreneurs.
- Bring in professionalism in management education.
- Adequacy of qualified and competent faculty members, proper infrastructure, support facilities and regular updating of curriculum.

**The techniques we used in management education covered in the article are listed here**

- Core faculty in main areas of management. Faculty must meet at least one of the three criteria requirements, namely: consultancy experience, research experience in management or knowledge of the latest management trends in terms of socio-technical systems and managerial techniques in the industry.
- Infrastructure and facilities: These must include class rooms with multimedia and projection facilities, computers and peripherals and a good library with collection of books on all management subjects.

\* Assistant Professor, Department of Business Management, Yogi Vemana University, Kadapa - 516003.

\*\* Assistant Professor, Department of Computer Applications, Yogi Vemana University, Kadapa - 516003.

\*\*\* Professor, Department of Commerce, Sri Venkateswara University, Tirupati - 517502



# WOMEN IN INDIA THROUGH THE AGES - A GLANCE



*Editor*  
**Smt. N. SIVAPARVATHI**



# WOMEN IN MANAGEMENT - AN OUTLOOK FROM THE FIFTIES TO THE NEW MILLENNIUM

*Dr. P. Saritha*

## INTRODUCTION

Woman has been as important as man. In fact, the status, employment and work performed by women in society is the indicator of a nation's overall progress. Without the participation of women in national activities, the social, economical or political progress of a country will be stagnated. Rural women in India constitute 77 per cent of the female population. They share abundant responsibility and perform a wide spectrum of duties in running the family, maintaining the house hold activities like rearing, feeding, attending to farm labour, tending domestic animals and the like, even then they suffer from being both economically and socially invisible.

Women carry a cultural heritage of five thousand years. The social structures and role processes which these women carry also belong to the traditional agrarian society which is two thousand five hundred years old. The Indian women for long have been seeped in cultural lore of idealism and faith, shackled within the context of involuntary conformity to social structures and roles, and marginalised vis- a- vis the males of the family. After a hundred years of industrialisation and over fifty years of freedom, Indian women at the workplace are realising their dreams and finding their feet. Education opened doors for a lot of women who dared to dream, and to weave a fabric of life within which they could live their dreams and achieve their ambitions. The journey which many women took in this century began with the freedom movement and recently crossed the threshold of the new millennium. Women learnt to juggle multiple expectations and demands of the system at home and at the workplace. They remained rooted in their dreams of freedom, and their desire for self-fulfilment. Women in management are finally coming of age. The transformation of the Indian woman from an enigmatic figure covered in metres of fabric, to today's educated, successful and accomplished professional has not been without great personal sacrifices. This image is as real and alive as the arduous path she has travelled to arrive at her current destination. These are women who have broken shackles thousands of years old, who have walked a previously non traversed path, who have had the courage to make new beginnings and pay the price for the choices they have made.

Exploring how the woman of today has travelled a long way and has created a niche for herself both at the home front and at the workplace, we examine the space she has created for herself. We explore how women in



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**N. SIVAPARVATHI**

M.A., M.Phil, B.Ed., (Ph.D).,  
Lecturer, Department of History,  
Govt. Degree College for Men (A),  
Kadapa, Y.S.R. District.

N. Sivaparvathi, Lecturer in Department of History, Govt. Degree College for Men (Autonomous), Kadapa, Y.S.R. District, Andhra Pradesh. In addition to M.A., M.Phil, B.Ed.,(PhD). She has 25 years of teaching experience at both UG and PG level. Her areas of specialization and research are Ancient Indian History & Archaeology. She has to her credit 05 Research Articles published in National and International Journals of repute. She was participated and presented more than 20 papers in National Seminars.

**RESEARCH INDIA PRESS**  
New Delhi (INDIA)



ISBN-978-93-5171-882-8



HUMAN RELATIONS MANAGEMENT IN COMPETITIVE ENVIRONMENT

Edited by: Dr. Talluru Sreenivas

ISBN: 978-93-5056-805-7

Edition: 2016

Published by: Discovery Publishing House Pvt. Ltd., New Delhi (India)

Role of Ethics in HR Policy Implementation in Small Manufacturing Enterprises in Rayalaseema Region of Andhra Pradesh

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P.V. Vara Prabhakar & T. Venkata Ramana

Most of the organizations are having systemized programmes to encourage the ethical and legal standards, whereas in HR area, role of ethics is one of the key pinching points to decide the future of the organization. This is because ethics management efforts are likely to raise questions of fairness, and trigger a fairness heuristic among employees that can generate important outcomes for the ethics programme specifically, and the organization generally. Relying on research on fairness in organizations and corporate ethics practices, the article presents a case study of sample respondent employees of small manufacturing enterprises in Rayalaseema region for examining eleven hypotheses. All the hypotheses have been rejected. This proves that HR policy implementation is not agreeable to the perceptions of employees. Radical changes are necessary to improve the implementation of HR policies in ethical standards. Keywords: Ethics, Individual Employees, Retention, Decision-making.

INTRODUCTION

Despite the moral appreciation of human resource management (HRM), there is a strong tradition in business that insists that business should not be concerned with ethics. As Milton Friedman, a vociferous proponent of this position has put it: 'The social responsibility of business is to its shareholders. The business of business is business' (1970).

The main aspect of the business opposes to hold attempting to secure the best possible return on any investment. Any dilution of this focus will lead to the corruption of what is a finely balanced system. Businesses that seek to be 'ethical' as well as profitable will probably fail economically, following which the whole community may suffer. Rather, let the invisible hand guide the market, and all will prosper. Like some evolutionary force, the best will always survive. Wealth will trickle down from successful enterprises, and humanity will be best served. Any constraint on the freedoms of the market - be they motivated by ethical angst or vote-seeking government policy - will just mess everything up.



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Role of Training in Performance Improvement of Women Power Loom Workers

B. Sujatha,\* K.L. Prasanna Kumar\* & P.V. Vara Prabhakar\*\*

Performance of workers and employees is directly related to the training they have received during the early periods of their career. Unlike the formal training systems designed to meet the training needs of employees, the skilled and semi-skilled workers depend on various means of informal training systems, and hence, wide variations are observed in the workers' post-training performance. The present study is initiated to assess the training methods and techniques followed to train women power loom workers in relation to their post-training work performance. The results of the study reveal that workers who have received full time training have performed better than the others who have received part time training. Post-training performance of workers is directly proportional to the number of hours spent on each day on training activity. The workers who were trained under relatives demonstrated lower level of performance than the workers who were trained under non-relatives. During the training period, the workers who were receiving compensation have demonstrated higher level of performance than the workers who were not receiving any compensation.

Keywords: Training and Post-training performance

INTRODUCTION

Performance plays a major role in assessing the training needs of workers. Individuals or organizations need to act cautiously in designing the training programme, since the impact of the training programme is crucial for post training performance of the employees or workers. Employees or workers in an organized sector undergo systematic training programmes where the client specific approaches and methods are followed to train the incumbents. However, in sectors like the domestic power loom industry, there are no organized and standardized training programmes to fulfill the training needs of workers. The training system followed in this sector is very informal, and lacks in monitoring and

\* Research Scholars, Department of Business Management, Yogi Vemana University, Vemanapuram, Kadapa - 516003.

\*\* Assistant Professor, Department of Business Management, Yogi Vemana University, Vemanapuram, Kadapa - 516003.



**ECONOMIC AND SOCIAL EMPOWERMENT**

Pages: 143-152

Edited by: Dr. Talluru Sreenivas

ISBN: 978-93-5056-806-4

Edition: 2016

Published by: Discovery Publishing House Pvt. Ltd., New Delhi (India)

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## Human Resource Management in School Administration in Andhra Pradesh

P.V. Vara Prabhakar\*; K. Sreenivas Mahesh\*\*;  
T. Venkata Ramana\*\*\*; M. Suresh\*\*\* & K. Giribabu\*\*\*

*The purpose of this study is to examine the usefulness of Human Resource Management in the administration of secondary schools in Andhra Pradesh. To guide the investigation, the researcher raised research questions, and formulated two hypotheses for the study. A sample of fifty-six schools was selected from a total population of 278 schools in Hyderabad City through the stratified random sampling technique. In these fifty-six schools, there was a total of 5,315 staff from which further selection of 1,063 staff, representing 20 per cent of the target population was the subject of study. A questionnaire was used for collecting data which were analyzed using percentage and Z-test statistic. The result of the findings revealed that human resources undergo different forms of training, and there is a significant difference between the performance of human resources in relation to students' academic performance. It was, therefore, concluded that school personnel should undergo training, and attend regular workshops and seminars periodically. Also that the performance of human resources has considerable effect on the students' academic performance. The researcher, therefore, recommended that the human resources in schools who are not trained professional staff should be advised to go for Post-Graduate Diploma in Education to acquire teaching skills. They should be made to understand the importance of appropriate teaching methods for specific subject areas as they help the staff perform more effectively.*

### INTRODUCTION

The efficiency of human resource management in Andhra Pradesh Schools is being called to question both within and outside the profession. Many dedicated educationists

- \* Assistant Professor, Department of Business Management, Yogi Vemana University, Vemanapuram, Kadapa - 516003.
- \*\* Research Scholar, Department of Business Management, Yogi Vemana University, Vemanapuram, Kadapa - 516003.
- \*\*\* Assistant Professors, Department of MBA, Sri Venkateswara College of Engineering and Technology, Chittoor - 517002.



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NEW DELHI



**ECONOMIC AND SOCIAL EMPOWERMENT**

**Edited by: Dr. Talluru Sreenivas**

**ISBN: 978-93-5056-806-4**

**Edition: 2016**

**Published by: Discovery Publishing House Pvt. Ltd., New Delhi (India)**

**3**

**A Study on the Path of Quality Education in India**

**P.V. Vara Prabhakar\* ; M. Suresh\*\* & A.Sreenivasulu\*\***

*Teaching is the gift of god for teachers, and education is an art to learn new concepts for the students. Education of acceptable quality must address the basic learning needs; enrich the lives of learners and their overall experience of living and well-being. Curriculum is enough to provide possibilities for adjustment to individual needs and to stimulate teachers to seek solutions that can be matched with the needs and abilities of each and every individual. In this regard, the current study is conducted for creating awareness about quality education and its implications for the nation. For this, we collected secondary data from published reports, magazines, journals and official websites. Finally, we reviewed the reforms in education, and developed the recommendations for the betterment of quality in education.*

**INTRODUCTION**

Common goal of the education is to develop the talented people and provide the potential employees to the corporate world. "All children and young people of the world, with their individual strengths and weaknesses, with their hopes and expectations, have the right to education. Therefore, it is the school system of a country that must be adjusted to meet the needs of the children." - B. Lindqvist, UN, 1994. India's higher education system is one of the largest systems of this kind in the world, and is also the fastest growing sector in the country. With the increasing demand for quality higher education in the country, it has become imminent that a consistent plan is laid for the growth and enhancement of quality higher education in India. Confederation of Indian Industry (CII) has been actively engaging with the government for enabling policies to support the changing dynamics and requirements of higher education in India. With the presence of a large number of industry as well as good educational institutions in its membership, CII takes leadership in initiatives towards enhancing the quality of higher education vice versa the industry requirements.

\* Assistant Professor, Department of Business Management, Yogi Vemana University, Vemanapuram, Kadapa - 516003.

\*\* Assistant Professors, Department of MBA, Sri Venkateswara College of Engineering and Technology (Autonomous), Chittoor - 517002.



## SERVICE QUALITY MANAGEMENT

Edited by: T. Sreenivas

ISBN: 978-93-5056-804-0

Edition: 2016

Published by: Discovery Publishing House Pvt. Ltd., New Delhi (India)

# 9

### Quality of Work Life Among Bank Professionals with Reference to Andhra Bank in Tirupati (Andhra Pradesh)

—P.V. Vara Prabhakar, K. Sreenivas Mahesh  
and T. Venkata Ramana

The aim of the study is to find out whether employees of the banking sector are satisfied from the angle of QWL factors. The factors of QWL chosen for the study are from the definition given by Jerome M Rosow, President of the Work in America Institute. He specifies pay, employee benefits, job security, alternative work schedules, occupational stress, participation, and democracy in the workplace as seven factors of quality of work life. The study was conducted by collecting data from a sample size of 120, comprising 49 male and 71 female employees of Andhra Bank at Tirupati. Questionnaires were used to collect the primary data. Statistical analysis of the data revealed that six of the said factors were satisfactory to both male and female employees but it was found that they experienced occupational stress. Also there was an attempt to examine the difference in opinion regarding quality of work life on the basis of sex, experience and age of the respondents; and it was found that there was significant difference. Suggestions are made to overcome occupational stress.

#### INTRODUCTION

##### Banking Industry

Banking in India originated during the 1790s. Currently, India has 88 scheduled commercial banks, 27 public sector banks which have the Government stake holding, 31 private banks which do not have government stake and publicly listed and traded on stock exchanges, and 38 foreign banks. According to a report by ICRA Limited, the public sector banks hold over 75 percent of total assets of the banking industry, with the private and foreign banks holding 18.2% and 6.5%, respectively.

##### Andhra Bank – A Nationalised Bank: Problem Focus

Banks were evergreen attraction to the job-seekers till recently, mainly because of the pay and employee benefits provided by the banking industry. In today's scenario, software companies dealing with information technology services,

Dr. P.V. Vara Prabhakar, Assistant Professor, and K. Sreenivas Mahesh, Research Scholar, Department of Business Management, Yogi Vemana University, Vemanapuram, Kadapa – 516 003

T. Venkata Ramana, Assistant Professor, Department of MBA, Sri Venkateswara College of Engineering and Technology (Autonomous), Chittoor – 517 002.



## SERVICE QUALITY MANAGEMENT

Edited by: T. Sreenivas

ISBN: 978-93-5056-804-0

Edition: 2016

Published by: Discovery Publishing House Pvt. Ltd., New Delhi (India)

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### A Study on Quality Management in CMC Hospital, Vellore (Tamil Nadu)

—K. Sreenivas Mahesh, P.V. Vara Prabhakar,  
and T. Venkata Ramana

*Quality work generates the desired results. In health service organisations, quality in services is an essential requirement to ensure the loyalty of existing and new customers – patients. The hospitals should maintain adequate resources, qualitative laboratories and good approach in both medical and non-medical services. The present study emphasizes the contribution of CMC hospital medical practitioners towards the patients. The main objective of the study is to examine the service quality and how it will influence patient loyalty in CMC hospital of Vellore (Tamil Nadu). Service quality measures are based on some of the dimensions of the Service Quality, and in this study two dimensions, namely, reliability and responsiveness are considered. The research is based on primary data. The data has been collected from 180 respondents by using a structured questionnaire. The data has been analyzed by using one sample t test analysis. The results revealed that both the dimensions of service quality, namely, reliability and responsiveness, are positively related to patients' loyalty.*

#### INTRODUCTION

During the last few decades, the number of private centers providing health care services in Mysore has been growing, and the private sector health care services market has turned out to be a competitive environment. Quality is such an important aspect that it is considered a really major concept in our real life. It is considered as a strategic weapon. And the vital need of increasing service organizations and advancing their services necessitates the measuring of service quality. The peer competitions have made the hospitals provide superior services in order to remain and grow in the competitive environment. Hospitals provide various types of services but with varying quality. Quality can, thus, be considered an important strategy to create competitive advantage.

#### LITERATURE REVIEW

**Crosby** defined Quality as constancy with fixed stipulation; and this agrees with **Karim's** definition, who defined Quality as everything that accords with the features of the product to convene the external customer's needs. Service is

K. Sreenivas Mahesh, Research scholar, and Dr. P.V. Vara Prabhakar, Assistant Professor, Dept. of Business Management, Yogi Vemana University, Vemanapuram, Kadapa – 516 003.  
T. Venkata Ramana, Assistant Professor, Department of MBA, Sri Venkateswara College of Engineering and Technology (Autonomous), Chittoor – 517 002.



14.3

Economy

20

G V Chandra Mouli / Y. Subbarayudu

## Personality & Work Performance. Evidence Based Analysis

Doctoral Dissertation Sum-up

Doctoral Thesis / Dissertation





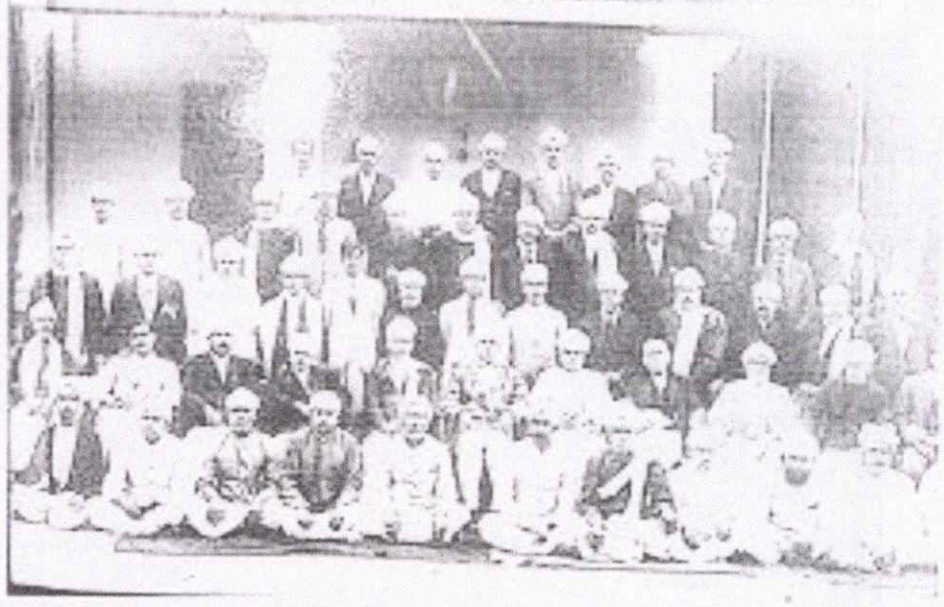
The studies relating to personality factor confirmed that personality aspect is decisive on certain issues of individual performance. But the present study results spotlighted its incidence on individual performance is not so visible due to mix of different permutations concerning employee perceptions and realities. Individual performance is a multi-dimensional factor. (...)





# COLONIAL DOMINANCE AND LOCAL RESISTANCE IN SOUTH INDIA

G. SAMBA SIVA REDDY





© Author

ISBN 978-93-5131-009-1

Price ₹ 2100/-

First Edition, 2016

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Published by:  
**RESEARCH UNDER PRESS**  
B-604, Sangam Vihar  
New Delhi-110062  
Phone: 011-26643813, 011-9818285704  
E-mail: [researchunderpress@gmail.com](mailto:researchunderpress@gmail.com)

Type Setting by  
G. E. Sharma



# Musings on South India

Festschrift to Konda Srinivasulu



*Edited By*

Yagati Chinna Rao  
D. Venkateswara Reddy  
B. Rama Chandra Reddy



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**Musings on South India: Festschrift to Konda Srinivasulu**

© Contributors

First Published in 2016

₹ 1795

**ISBN 978-93-85957-06-2**

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**Published by : MEENA BOOK PUBLICATIONS**

140, Gali No. 9 C, Prem Nagar,

Karawal Nagar, Delhi-110094

Tel.: 9868280998

E-Mail: meenabookpublications@gmail.com

**Sales Office : 21/4648, Ansari Road,**

Daryaganj, New Delhi-110002

Tel.: 011-23277141

E-Mail: meenabookpublications@gmail.com

**Laser Typesetting : Aarati Computers, Delhi-110 009**



V. Sreenivasulu  
28/6/2011

# VISUAL ART FORMS OF MEDIEVAL INDIA



*Editor*

**K. Mrutyunjaya Rao**

Coordinator & Assistant Professor  
Department of Fine Arts  
Yogi Vemana University  
Kadapa, Andhra Pradesh

*Published by*

THE REGISTRAR  
YOGI VEMANA UNIVERSITY  
KADAPA  
ANDHRA PRADESH

ISBN 978 - 93 - 5254 - 229 - 1



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## Lepakshi Paintings :The Splendors of Andhra Murals

**D.N.V.S. Seetaramaiah**

IGNCA, New Delhi

**Prof. G. Samba Siva Reddy**

Kadapa, Andhra Pradesh

**R. Giridhar Gowd**

Guntur

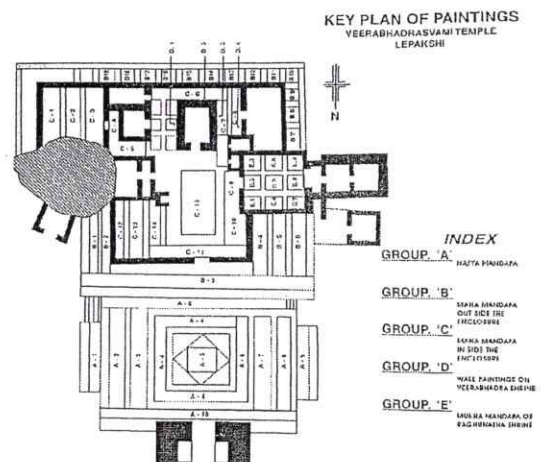
### Introduction:

The Lepakshi is village in Hindupur of Ananthapur is renowned as the repository of the best mural paintings, architecture and sculptures of the Vijayanagar Kings of 16th Century A.D. The Lepakshi consists of three shrines dedicated to Shiva, Vishnu and 'Virabhadra'. It was developed into the present exquisite shrine by 'Virupanna Nayak', the treasurer of the Achyuta Deva Raya (1529-1547) the Vijayanagar King of Tuluva dynasty. He conceived the idea as he found the image of Veerabhadra. He executed the plan in the absence of the king and used the treasure when he was away at Vijayanagar. When the construction was almost finished and it was being supervised, the king returned and found the treasure empty. The King ordered, as a punishment to this heinous crime, that he should be blinded. The treasurer being a loyal person carried out the punishment on the spot with his own hands. During the reign of Vijayanagara kings, pilgrims flooded to this temple to visit Lord Veerabhadra. It was once a great center for trade, flourished as a second capital became now insignificant spot. The essence of the paintings is celebration connected to Shiva the lord of dancers.

For the convenience of the study the temple complex can be divided as three

sections. They are 1. Natya mandapa or Mukhamandapa 2. Ardhmandapa and girbha griha 3. Kalyana mandapa, a appendix to main temple left more unfinished. The ceilings of Natyamandapa was divided into different panels by beams. Altogether there are Thirteen painted panels

The most important and interesting section of the building is Natyamandapa which is a pillared hall with dancing figures and drummers. The ceiling of entire Natyamandapa was painted in bright colours in strange appearance than the Northern Indian mural tradition of Ajanta. The ceiling of Natyamandapa is divided by the long beams over the pillars into rectangular panels running from North to South as given the below.





9.5.

**ANDHRA CHARITRA, SAHITYAM, SAMSKRUTI (VYASA SANKALANAM)**  
Edited by I.L.N. CHANDRA SEKHARA RAO, Head & Chairman, Board of Studies,  
Dept. of History, Govt. College for Men (Autonomous), Kadapa, A.P.

© Author

ISBN : 978-81-930837-2-7

PRICE : Rs. 695/-

First Edition : 2016

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**I.L.N. CHANDRA SEKHARA RAO,**  
Head, Dept. of History,  
Govt. College for Men (A)  
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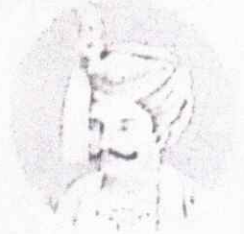
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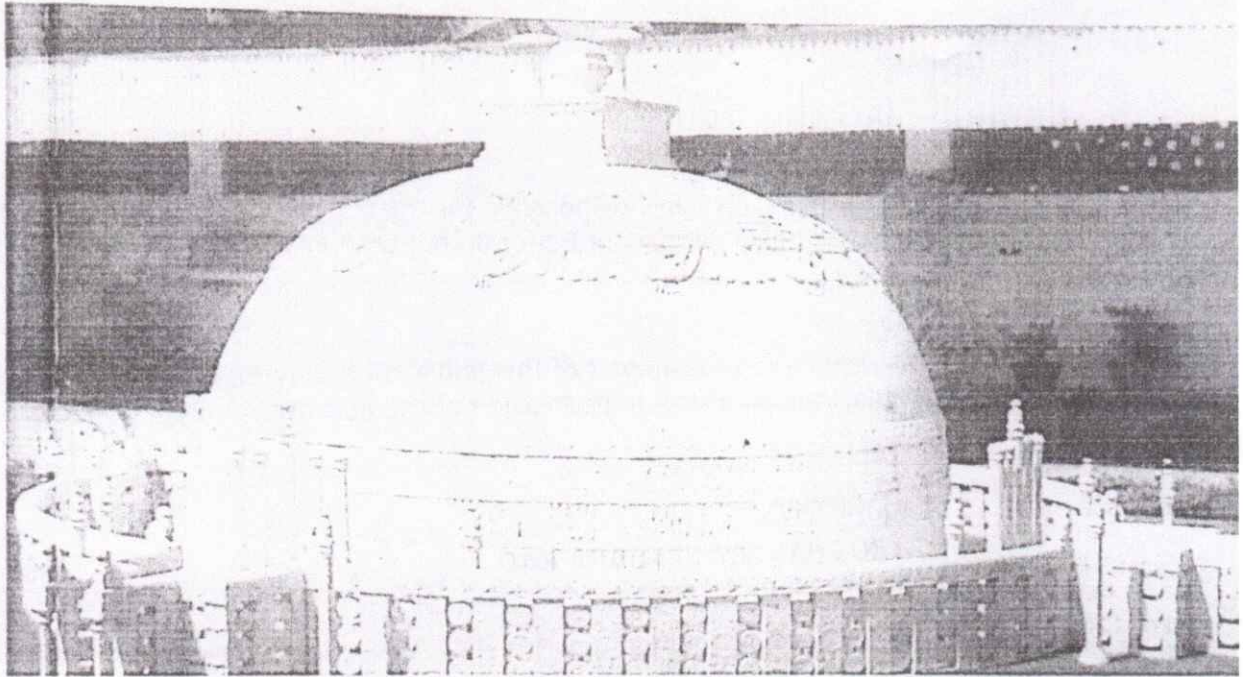
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# ఆంధ్రుల చరిత్ర, సాహిత్యం, సింస్కృతి



సంపాదకులు

ఐ.ఎల్.ఎన్. చంద్రశేఖర రావు





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# VISUAL ART FORMS OF MEDIEVAL INDIA



*Editor*

**K. Mrutyunjaya Rao**

Coordinator & Assistant Professor  
Department of Fine Arts  
Yogi Vemana University  
Kadapa, Andhra Pradesh

*Published by*

THE REGISTRAR  
YOGI VEMANA UNIVERSITY  
KADAPA  
ANDHRA PRADESH

ISBN 978 - 93 - 5254 - 229- 1



**Compendium of the articles of the National Seminar**

“Visual Art forms of Medieval India” Jointly organized by  
Department of Fine Arts, Yogi Vemana University, Kadapa-516003, Andhra Pradesh  
Lalit Kala Akademi, New Delhi, Department of Language & Culture,  
Government of Andhra Pradesh and Amaravathi Visual Art Society, Vijayawada.  
On 04<sup>th</sup>-06<sup>th</sup> March 2016.

**Copies: 150**

**Price : 950**

The publication of the proceedings are financially supported by  
Lalit Kala Akademi, New Delhi and  
Department of Language and Culture, Government of Andhra Pradesh.  
The responsibility of the fact stated, opinions expressed, or conclusions reached is the that  
of the authors of the articles. Convener of the Seminar, Department of Fine Arts,  
Yogi Vemana University, Kadapa-516003 accepts no responsibility for them.

**Editor:**

**K. Mrutyunjaya Rao,**  
Coordinator, Department of Fine Arts,  
Yogi Vemana University, Kadapa-516003  
09492345419  
**ISBN 978 -93 – 5254 – 229 – 1**

Published on behalf the Department of Fine Arts by

**The Registrar,  
Yogi Vemana University,  
Kadapa-516003**

March 2016

Cover Design : K.Mrutyunjaya Rao

Acknowledgements: *Cover Design Photograph* by Sri Madhu Jagdeesh,  
Mahalinga Puram, Pollachi -642002 Tamilnadu.  
Back cover page image from <https://en.wikipedia.org/wiki/Vontimitta>

*Printing:*

**Konduru Janardhana Raju**  
R.K. Graphics,  
Kadapa - 516 001.



## Temples of Medieval period of YSR district, Andhra Pradesh : Geological aspects influencing their preservation

Dr. K. Raghu Babu

Kadapa

### Introduction

Temples are the places designed to bring human beings and gods at one place (George Michell, 1988). The construction of a temple includes transportation of the construction material from its place of availability to the place of construction apart from the other expenditure. Hence patrons who are behind these constructions choose suitable local material for the purpose. Most of the temples built with the rocks available around the place of construction. Granites, quartzites, limestones and shales are the available rocks compatible for construction in YSR District. In YSR district most of the temples were built with quartzite and limestone, but some times shales rich in silica content are also used. Granites are made up of minerals like Feldspars, Silica and Iron, where as composition of quartzite is  $\text{SiO}_2$  and limestone is  $\text{CaCO}_3$ , while that of shale is Alumino silicates. Among these three rock types, limestone are easy for carving but not so durable while quartzite are very hard and resistant to weathering hence they are more durable and shale is very soft, brittle rock. Though most of the temples evidently built with quartzites which are known to be high weather resistant, prevalence of high subtropical temperatures of southern India, there is a possibility of breakdown of rocks due to expansion of minerals by high temperatures during day time and shrinking of minerals in night due to cooling.

### Rock Properties

The Cuddapah Supergroup of Rock succession consists of three types of rocks

with varying composition namely 1) Quartzites, 2) Limestones and 3) Shales

### Quartzites

Silica is the major constituent of quartzites with iron as cementing material. Most of the quartzites of Cuddapah Supergroup are iron rich. The grains are very tightly packed with interlocking mechanism. They have less porosity and permeability. The quartzites are high weather resistant owing to their silica composition. But high subtropical temperatures of south India may cause breakdown of these rocks.

### Limestones

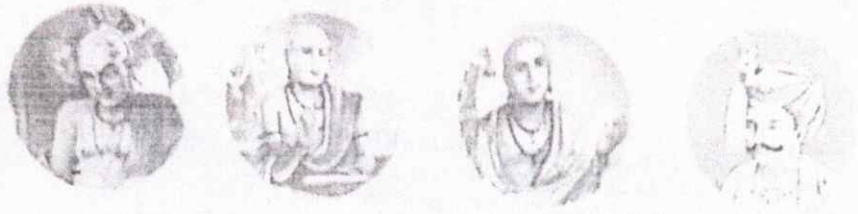
Limestones are composed of  $\text{CaCO}_3$  readily undergo chemical decomposition in acidic water. The limestones are present in alternate succession along the quartzites and shales in the Cuddapah Supergroup of rocks. They are highly porous and permeable, hence even in rain water of pH little less than 7 they undergo weathering.

### Shales

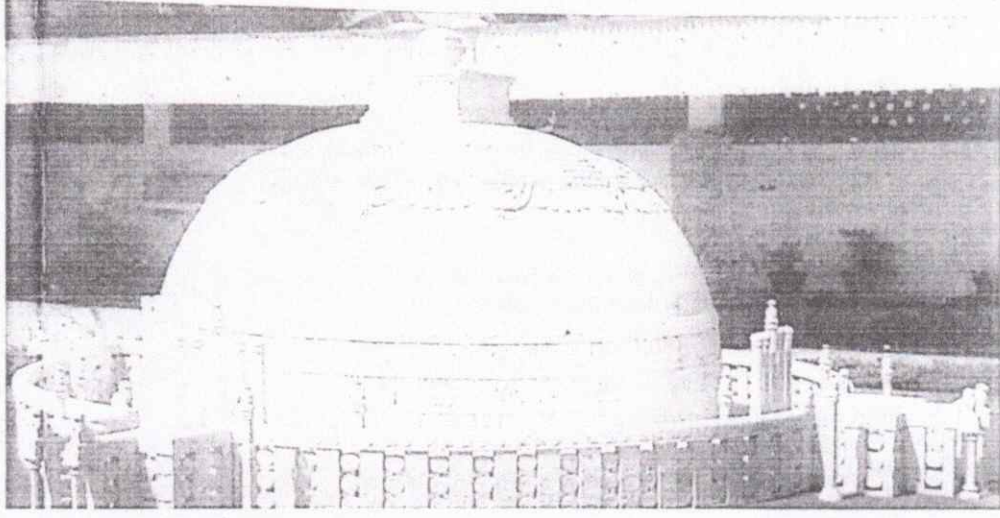
Shales of Cuddapah Supergroup are Ferruginous Alumino silicates. They are generally very soft in nature. But in the study area they are highly siliceous and hence they are hard and used as building material in some places. These shales are less porous and almost impermeable. Because of their softness when compared with the quartzites and shales they are widely used in the construction.



9.5.



# ఆంధ్రుల చరిత్ర, సాహిత్యం, సంస్కృతి



సంపాదకులు  
ఐ.ఎల్.ఎన్. చంద్రశేఖర రావు





95.

**ANDHROLA CHARITRA, SAHITYAM, SAMSKRUTI (VYASA SAIKALANAM)**  
Edited by I.L.N. CHANDRA SEKHARA RAO, Head & Chairman, Board of Studies,  
Dept. of History, Govt. College for Men (Autonomous), Kadapa, A.P.

© Author

ISBN : 978-81-930837-2-7

PRICE : Rs. 695/-

First Edition : 2016

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For Copies

**I.L.N. CHANDRA SEKHARA RAO,**  
Head, Dept. of History,  
Govt. College for Men (A)  
Kadapa - 516004, A.P.  
Cell : 9059075081

Page Setting & Printing

**Konduru Janardhana Raju**  
R.K. Graphics  
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Published by

**ARC Conferences**  
Ongole







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ISBN 978 - 93 - 5254 - 229- 1



# THE EVERLASTING ANDHRA ARCHITECTURAL GLORY

**Dr. Mula Mallikarjuna Reddy**

Kadapa, Andhra Pradesh

"A thing of beauty is joy forever"  
- John Keats

In the construction of Man's Modern Mansion Construction among the Fine Arts undoubtedly the prime role is played by Superb Architecture. The main reason is our Architectural Treasure for India's fame and greatness among the continents towards Architecture from ancient times. Even today our Chief Sculptural reputation is the most enticing factor for thousands of foreign tourists

Historically Architecture has the most vital point in toto. In the Cosmic Culture Architecture appears in multifarious shapes. Every country contains its kingly insignia, national emblem. In the same way you have crowns and thrones. Aren't they the Architectural Beauty Symbols of those Peoples! A Nation's Culture, tradition and special skills are shown by Architecture. Please look at today's one rupee coin of ours. The spotless imposing lions which have rushed out of the brain of that immortal sculptor of King Ashoka's golden period. That is the inseparable union of man with Architecture.

At present in this essay an introspection of Andhra's Architecture of middle ages is viewed from a historical point in different styles with rich imagination.

From 235 BC to 202 AD. During Syathavaahana King's regime who ruled Andhra Kingdom is seen as imaginative and imaging sculpture. During that period itself

Andhra Architects and Sculptors have established their reputation in the Indian Architectural history. In the Syathavaahana era Amaravathi Architecture was at the zenith. Later on during Ikshwaka period Buddhististic Sculpture flourished and nourished very grandly. In the Nagaarjuna Hill Caves chief impact was on the phases of Gowthama Buddha's Life history. Nagaarjuna's statues are the pride of Andhra race like those of Amaraavathi Sthoopas. Of course, the Nagaarjuna Architectural style is slightly improved and specific in trend setting. During 5th and 6th AD the Vishnu Kundinulu also followed the Architectural tradition of Ikshawakas.

During the regime of Pallava Kings a novel era was started in Andhra Architecture. Mahendra Varma was the supreme king among the Pallavas who knew the architectural inner intricacies. He had introduced the construction of Cave Temples in Mahaabalipuram. For Pallava Architecture Sathavaahana Amaraavathi Sculpture was the inspiration. In Mahaabalipuram you find that the five Pandavas' Chariots Chiselled in single rocks are the notable wonders. Adavi Baapiraaju is of the opinion that for Sathavaahana Architecture this Pallava Sculpture is the dear child/progeny and those who created them are the Andhras. A new tradition is started in the Andhra Pallava Architecture from that day. This is the Indian Hindu Sculpture. This Architecture is the intermingling of subtleties and nuances. Pallavas



# Dynamics

of

## India and China Relations

### Implications for New World Order



G. Jayachandra Reddy



UGC Centre for Southeast Asian & Pacific Studies  
Sri Venkateswara University, Tirupati



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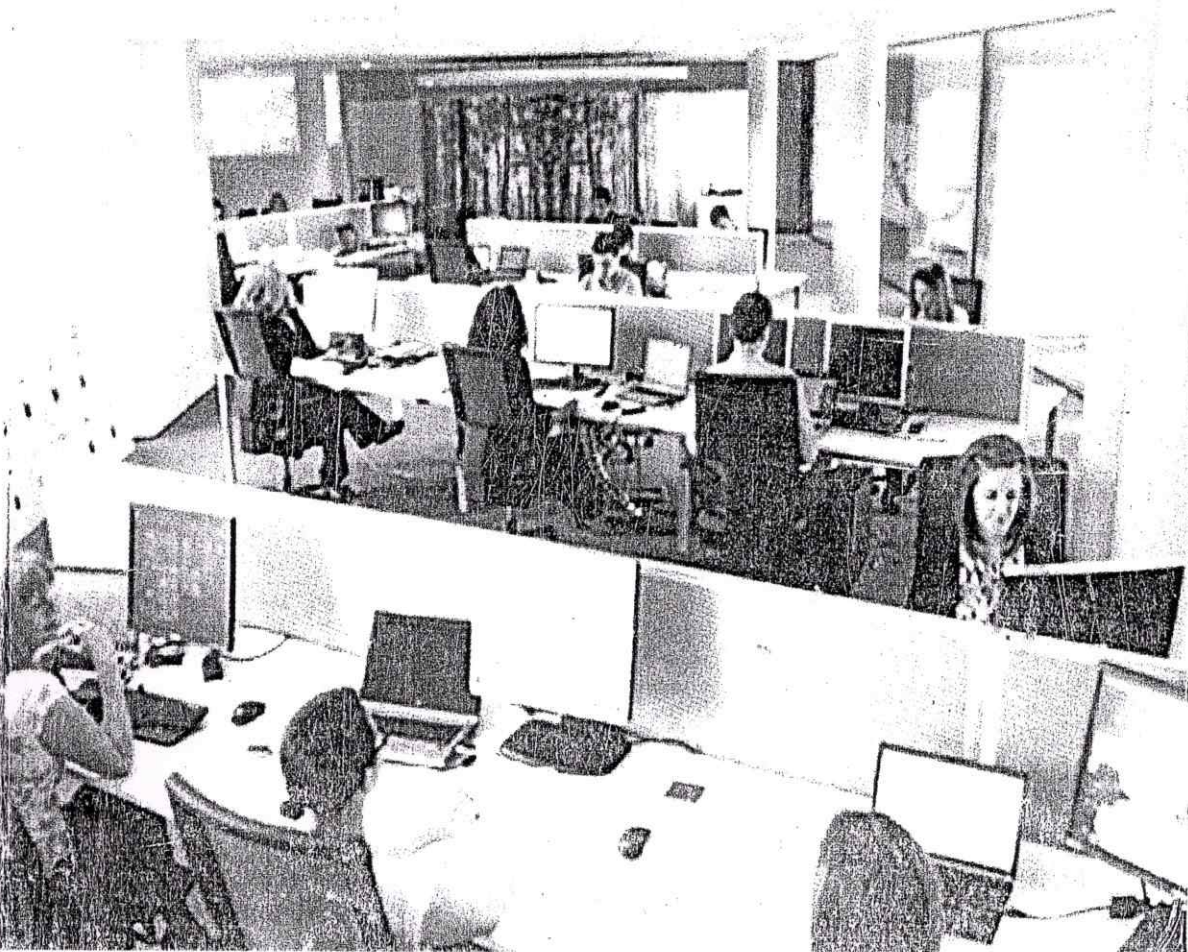
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# SERVICE QUALITY MANAGEMENT

Talluru Sreenivas





11  
2016-01

# SERVICE QUALITY MANAGEMENT

*Editor*

**Dr. Talluru Sreenivas, Ph.D.,**

*Professor*

*Deptt. of Business Management & Dean*

*Faculty of Commerce and Management*

*Yogi Vemana University*

*Kadapa - 516 003 (Andhra Pradesh)*

*(India)*

*Foreword by*

**Prof. B. Syama Sundar**

*Vice Chancellor*

*Yogi Vemana University*

*Kadapa - 516003 (Andhra Pradesh)*

*(India)*



**DISCOVERY PUBLISHING HOUSE PVT. LTD.**  
**NEW DELHI-110 002**



*Published by:*

**Namit Wasan**

**DISCOVERY PUBLISHING HOUSE PVT. LTD.**

4383/4B, Ansari Road, Darya Ganj

New Delhi-110 002 (India)

*Phone* : +91-11-23279245, 43596064-65

*Fax* : +91-11-23253475

*E-mail* : [discoverypublishinghouse@gmail.com](mailto:discoverypublishinghouse@gmail.com)

[namitwasan9@gmail.com](mailto:namitwasan9@gmail.com)

[sales@discoverypublishinggroup.com](mailto:sales@discoverypublishinggroup.com)

*web* : [www.discoverypublishinggroup.com](http://www.discoverypublishinggroup.com)

*First Edition: 2016*

**ISBN: 978-93-5056-804-0**

**Service Quality Management**

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*Printed at:*

Infinity Imaging Systems

Delhi



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## SERVICE QUALITY MANAGEMENT

Edited by: T. Sreenivas

ISBN: 978-93-5056-804-0

Edition: 2016

Published by: Discovery Publishing House Pvt. Ltd., New Delhi (India)

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### Private Health Care Services in India A Healing Touch

— A. Hari Hara Nath Reddy and S. Raghunatha Reddy

*India's healthcare sector is poised to grow at a compound annual growth rate (CAGR) of 19 per cent to touch \$280 billion by 2020, where the private sector will be the major provider of healthcare services, causing India to be recognized as a destination for world class healthcare, according to "Sustainable Strategies for a Healthy India 2013, a report by Deloitte, Touché Tohmatsu limited and All India Management Association". The private sector is expected to ensure that India's healthcare sector grows from \$78.6 billion in 2012 to \$158.2 billion by 2017. Manipal Hospital is the third largest healthcare chain in the country after Fortis and Apollo. The new vision of 3 major healthcare chains is to enter the emerging health care segments and become leading health care companies in India. The article refers to a few recent trends in the country, namely, a strategic approach to quality healthcare, profitable ventures in home based medical care set up by entrepreneurs, growing investment in healthcare, surge in medical tourism, and integrated, seamless, and healthcare services model. It is hoped, these will provide accessible, affordable and acceptable services in urban and rural areas of the country in the near future.*

#### INTRODUCTION

India's healthcare sector is poised to grow at a compound annual growth rate (CAGR) of 19 per cent to touch \$280 billion by 2020, where the private sector will be the major provider of healthcare services, causing India to be recognized as a destination for world class healthcare, according to "Sustainable Strategies for a Healthy India 2013, a report by Deloitte, Touché Tohmatsu limited and All India Management Association". The private sector is expected to ensure that India's healthcare sector grows from \$78.6 billion in 2012 to \$158.2 billion by 2017. Rising disposable income, more facilities for high quality health care and personal need to look after one's own health and hygiene propelled India's per capita healthcare expenditure to grow at a CAGR of 10.3% from \$43.1 in 2008 to \$57.9 in 2012, and is expected to touch \$88.7 by 2015. Manipal hospital is the third largest healthcare chain in the country after Fortis and Apollo. The new

Dr. A. Hari Hara Nath Reddy, Assistant Professor, Department of MBA, KLM College of Engineering for Women, Kadapa – 516003.

Dr. S. Raghunatha Reddy, Professor and Head, Department of Commerce, Yogi Vemana University, Vemanapuram, Kadapa – 516003.



One of 3 major healthcare chains is to enter the emerging health care segments and become leading health care companies in India.

### Quality Healthcare – A Strategic Approach

The main aim of the 3 major hospitals is to provide world quality healthcare to people of India anywhere. The principal strategy is to make the hospitals one-stop shop for any medical problem. Factors like huge cost advantage for foreign patients, more Indians accepting healthcare insurance policies and the management of Manipal chain of hospitals contemplate with the idea of converting it into a global health brand. Better education, awareness, proactive chronic disease management, treatment support, and diagnostics support and disease surveillance – they all have contributed to this progress. The strategy is to ensure that healthcare is affordable with retaining quality. In this direction Manipal group has started providing multi-speciality facilities in all new hospitals. Super speciality services in cardiology, cardio-thoracic surgery, neurology, neurosurgery, nephrology, urology, high-end orthopedics, gastroenterology and plastic surgery will be introduced in these hospitals as part of the top of the pyramid approach under upgrading the existing hospitals into multi-speciality units.

Manipal health hospital services are successfully adopting the marketing principle of taking brand into new territories alongside with suitable product expansion.

In contrast 'chaupal' which has launched health centres and a mobile hospital in Sonapat, Haryana works on a dual model. Mobile hospitals are non-profit, and are in the non-profit space whereas they have other health centres for profit as a motive. In the broad scenario of health care services in India, it is found that both 'top of the pyramid' and 'bottom of the pyramid' approaches are in operation to ensure effectiveness in delivery mechanisms. Organisations such as 'Aravind Eye Care System' and 'Narayana Hrudayalaya' have amply proved that it is possible to achieve significant reductions in cost and yet maintain the safety and quality standards of the best hospitals in the world. Their approach is 'middle of the pyramid' as well as 'bottom of the pyramid'.

### Does Cost Really Matter?

The biggest advantage India has over other countries is its large pool of well-trained medical professionals leading to a substantial cost advantage, when compared to other Asian and Western countries. The cost of the surgery in India is one-tenth of that in the US or Western Europe with the same equipment, technology and post-operative treatment. Low-cost solutions are fine, but lower cost must come from genuine and sustainable innovation without compromising on quality. The approach of Manipal hospital is multi-pronged. As the need arose, super-speciality services will foray into tier II and tier III cities.

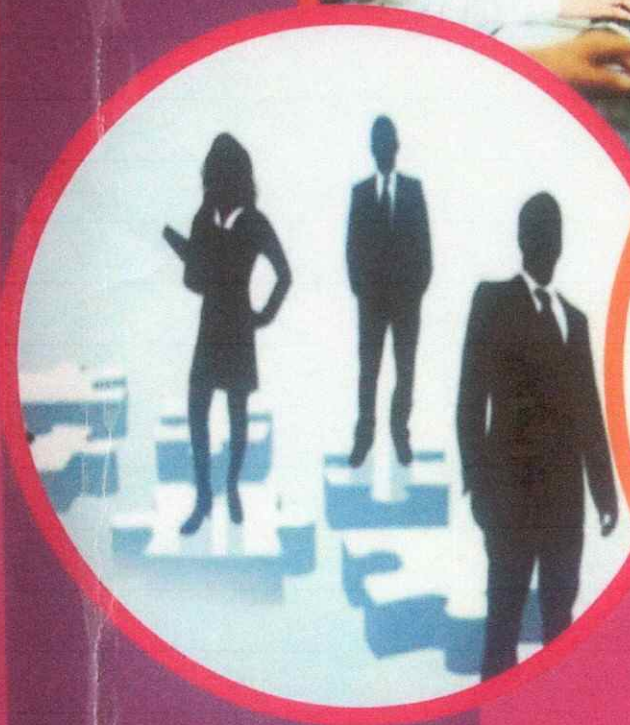
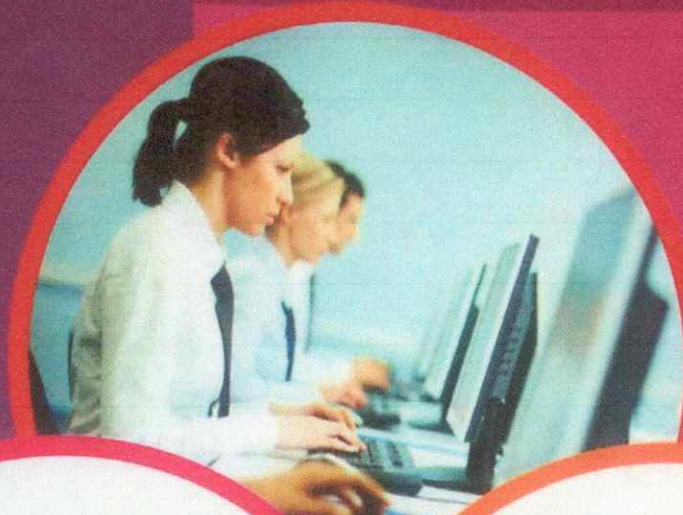
### Living Trends in Medical Care

A growing number of entrepreneurs seek to build profitable ventures in home-based medical care. Some of the 'home care companies' are 'Portea Health Care' (PHC), 'India Home Health Care' (IHHC) and 'Health Care at Home'



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# SERVICE QUALITY AND CUSTOMER RELATIONSHIP MANAGEMENT IN 21<sup>st</sup> CENTURY: EMERGING ISSUES AND CHALLENGES



Editor  
Prof.M.Venkateswarlu



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### Service Quality and Customer Relationship Management in 21<sup>st</sup> Century: Emerging Issues and Challenges

**Dr.M.Venkateswarlu**  
Professor,  
Department of Commerce,  
Sri Venkateswara University,  
Tirupati-517 502, A.P, India.

ISBN 978-93-80509-84-0

(C) Editor  
Copies: 300  
Price: Rs.500-00

First Edition: August, 2016.

For Copies:  
**Srikar Midasala**  
2-89, Santhapeta, Ongole-523001.  
Ph: 08592-242272

Quarter No. 57, Red Buildings,  
SG Puram, Tirupati, Chittoor District.  
Phone: 0877-2248501  
Mobile: 9491152135

Printed at:  
Sri Hamsa Prabha Graphics,  
G9, Aditya Towers, Balaji Colony, Tirupati.



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## A STUDY ON SERVICE QUALITY IN ANDHRA PRAGATHI GRAMEENA BANK, IN KADAPA DISTRICT

V.Reddy Lakshmi, Research scholar Department of commerce  
Sri Venkataeswara University, Tirupati  
Dr. P. Mohan Reddy, Professor & head, Department of commerce  
Sri Venkataeswara University, Tirupati  
**Dr. G. Vijaya Bharathi**, Assistant professor  
Department of commerce, **Yogi vemana university**, Kadapa

### Abstract

Among the various infrastructural facilities for economic development and eradication of poverty, providing adequate banking facilities are very important. Accessibility of credit facilities is an essential condition for the socio-economic development of the poor whether living in urban or rural areas. In this context, RRBs have emerged as right institutions to extend credit facilities to the weaker sections of the population. The success of any institution depends on its customer satisfaction. To obtain the customer satisfaction maintaining the service quality is very important. Thus, the present study aims at assessing the service quality, which is delivered by Andhra Pragathi Grameena Bank in Kadapa district of Andhra Pradesh, using SERVQUAL model.

**Key Words:** Service quality, Rural banks, SERVQUAL

### Introduction

Banking is the key sector of any economy. Its energy and vitality indicates the health & prosperity of any nation. Despite of the urbanization 75% of the world's poor live in rural areas. Rural development aims at all-round development of rural economy with more emphasis on socio-economic amelioration of rural people. The RRBs are intended to develop the rural economy by providing rural credit and other facilities particularly to the small and marginal farmers, agricultural laborers, artisans and small entrepreneurs so as to develop agriculture, trade, commerce, industry and other productive activities in the rural areas. APGB is one among the RRBs in providing the rural credit and other facilities to develop the rural areas in the Kadapa district.

### Service Quality

Service quality is a critical component of customer perceptions about the service. Customers perceive services in terms of its quality and how satisfied they are overall with their experiences. According to Parasuraman, Zeithaml & Berry (1988) service quality means the customers overall judgment of the excellence of the service or the difference between one's expectation and the actual service performed.

### SERVQUAL Model

The SERVQUAL instrument developed by Parasuraman, Zeithaml & Berry originally considered of 97 items and 10 dimensions, it was then items and 10 dimensions, it was then refined and reduced to 22 items that measure five dimensions. The



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## ECONOMIC AND SOCIAL EMPOWERMENT

Edited by: Dr. Talluru Sreenivas

ISBN: 978-93-5056-806-4

Edition: 2016

Published by: Discovery Publishing House Pvt. Ltd., New Delhi (India)

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## Pilgrimage Tourism in Tirupati, Andhra Pradesh

G. Vijaya Bharathi\*, S. Masthani\*\* &amp; P. Harinatha Reddy\*\*\*

*The pilgrimage is a journey undertaken for the betterment of the spiritual knowledge and peace. The flow of people to places of religious importance in India has increased in the last couples of decades tremendously with the availability of modern means of travel, like: the road transport, railways and air travel, increase in accommodation facilities, growth of Information and Communication Technology that provides vast information about the places, and the like. Tourism in Andhra Pradesh is mostly considered a pilgrimage and heritage tourist destination. The present study consisted of a sample size of 50 pilgrim tourists to Tirumala, carried out to capture their perception, preferences and satisfaction with various services and facilities available in Tirupati and Tirumala, and to measure the level of satisfaction with respect to transportation facilities in the temple town, Darshan/seva availability, and accommodation. The results indicate the respondents' satisfaction regarding accommodation, transportation, hygiene and quality of food available at the temple town. The study also reveals the socio-demographic profile of the sample pilgrim respondents.*

## INTRODUCTION

Since the ages, travel and tourism has been a source of satisfaction, pleasure and knowledge for the seekers. Most of the earlier travelers were pilgrims, merchants, students and adventurers that sought thrilling in new experiences of the destinations, and understand the nature of different places. With the reformed and technological ideas, travel and tourism have developed into an established and prominent industry in several parts of the world. Andhra Pradesh with its diverse opportunities of history, cultural heritage, business and leisure pilgrimage, and wild life and adventure tourism

\* Assistant Professor, Department of Commerce, Yogi Vemana University, Vemanapuram, Kadapa - 516003.

\*\* Project Fellow, Department of Commerce, Yogi Vemana University, Vemanapuram, Kadapa - 516003.

\*\*\* Academic Consultant, Department of Commerce, Yogi Vemana University, Vemanapuram, Kadapa - 516003.



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### ECONOMIC AND SOCIAL EMPOWERMENT

ic and Social Empowerment deals with empowering people in various services offered in different sections are: (a) Education, (b) Women Empowerment, and (c) Tourism. The publication presents 42 articles, along with highlights of the volume presented in section I - 22 articles deal with primary, secondary and including management education, and education sector - an overview; 10 articles present through a number of programmes; and 10 articles discuss insurance, tourism sectors. One important theme covered in depth in a number of papers is quality management (TQM) techniques in each sector. TQM is an integrated in delighting customers by meeting their expectations on a continuous basis in the. In education, role of HRD, HRM and training in different levels of educational discussed. The aspects covered in Women Empowerment include entrepreneurship crises, women workers, human resource management, literacy, education, training and self help group (SHG) approach. There are 14 case studies analyzing field level implementation of programmes. The publication is a collection of rich research - based deal with the environment in Andhra Pradesh and a few neighbouring States. The ul for faculty and researchers engaged in or interested in pursuing socio-economic use value to researchers in management, in particular.

#### THE EDITOR

(born 1967) is Professor in the Department of Business he is Dean, Faculty of Commerce and Management and also ies (PG) in Management in Yogi Vemana University, Kadapa r, he served the RVR & JC College of Engineering, Guntur Department of Management Sciences in various capacities. In ademic career, he has many accomplishments in teaching, emic pursuits. He was awarded Ph.D. by Acharya Nagarjuna e Faculty of Management for his work on Management of on of his post-graduation, he secured M.Phil. from Central , Pondicherry. He has to his credit many post-graduate degrees and diplomas in Com., MBA and MHRM. He has participated in a series of Faculty Development c Management, organised by the Strategic Management Forum of India over a d conducted by the leading Indian Institutes of Management (IIMs), and All India



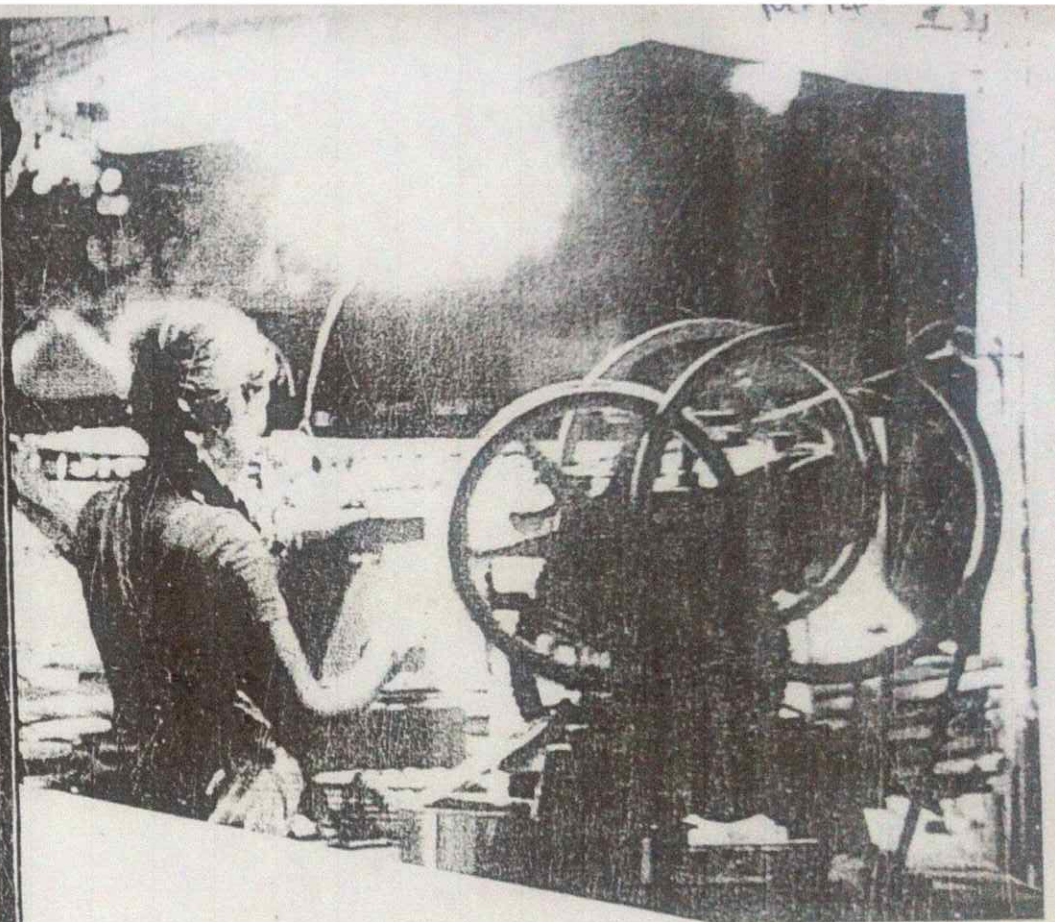
Group Study Exchange Programme sponsored by Rotary International during hich gave him an opportunity to visit a few leading Business Schools in USA, and working. Harvard Business School, Massachusetts Institute of Technology (MIT), and Salem School of Management were covered in this visit. He has to his credit a s and articles on different aspects of management. At present his areas of interest nisational behaviour, hospital management, strategic management, and change



**PUBLISHING HOUSE PVT. LTD.**  
 ad: Darya Ganj, New Delhi-110 002 (India)  
 3/43596064/43596065; Fax.: +91-11-23253475  
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**ECONOMIC AND SOCIAL EMPOWERMENT**  
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# ECONOMIC AND SOCIAL EMPOWERMENT

Talluru Sreenivas

Scanned with CamScanner



# ECONOMIC AND SOCIAL EMPOWERMENT

Published by:

Namit Wasan

DISCOVERY PUBLISHING HOUSE PVT. LTD.

4383/4B, Ansari Road, Darya Ganj

New Delhi-110 002 (India)

Phone : +91-11-23279245, 43596064-65

Fax : +91-11-23253475

E-mail: [discoverypublishinghouse@gmail.com](mailto:discoverypublishinghouse@gmail.com)

[namitwasan9@gmail.com](mailto:namitwasan9@gmail.com)

[sales@discoverypublishinggroup.com](mailto:sales@discoverypublishinggroup.com)

website: [www.discoverypublishinggroup.com](http://www.discoverypublishinggroup.com)

First Edition: 2016

ISBN: 978-93-5056-806-4

Economic and Social Empowerment

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Printed at:

Infinity Imaging Systems

Delhi

Editor  
Dr. Talluru Sreenivas, Ph.D.  
Professor  
Department of Business Management & Dean  
Faculty of Commerce & Management  
Yogi Vemana University  
Kadapa - 516 003  
(Andhra Pradesh)  
(INDIA)

Foreword by  
Prof. V. Venkaiah  
Former Vice Chancellor  
Krishna University  
Andhra Pradesh - 521 001  
Andhra Pradesh  
(INDIA)



DISCOVERY PUBLISHING HOUSE PVT. LTD.  
NEW DELHI-110 002



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Edited by: Dr. Talluru Sreenivas

ISBN: 978-93-5056-806-4

Edition: 2016

Published by: Discovery Publishing House Pvt. Ltd., New Delhi (India)

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Role Played by Educational Institutions  
in Training the Human Resources

G. Vijaya Bharathi\*, S. Masthani\*\* &amp; P. Harinatha Reddy\*\*\*

*Educational institutions play a very important role in the life of every person, as it is the place where we learn so many things about life and follow them up throughout the life. It is the primary duty of the educational institutions to train up the students not only in their academics but also they have to develop the students in such a way to meet the global competitiveness. The present paper aims to give a brief idea about the role played by educational institutions in training Human Resources. India is a country which is known for its highest Human Resource. Proper utilization of Human Resource leads to economic development of the nation. In the path of training the Human Resource, the role played by the educational institutions is predominant. In this present context of the world, it is necessary to have a proper human resource which leads to the overall development of the nation.*

## INTRODUCTION

Education can be used as a tool to empower the individual. Through child centered learning, students are able to see their own role in transformation. Societal change comes from the collective transformation of the individuals within that society. It has become secular today. It is an independent institution now. Education has been chiefly instrumental in preparing the way for the development of science and technology. Education has brought about phenomenal changes in every aspect of a person's life.

Francis J. Brown remarks that Education is a process which brings about changes in the behaviour of society. It is a process which enables every individual to effectively participate in the activities of society and to make positive contribution to the progress of society.

\* Assistant Professor, Department of Commerce, Yogi Vemana University, Vemanapuram, Kadapa - 516003.

\*\* Project Fellow, Department of Commerce, Yogi Vemana University, Vemanapuram, Kadapa - 516003.

\*\*\* Academic Consultant, Department of Commerce, Yogi Vemana University, Vemanapuram, Kadapa - 516003.

## Education in the Present Period

Education today is oriented to promoting values of an urban, competitive consumer society. Through the existing education system, India has produced in the last five decades, a number of scientists, professionals and technocrats who have excelled in their fields and made a mark at national and international levels. These include top scientists, doctors, engineers, researchers, professors, etc., not those who were educated abroad but had got their entire education in India. It is not a question of the extent to which education provides or fails to provide employment to people but it is a question of education providing modern technology for the benefit of the poor and deprived people. It is a question of the quality of education. Instead of merely viewing the growing population as a liability, we should change the population into an asset and strengthen it along with trying to control its growth.

This can be done only by education and human development.

The three main deficiencies in the present education system may be described as follows:

1. The present education does not generate or fortify the type of knowledge that is relevant to our changed society.
2. Technology associated with a particular body of knowledge is inappropriate to our stage of development in terms of its employment potential or investment demands.
3. Education has failed to provide value framework which may prepare committed politicians, bureaucrats, technocrats, and professionals on whom our nation can depend for sophisticated system of support services to be useful in taking the country to the highest level.

Though education does not guarantee high status and higher positions to all people, yet without education, an individual is unlikely to achieve social mobility. Gore avers that education plays a role in equalizing opportunities in three ways.

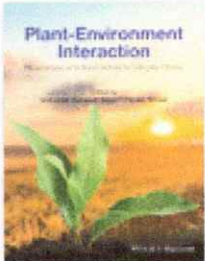
- (i) By making it possible for all those who have the desire to be educated and the ability to benefit by that facility.
- (ii) By developing a content of education which will promote the development of a scientific and objective outlook.
- (iii) By creating a social environment of mutual tolerance based on religion, language, caste, class, etc., for providing equal opportunities of social mobility to all individuals in society, and for providing equal opportunity to secure good education is crucial.

How is education related to equality of opportunity can be perceived on the basis of the findings of one empirical study conducted in eight states in 1967 on the social background of students (age, sex, caste, father's occupation, father's education, etc.,) studying at various levels in high school, college and professional colleges.

## Introduction of Human Resource

Human Resource Management (HRM) is a relatively new approach to managing people in any organization. People are considered the key resource in this approach. It is concerned with the people dimension in management of an organization. Since an organization is a body of people, their acquisition, development of skills, motivation for higher levels of attainments, as well as ensuring maintenance of their level of commitment are all significant activities. These activities fall in the domain of HRM. Human Resource Management is a process, which consists of four main activities, namely, acquisition, development, motivation, as well as maintenance of human resources.





## Plant-Environment Interaction: Responses and Approaches to Mitigate Stress

Editor(s): Mohamed Mahgoub Azooz, Parvaiz Ahmad

First published: 13 November 2015

Print ISBN: 9781119080992 | Online ISBN: 9781119081005 | DOI: 10.1002/9781119081005

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### About this book

The increase in global population, urbanization and industrialization is resulting in the conversion of cultivated land into wasteland. Providing food from these limited resources to an ever-increasing population is one of the biggest challenges that present agriculturalists and plant scientists are facing. Environmental stresses make this situation even graver. Plants on which mankind is directly or indirectly dependent exhibit various mechanisms for their survival. Adaptability of the [... Show all](#) ▾

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## CHAPTER 7



## CHAPTER 3

# Proteomic analysis of food crops under abiotic stresses in the context of climate change

P. S. Sha Valli Khan<sup>1</sup>, P. Osman Basha<sup>2</sup>, G. Vijaya Lakshmi<sup>1</sup>, M. Muniraja<sup>1</sup>, K. Sergeant<sup>3</sup> and J. F. Hausman<sup>1</sup>

<sup>1</sup>Department of Botany, Yogi Vemana University, Vemanapuram, Kadapa, India

<sup>2</sup>Department of Genetics and Genomics, Yogi Vemana University, Vemanapuram, Kadapa, India

<sup>3</sup>Environment Research and Innovation Department (ERIN), Luxembourg Institute of Science and Technology, Luxembourg

### 3.1 Introduction

#### 3.1.1 Climate change

The change in the statistical distribution of weather patterns over a longer period is termed 'climate change'. Factors called climate forcings or forcing mechanisms, which can be either internal or external, cause climate change. Internal forcing mechanisms include regular changes in the global climate system such as atmosphere, hydrosphere, cryosphere, lithosphere, biosphere and their interactions. External forcing mechanisms include alterations in the Earth's orbit, plate tectonics, changes in solar yield, volcanic emissions and anthropogenic factors (IPCC, 2007). Anthropogenic activities such as fossil fuel combustion, land use pattern and agriculture trigger an increase in production and liberation of greenhouse gases (GHGs) and cause changes in mean climate. Climate change is unavoidably causing alterations in frequency, variability, spatial extent and severity, scheduling and period of extreme weather and climate events (IPCC, 2012). Climatic change will have largely irreversible and significant consequences for natural and human systems in different ways. The International Panel on Climate Change (IPCC) report published in 2013 states that 'anthropogenic effect has been noticed to bring changes in the global weather cycle, increase in temperature of atmosphere and oceans, melting of the snow and ice in polar regions, and rise in levels of sea and variations in other climate extremes'. Recently Thornton *et al.* (2014) reviewed the

probable effects of changes in climate variability on biological and food systems.

#### 3.1.2 Impacts of climate change on agriculture

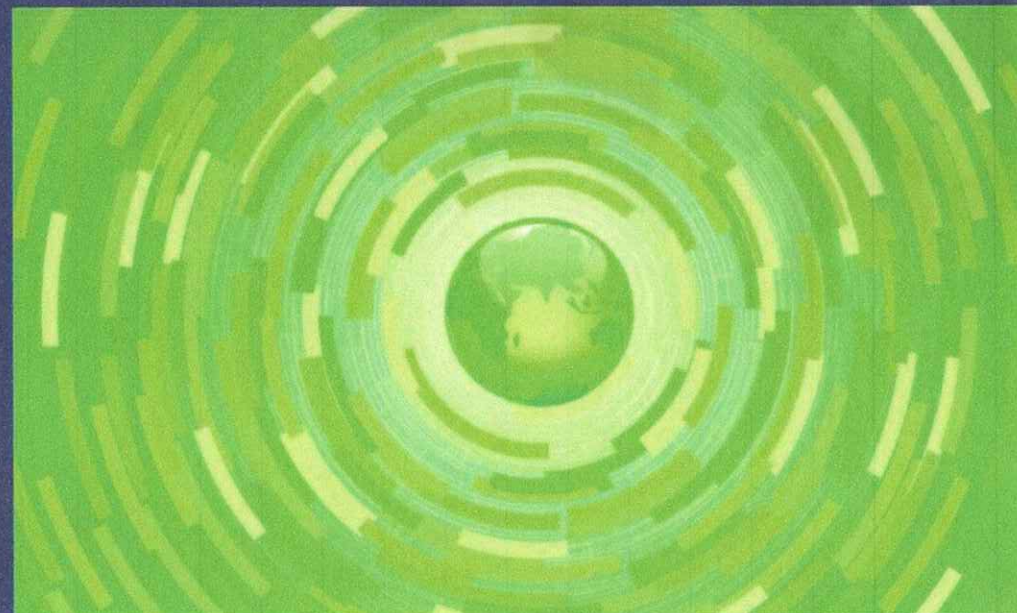
Globally, climate change may have substantial impact on sectors like water, agriculture and food security. Rise in average temperature, increasing concentrations of atmospheric CO<sub>2</sub>, tropospheric O<sub>3</sub>, frequencies of droughts and flooding events (related water sector) and decline in soil quality adversely affect the agriculture sector and are predicted to lead to food insecurity in the future (Ainsworth *et al.*, 2008; Wheeler & von Braun, 2013). For example, loss of 30% of maize crop in southern Africa has been predicted by the year 2030 by Lobell and others (2008). Estimated losses of many regional staple crops, such as rice, millet and maize, could top 10% in South and East Asia as a result of climate change. In contrast, the productivity of cereals and cool season seed crops is estimated to increase, especially in mid and high latitudes. In Europe, the cultivation of crops like maize, sunflower and soybeans could also become feasible further north and at higher altitudes (Olesen *et al.*, 2007).

The demand for agriculture-based products is projected to escalate by 70–110% by the year 2050 due to a predicted increase of world population to 9 billion people (Dwivedi *et al.*, 2013). A shift is also observed from a vegetarian food habit to a meat-based diet and a swelling demand for the production of biofuels and bio-based



The present interdisciplinary study revealed that latex yielding species *E. antiquorum* has tremendous potential as a second generation feedstock for liquid biofuel production due to its abundant availability, capacity to grow on marginal lands with high water use efficiency and good percentage of extractable biocrude (21.8%). In general limiting factor for the use of latex yielding plants in biofuel production is the lack of systematic studies, low-cost production and processing technologies that efficiently convert biomass into liquid biofuels. The present study highlighted the use of dried phylloclade biomass, for extraction of biocrude in single step, A5/A10 blending of biocrude with neat diesel, its engine performance and reduced emissions as compared to neat diesel. This study has also revealed the antibacterial properties of flavonoids extracted from pure latex. The enzymes hydrolysate resulted in the release of simple sugars from spent residue for subsequent fermentation by *Saccharomyces cerevisiae* NCIM 3215. Enzyme hydrolysate yielded 22 g/l ethanol. This study was demonstrated an integrated approach for producing liquid biofuels, i.e. biocrude, Biodiesel and Ethanol .

Latex Biofuels



Dr. Pradeep Kumar Sake is a Microbiologist from India, who did research in the area of Biofuels. He also demonstrated his ability in the fields of Nano Biotechnology, Bioinformatics, Drug designing and Clinical trials. Till now (April-2016) he published 17 articles in different national and international journals.



978-3-659-88228-9

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## Latex Biofuel

Liquid biofuels production from *Euphorbia antiquorum*

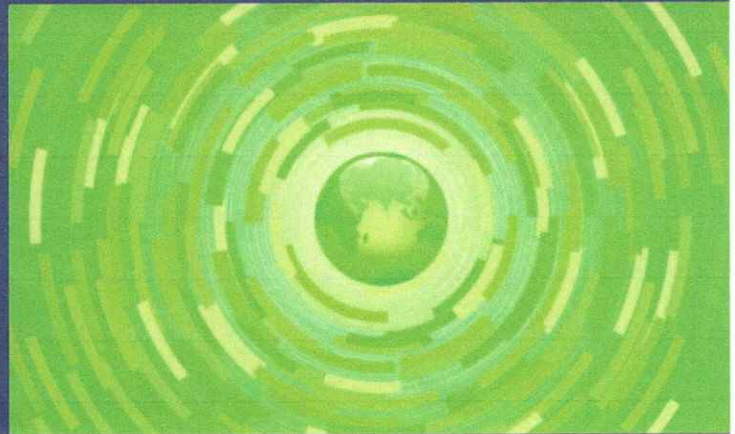
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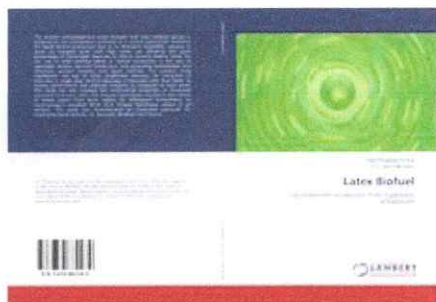


978-3-659-88228-9

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**ISBN-13:**

978-3-659-88228-9

**ISBN-10:**

3659882283

**EAN:**

9783659882289

**Book language:**

English

**Blurb/Shorttext:**

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**Publishing house:**[LAP LAMBERT Academic Publishing](#)**Website:**<https://www.lap-publishing.com/>**By (author) :**[Sake Pradeep Kumar, P.S. Sha Valli Khan](#)**Number of pages:**

316

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Chandra Obul Reddy Pulli  
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**Cloning of drought responsive genes from legume crops**



## Cloning of drought responsive genes from legume crops

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Legumes or pulse crops are most important dietary supplements in Asian countries. Legumes not only rich of proteins, but also contains vitamins and minerals, popularly known as "Poor man's meat". Pulse crops such as horsegram (*Macrotyloma uniflorum* (Lam.) Verdc.) and groundnut (*Arachis hypogaea* L.) were grown as rain-fed crops in the arid and semi-arid regions, which are highly prone to extremes of temperature, frequent drought spells, relative humidity and high wind velocity. Studies so far indicated that horsegram is relatively better tolerant to drought and soil salinity conditions compared to groundnut and other semi-arid pulse crops. Now there are compiling evidences, that stress responsive genes expressed in tolerant species are novel or may have different regulatory genes participating in the signal cross talk, for efficient expression. To gain a better understanding of changes in gene expression associated with drought tolerance in two semi-arid pulse crops, such as horsegram and groundnut, a comparative genomic approach on the analysis of expressed sequence tags (ESTs), cloning and characterization of stress responsive genes is undertaken in the present investigation.

### Book Details:

ISBN-13:	978-3-659-86712-5
ISBN-10:	3659867128
EAN:	9783659867125
Book language:	English

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Number of pages: 220  
Published on: 2016-03-29  
Category: Botany

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Rice is one of the most important staple food crop providing 35-60% of the calories to 2.7 billion people across the world. Drought stress is a serious limiting factor for rice production and yield stability across rainfed rice cultivation areas. Development of cultivars with high grain yield across heterogeneous environments has been the major objective of rice breeders. Combined effects of variable environmental factors with genotypic variation for drought resistant traits, genotype-by-environment (G X E) interaction for yield are generally large. Advances in molecular marker technology, in combination with precision phenotyping and functional genomics, will help in identification of genetic segments associated with drought tolerance in rice. Saturated genetic linkage maps in combination with precise phenotyping experiments and statistics would allow detection and characterization of genes(s) at QTL. This book present, generation of EST-PCR based markers and addition of SSR markers, that were effectively used for diversity analysis and map saturation and QTL identification of a DHL mapping population of rice under field drought stress.

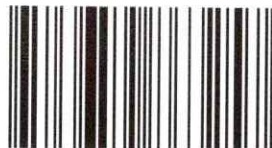
Molecular Markers and QTL's



Chandra Sekhar Akila  
Ramachandra Reddy Arjula

Dr. A Chandra Sekhar, done M.Sc., Ph.D., at HCU, Hyderabad, INDIA. Later moved to Prof. Roberto Tuberosa, at Univ. of Bologna as Senior Visiting Fellow. Currently working as Asst. Prof. in Dept. of Biotechnology, Yogi Vemana University. Currently focusing on Functional Genomics of Drought in small millets. Experienced: Teaching 9Y; Research 15 Y.

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978-3-659-86325-7

Akila, Arjula

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### **Impressum / Imprint**

Bibliografische Information der Deutschen Nationalbibliothek: Die Deutsche Nationalbibliothek verzeichnet diese Publikation in der Deutschen Nationalbibliografie; detaillierte bibliografische Daten sind im Internet über <http://dnb.d-nb.de> abrufbar.

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Bahnhofstraße 28, 66111 Saarbrücken, Deutschland / Germany

Email: [info@lap-publishing.com](mailto:info@lap-publishing.com)

Herstellung: siehe letzte Seite /

Printed at: see last page

**ISBN: 978-3-659-86325-7**

Zugl. / Approved by: Hyderabad, University of Hyderabad, 2005

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Rice is one of the most important staple food crop providing 35-60% of the calories to 2.7 billion people across the world. Drought stress is a serious limiting factor for rice production and yield stability across rainfed rice cultivation areas. Here we have carried out comparative genetic mapping in rice and sorghum using rice ESTs, generated from drought stressed rice seedlings of Nagina 22. ESTs are very much useful for the development of functional based markers. These EST-RFLPs were used to screen the polymorphism in selected cereals include 17 genotypes that have been used in making mapping population mainly DHLs and RILs used for drought tolerance breeding programmes across world. Of the targeted 67 putative candidate genes (EST-RFLP) of stress response and other genomic clones, 31 were mapped on to rice and 25 onto sorghum maps. Chromosomal synteny for the regions carrying these markers in rice and sorghum genomes was determined. Consensus markers that can potentially be used for identification of stress response-associated QTLs in rice and sorghum were identified.

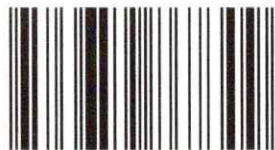
Rice Sorghum Comparative Mapping



Lekkala Sivarama Prasad  
Chandra Sekhar Akila  
Ramachandra Reddy Arjula

Dr. Sivarama P Lekkala, completed M.Sc., Ph.D., from School of Life Sciences at University of Hyderabad. Also he has done his Postdoctoral fellow in the Institute of Plant sciences, Volcani, Israel. Later he worked with seed companies, Naturole Bioenergy Ltd., Vibha seeds as Lead scientist and DGM. Present he is Lead Scientist at Scigenom Labs Ltd.,

## Comparative Mapping of Rice and Sorghum : A EST-RFLP Based Approach



978-3-659-86730-9

Sivarama Prasad, Akila, Arjula

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### **Impressum / Imprint**

Bibliografische Information der Deutschen Nationalbibliothek: Die Deutsche Nationalbibliothek verzeichnet diese Publikation in der Deutschen Nationalbibliografie; detaillierte bibliografische Daten sind im Internet über <http://dnb.d-nb.de> abrufbar.

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Bahnhofstraße 28, 66111 Saarbrücken, Deutschland / Germany

Email: [info@lap-publishing.com](mailto:info@lap-publishing.com)

Herstellung: siehe letzte Seite /

Printed at: see last page

**ISBN: 978-3-659-86730-9**

Zugl. / Approved by: Hyderabad, University of Hyderabad, Diss., 2006

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This book is an outcome of research work carried out for five years in the Department of Zoology, Yogi Vemana University, Kadapa, Andhra Pradesh, India. In this study, we recorded the regional butterflies' faunistics and also their nectar plants and their biodiversity in Eastern Ghats of Southern Andhra Pradesh. The book encompasses 5 chapters. Chapter-I and Chapter-II, deals with the Taxonomy of Butterflies and status of species, abundance and diversity has been analyzed. Colour photographs, checklist of all species were updated. Chapter-III & IV,V includes Biodiversity of Butterflies, a yearlong quantitative survey of butterfly biodiversity from different sampling sites; in which Shannon diversity index and Simpson diversity index of the present butterflies were investigated and Eco-biology study and highlighting the all aspects and deals with conclusion and results. This book can be foundation for future endeavors to build upon these results for development of insect conservation. These groups are used as a potential subject for analytical studies by the ecologists across the globe concerning recent scenarios of diversity and eco-biology studies.

Diversity & Eco biology of butterflies



Harinath Palem  
Venkata Ramana Sri Purushottam

Dr. Palem Harinath M.Sc., Ph.D., is an active entomologist working as a senior research fellow Dept of Zoology, Yogi Vemana University, Kadapa, Andhra Pradesh - India. Presently he was engaged in biodiversity research and conservation of butterflies & other insects. He has published several publications on butterfly biology & Insect conservation.

## Diversity & Eco-biology of butterflies in the Eastern Ghats of A.P



978-3-659-92594-8

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Editor : **Smt: N. Sivaparvathi**

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ISBN : 978-93-5171-082-0

Price : Rs. 995/-

First Edition : 2016

Published by :

**RESEARCH INDIA PRESS**

E-6/34, Sangam Vihar

New Delhi - 110062

Phone : 011-26047013, (M) 9818085794

E-mail : researchindiapress@gmail.com

Typesetting by

**K. Janardhana Raju**

9849197044

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## Women in Science and technology: an Indian Perspective

Kalpna Panati  
Venkata Ramireddy Narala

### Introduction

All the major world organizations have accepted the vital role that a woman plays in enlightening the entire family and also in preserving its health in a developing country (1). Science and technology has become part and partial of Indian civilization which made rapid strides in various fronts. At glance, the women look like simple, docile and humble. Right from the childhood a girl is always counseled to learn to be patient, to adapt, adjust and submit. But, behind this simple straight face there is a razor sharp brain, strong ability to execute and conversion of thought to action without much ado are there. Historically women have been active in numerous scientific activities in traditional societies such as brewing and baking, medicine and midwifery, food production and preservation etc (2). As Mahatma Gandhi said, women is the companion of man, gifted with equal mental capabilities. Nevertheless, the education of women in India was influenced by patri-focality, which give preference to men over women. Historically women education was extremely restricted in India due to established patri-focality (3). In the nineteenth century, social reformers in India supported the education of women with an intension of educated women would make better wives and mothers. Science was excluded from curriculum studied by women, since they presumably would not take up jobs after education (4). All areas of study were thrown open to both men and women only after the independence in 1947. Admission of women into technical courses was possible only after 1948 (5).

### Women Education in India

In India, family decides what education the children (specifically daughters) should get. Marriages are usually arranged by parents who consider it as a sacred duty to find a suitable match for their daughters. After marriage, the daughter becomes a part of the groom's family. Thus the educational prospects of daughters are influenced by marital obligations of parents. In such circumstances, investing in daughter's education implies difficulty in finding a more qualified groom, still giving dowry, benefitting the groom's family. It was found that the unwillingness of the parents to expend the resources on their daughter's education due to assumption that the benefits of their education belongs to the groom's family after marriage (6). Sending girls to predominantly

male colleges, fear of travelling alone across the towns at odd hours, for long periods of study, the danger of not finding a compatible life partner for marriage were some of the barriers to women's education in science and engineering in India (6). More over 60% of primary school dropouts are girls (7).

In India in the past the challenges for women in science sector were cultural, social, familial and professional related and lack of career opportunities. In the cultural and economic setting of India, access to higher education was also limited for the girl child (<http://www.dst.gov.in/>). Every year, girls do far better than boys, in science and arts, in the Class X and Class XII examinations. In some institutions, the majority of the toppers are girls (8). However, even before they reach the point of choosing a career in science, women have to make difficult choices.

Although, women have excelled academically in the last decade, they are underrepresented in science and technology at various levels. The share of women in arts and education has increased from 36% and 29% in 1974-75 to about 48% and 50% in 1999-2000. But the situation is different with respect to science subjects. Their share in science and technology has changed from 32% and 35% to 35% and 16% respectively during the same period (7). Only a 3% increase was observed in science subjects. Among the women science graduates, 88% of degree holders are in pure sciences, 8% in medicine and about 3% in engineering and technology (9). Life sciences are a much sought after career by women. It is found that two thirds of women scientists are engaged in teaching, hardly 3% are in research and development and an insignificant number of women are in industrial production, managerial and entrepreneurship (7).

### Increase in Enrolment of women in higher education

India has witnessed a substantial increase in enrollment of women in engineering (technology). The increase in enrollment is from about 0.2% in 1950-51 to 23% in 2005-06 (3, 10). It might be because of the privatization of education and the growth in the economy after the liberalization policy of 1990s. In recent years, there is a considerable support for girls from parents to pursue engineering education. Degree in engineering eases marriage and ensures certainty of job (3). Marriage and career issues of women are interrelated. Higher education for girls enhances bright career and marital prospects (3, 11). The earning potential of bride is an asset due to high cost of urban living and the desire of husbands for an economically independent wife (6).

### Opting out of Married women from work

The opinion of the respondents in the study was that the career is important but it cannot be said with certainty as to how fruitfully they would be able to





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Journal of Literary, Culture & Language Studies

Vol. 17 - Issue. 1 - Spl. Edition - January 2020 - ISSN No. : 2456-4702

రాయలసీమ ఆధునిక తెలుగు సాహిత్యం - గ్రామీణ సంస్కృతి  
జాతీయ సదస్సు  
29 - 30 జనవరి 2020



డా. పాలెం రమాదేవి, ప్రధాన సంపాదకులు, తెలుగు శాఖ,  
యోగి వేమన విశ్వవిద్యాలయం, కడప, ఆంధ్రప్రదేశ్ - 516 005.



# Chapter 18

## Polysaccharides of Natural Gums-Based Biomedical Devices for Drug Delivery Application



Kasula Nagaraja, Kummara Madhusudana Rao,  
Kummari S. V. Krishna Rao, Khateef Riazunnisa, and K. V. N. Suresh Reddy

### 18.1 Introduction

Plant gums are one of the most accepted natural remedies for the protection of human health. These are more sustainable, eco-friendly, non-toxic and safer for production of biomaterials; it is due to the above properties that they have great potential application in various fields. Gums are readily dissolved in water and other aqueous media; it results in the formation of mucilage and slimy masses. Natural gums are pathological products, whereas mucilages are physiological products. Examples of natural gums are tragacanth gum, gum kondagogu, gum karaya, tamarind gums and guar gum. While mucilage is found in various parts of plants, such as epidermal cell walls, roots, seed coats, barks and middle lamella, plant-based natural gums contain hydrophilic carbohydrate polysaccharides. Most of the natural gums are high molecular weight polymers, and they are composed of monosaccharide units linked in glycoside bonds (Pandey and Khuller 2004; Chamrathy and Pinal 2008).

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K. Nagaraja · K. S. V. Krishna Rao (✉)  
Polymer Biomaterial Design and Synthesis Laboratory, Department of Chemistry, Yogi Vemana University, Kadapa, Andhra Pradesh, India  
e-mail: [ksvkr@yogivemanauniversity.ac.in](mailto:ksvkr@yogivemanauniversity.ac.in)

K. M. Rao  
School of Chemical Engineering, Yeungnam University,  
Gyeongsan, Gyeongbuk, South Korea

K. Riazunnisa  
Biotechnology and Bioinformatics, Yogi Vemana University, Kadapa, Andhra Pradesh, India

K. V. N. Suresh Reddy  
Department of Chemistry, GITAM Institute of Technology, GITAM (Deemed to be University), Visakhapatnam, Andhra Pradesh, India



## The Challenges of Food Security: A Comprehensive Study on Safety, Sustainability, Transforming Food Systems and Machine Learning Based Approaches

S. Anjum Mobeen<sup>1</sup>, M. Vidya Vani<sup>1</sup> and K. Riazunnisa<sup>1</sup>. \*

<sup>1</sup>Department of Biotechnology and Bioinformatics, Yogi Vemana University, Kadapa, Andhra Pradesh, India.

\*Corresponding author: krbtbi@yogivemanauniversity.ac.in; khateefriaz@gmail.com

### ABSTRACT

Due to the increasing population, the demand for food products has become a major concern that can be solved through the proper utilization of resources and the production of food products. The major factors that affect the food system includes increasing food shortage, decreasing quality, wastage, and loss of food products, limited natural resources, etc. According to the World Food Program (WFP), around 30% - 50% of food produced globally goes waste. Climate change is considered as one of the main factors that affect food security. Other factors such as urbanization, climate change, and natural disasters also affect food security. Family farming can help minimize food security. Numerous ways exist to achieve sustainability and food security, some of these include limiting food losses and waste, increasing the use of plant-based food, and recycling. The establishment and expansion of effective and inclusive governance institutions are key components of the strategy to transform food systems. One of the recent citations of Sood and Harjeet (2021) address the various aspects of image processing, which are used to minimize the issues faced by researchers when it comes to analysing food production and agriculture-related applications. Some of the active research areas related to food security are food tracing system, monitoring the growth of plants using modern machine vision techniques, use of internet for global food security, artificial intelligence will automate the human work for food security and image processing and deep learning collectively helped in achieving food security.

**Keywords:** Food security, machine learning, image processing, WFP.

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### INTRODUCTION

The concept of food security emanates from the world food conference (WFC), Food and Agriculture Organization (FAO), which came out in 1974. The FAO in 1996 defined and redefined in 2001 food security as the “when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food, which meets their dietary needs and food preferences for an active and healthy life” by Sood and Harjeet 2021. Food security is a concept conceptualized by the FAO/UNICEF (United Nations International Children’s Emergency Fund) and the Food Authority of the US alienated food security into four pillars which resembles as; (1) It involves the availability of food for people to meet their dietary needs, (2) Food access is a basic human need that should be maintained in such a way that people should have enough resources to buy nutritious food, (3) When food is available, it is time to utilize it with proper hygiene and storage techniques will help in improving the efficiency of food processing and (4) Food stability, means households get constant food supply throughout the year.





Manoj Kumar Gupta, Gayatri Gouda, Ravindra Donde,  
S. Sabarinathan, Goutam Kumar Dash, Menaka Ponnana,  
Pallabi Pati, Sushil Kumar Rathore, Ramakrishna Vadde, and  
Lambodar Behera

### Abstract

High-throughput methods are rapidly becoming prevalent in biological sciences and clinical studies. Thus, more rigorous statistical techniques are required to accurately predict the resulting big datasets. In this chapter, the authors attempted to understand how statisticians develop and employ various strategies to investigate and analyze these big datasets. Results obtained revealed that, to date, several statistical methods have been developed for analyzing large-scale biological data, like multiple testing, unsupervised learning and data

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Goutam Kumar Dash and Menaka Ponnana contributed equally with all other contributors.

---

M. K. Gupta (✉) · G. Gouda · R. Donde · G. K. Dash · L. Behera  
Crop Improvement Division, ICAR-National Rice Research Institute, Cuttack, Odisha, India

S. Sabarinathan  
Crop Improvement Division, ICAR-National Rice Research Institute, Cuttack, Odisha, India  
Department of Seed Science and Technology, College of Agriculture, Odisha University of  
Agriculture and Technology, Bhubaneswar, Odisha, India

M. Ponnana  
Crop Improvement Division, ICAR-National Rice Research Institute, Cuttack, Odisha, India  
Department of Plant Physiology, College of Agriculture, Odisha University of Agriculture and  
Technology, Bhubaneswar, Odisha, India

P. Pati  
District Headquarter Hospital, Ganjam, Odisha, India

S. K. Rathore  
Department of Zoology, Khallikote Autonomous College, Ganjam, Odisha, India

R. Vadde  
Department of Biotechnology and Bioinformatics, Yogi Vemana University, Kadapa, Andhra  
Pradesh, India





N. Rajesh, Manoj Kumar Gupta, Gayatri Gouda, Ravindra Donde, S. Sabarinathan, Goutam Kumar Dash, Menaka Ponnana, Lambodar Behera, and Ramakrishna Vadde

## Abstract

The simultaneous genetic change in interacting species as a result of mutually imposed natural selection is known as co-evolution. Many biologists believe that the process of co-evolution between plants and the biota that surrounds them, which includes mammals, viruses, fungus, bacteria, insects, and nematodes, is responsible for most of the earth's biological variety. While most of the debate around plant co-evolution focuses on one host–one pathogen, two or more hosts–one pathogen, and one host–two contrasting co-occurring pathogens single plant–pathogen interactions, a wide range of many other micro-and macroevolutionary

Gayatri Gouda, Ravindra Donde, S. Sabarinathan, Goutam Kumar Dash, and Menaka Ponnana contributed equally to this work.

N. Rajesh · R. Vadde (✉)

Department of Biotechnology & Bioinformatics, Yogi Vemana University, Kadapa, Andhra Pradesh, India

M. K. Gupta · G. Gouda · L. Behera

Crop Improvement Division, ICAR-National Rice Research Institute, Cuttack, Odisha, India

R. Donde · G. K. Dash

ICAR-National Rice Research Institute, Cuttack, Odisha, India

S. Sabarinathan

ICAR-National Rice Research Institute, Cuttack, Odisha, India

Department of Seed Science and Technology, College of Agriculture, Odisha University of Agriculture and Technology, Bhubaneswar, Odisha, India

M. Ponnana

ICAR-National Rice Research Institute, Cuttack, Odisha, India

Department of Plant Physiology, College of Agriculture, Odisha University of Agriculture and Technology, Bhubaneswar, Odisha, India





# Artificial Intelligence and Machine Learning 12 in Rice Research

Ravindra Donde, Gayatri Gouda, S. Sabarinathan,  
Manoj Kumar Gupta, Goutam Kumar Dash, N. Rajesh,  
Sushanta Kumar Dash, Khirod Kumar Sahoo,  
Priyadarsini Sanghamitra, C. Parameswaran, Ramakrishna Vadde,  
and Lambodar Behera

## Abstract

Food security is a significant challenge for emerging and underdeveloped countries all over the world. The world's population is growing tremendously; therefore, more food will be required to fulfill their needs. As a result, farmers and breeders put more pressure on agricultural land to produce more food grains. Rice is a primary food crop for 1.3 billion people globally, with Asia contributing for 90% of rice production and consumption. In undeveloped nations, the majority of farmers rely on traditional farming methods, which are insufficient to meet rising food grain demand. Their poor farming methods must be wreaking havoc on the land by utilizing more harmful pesticides and chemical fertilizers. As a result, a destructive impact on soil microfauna and flora affects soil nutritional quality, agricultural practices, and the soil becomes barren with the loss of fertility. In the future, agriculture automation is a big concern for all countries to feed and

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R. Donde (✉) · G. Gouda · M. K. Gupta · G. K. Dash · S. K. Dash · P. Sanghamitra ·  
C. Parameswaran · L. Behera  
Crop Improvement Division, ICAR-National Rice Research Institute, Cuttack, Odisha, India

S. Sabarinathan  
Crop Improvement Division, ICAR-National Rice Research Institute, Cuttack, Odisha, India

Department of Seed Science and Technology, College of Agriculture, Odisha University of  
Agriculture and Technology, Bhubaneswar, Odisha, India

N. Rajesh · R. Vadde  
Department of Biotechnology & Bioinformatics, Yogi Vemana University, Kadapa, Andhra  
Pradesh, India

K. K. Sahoo  
Department of Botany, Ravenshaw University, Cuttack, Odisha, India

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Ltd. 2021

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M. K. Gupta, L. Behera (eds.), *Applications of Bioinformatics in Rice Research*,  
[https://doi.org/10.1007/978-981-16-3997-5\\_12](https://doi.org/10.1007/978-981-16-3997-5_12)





Menaka Ponnana, N. Rajesh, Gayatri Gouda, Manoj Kumar Gupta,  
S. Sabarinathan, Pallabi Pati, Sushil Kumar Rathore,  
Ramakrishna Vadde, and Lambodar Behera

## Abstract

De novo evolution of genes was used as an important approach in the rice breeding program. The identification of the novel genes in the rice genome regulates economic traits such as grain size, weight, and others linked to grain yield or quality. Specific novel genes, also called orphan genes, were used to detect these orphan genes and their expression pattern in rice development. This certain evolution of genes helps to study the expression pattern of the plant

Menaka Ponnana and N. Rajesh contributed equally with all other contributors.

M. Ponnana

Crop Improvement Division, ICAR-National Rice Research Institute, Cuttack, Odisha, India

Department of Plant Physiology, College of Agriculture, Odisha University of Agriculture and Technology, Bhubaneswar, Odisha, India

N. Rajesh · R. Vadde

Department of Biotechnology and Bioinformatics, Yogi Vemana University, Kadapa, Andhra Pradesh, India

G. Gouda · M. K. Gupta · L. Behera (✉)

Crop Improvement Division, ICAR-National Rice Research Institute, Cuttack, Odisha, India

S. Sabarinathan

Crop Improvement Division, ICAR-National Rice Research Institute, Cuttack, Odisha, India

Department of Seed Science and Technology, College of Agriculture, Odisha University of Agriculture and Technology, Bhubaneswar, Odisha, India

P. Pati

District Headquarter Hospital, Ganjam, Odisha, India

S. K. Rathore

Department of Zoology, Khallikote Autonomous College, Ganjam, Odisha, India





# The CRISPR Technology and Application in Rice

# 10

Gayatri Gouda, Manoj Kumar Gupta, S. Sabarinathan,  
Ravindra Donde, Menaka Ponnana, Goutam Kumar Dash, N. Rajesh,  
Priyadarsini Sanghamitra, C. Parameswaran, Ramakrishna Vadde,  
Lambodar Behera, and Trilochan Mohapatra

## Abstract

Genome editing is the main goal in improving rice productivity by inducing gene-specific mutations to modify the gene function. Due to the advances in the biotechnology approach, it is possible to make the gene manipulation that could give effective results against various biotic and abiotic stresses and grain quality. Nowadays, population increases day by day; therefore, it is a big challenge for developing countries. However, it is important to release new crop varieties with

S. Sabarinathan, Ravindra Donde, Menaka Ponnana, Goutam Kumar Dash and N. Rajesh contributed equally with all other contributors.

G. Gouda · M. K. Gupta · R. Donde · G. K. Dash · P. Sanghamitra · C. Parameswaran · L. Behera (✉)

Crop Improvement Division, ICAR-National Rice Research Institute, Cuttack, Odisha, India

S. Sabarinathan

Crop Improvement Division, ICAR-National Rice Research Institute, Cuttack, Odisha, India

Department of Seed Science and Technology, College of Agriculture, Odisha University of Agriculture and Technology, Bhubaneswar, Odisha, India

M. Ponnana

Crop Improvement Division, ICAR-National Rice Research Institute, Cuttack, Odisha, India

Department of Plant Physiology, College of Agriculture, Odisha University of Agriculture and Technology, Bhubaneswar, Odisha, India

N. Rajesh · R. Vadde

Department of Biotechnology and Bioinformatics, Yogi Vemana University, Kadapa, Andhra Pradesh, India

T. Mohapatra

Secretary (DARE), and Director General (ICAR), Government of India, New Delhi, India

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M. K. Gupta, L. Behera (eds.), *Applications of Bioinformatics in Rice Research*, [https://doi.org/10.1007/978-981-16-3997-5\\_10](https://doi.org/10.1007/978-981-16-3997-5_10)

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## Computational Epigenetics in Rice Research

# 6

Gayatri Gouda, Manoj Kumar Gupta, Ravindra Donde,  
S. Sabarinathan, Ramakrishna Vadde, Lambodar Behera, and  
Trilochan Mohapatra

### Abstract

The epigenetic study is now most widely used in plant research to identify the mutation as well as modifications present at the genome level. Modern advanced technologies enable genome-wide DNA and histone modifications to be assessed, which in turn help us to understand how they regulate the functions, and this might also be an aid in classifying plant regulation mechanisms on a higher level than the nucleotide sequence. Rice is an important food grain and is an ideal example for monocotyledons because it has a smaller genome size and a completely sequenced, well-annotated genome. Computational methods and bioinformatics tools are used in epigenomics studies, particularly during experimental design, data analysis, hypothesis confirmation, and results interpretation, due to the large quantity of data produced by high-throughput sequencing. High-throughput sequencing approaches are widely used to identify such modifications in rice that have an effect on growth, development as well as biotic and abiotic

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Ravindra Donde and S. Sabarinathan contributed equally with all other contributors.

---

G. Gouda · M. K. Gupta · R. Donde · L. Behera (✉)

Crop Improvement Division, ICAR-National Rice Research Institute, Cuttack, Odisha, India

S. Sabarinathan

Crop Improvement Division, ICAR-National Rice Research Institute, Cuttack, Odisha, India

Department of Seed Science and Technology, College of Agriculture, Odisha University of Agriculture and Technology, Bhubaneswar, Odisha, India

R. Vadde

Department of Biotechnology & Bioinformatics, Yogi Vemana University, Kadapa, Andhra Pradesh, India

T. Mohapatra

Secretary (DARE), and Director General (ICAR), Government of India, New Delhi, India





# Computational Approaches Towards Decoding The Extrachromosomal Genome of Rice

# 5

Gayatri Gouda, Ravindra Donde, S. Sabarinathan, Manoj Kumar Gupta, Menaka Ponnana, N. Rajesh, Sushil Kumar Rathore, Pallabi Pati, Ramakrishna Vadde, Lambodar Behera, and Trilochan Mohapatra

## Abstract

Rice is considered as a model crop plant to study phylogeny and genetic diversity. By improving the various sequencing techniques of whole genome it is possible to find out the region of both nuclear and mitochondrial and chloroplast genomes that are mainly involved in evolution. In rice evolution, many genes present in the chloroplast and mitochondrial genome play a role in plant evolution. As compared to the mitochondrial genome, the chloroplast genome contains a highly conserved sequence that makes researchers find out the genetic variation that led

G. Gouda · R. Donde · M. K. Gupta · L. Behera (✉)

Crop Improvement Division, ICAR-National Rice Research Institute, Cuttack, Odisha, India

S. Sabarinathan

Crop Improvement Division, ICAR-National Rice Research Institute, Cuttack, Odisha, India

Department of Seed Science and Technology, College of Agriculture, Odisha University of Agriculture and Technology, Bhubaneswar, Odisha, India

M. Ponnana

Crop Improvement Division, ICAR-National Rice Research Institute, Cuttack, Odisha, India

Department of Plant Physiology, College of Agriculture, Odisha University of Agriculture and Technology, Bhubaneswar, Odisha, India

N. Rajesh · R. Vadde

Department of Biotechnology & Bioinformatics, Yogi Vemana University, Kadapa, Andhra Pradesh, India

S. K. Rathore

Department of Zoology, Khallikote Autonomous College, Ganjam, Odisha, India

P. Pati

District Headquarter Hospital, Ganjam, Odisha, India

T. Mohapatra

Secretary (DARE), and Director General (ICAR), Government of India, New Delhi, India





## Quantitative Trait Locus Mapping in Rice

# 3

Gayatri Gouda, S. Sabarinathan, Manoj Kumar Gupta, Ravindra Donde, Goutam Kumar Dash, Menaka Ponnana, N. Rajesh, Sushil Kumar Rathore, Pallabi Pati, Ramakrishna Vadde, Lambodar Behera, and Trilochan Mohapatra

### Abstract

Rice is considered as a model plant to map the complete genome and identify the genes in the genome for various traits. Recent advance in molecular biology and statistical analysis techniques could boost the plant breeder to gain knowledge on rice genome and find out the function and expression of rice genes. Near the

Manoj Kumar Gupta, Ravindra Donde, Goutam Kumar Dash, Menaka Ponnana and N. Rajesh contributed equally with all other contributors.

G. Gouda · M. K. Gupta · R. Donde · G. K. Dash · L. Behera (✉)

Crop Improvement Division, ICAR-National Rice Research Institute, Cuttack, Odisha, India

S. Sabarinathan

Crop Improvement Division, ICAR-National Rice Research Institute, Cuttack, Odisha, India

Department of Seed Science and Technology, College of Agriculture, Odisha University of Agriculture and Technology, Bhubaneswar, Odisha, India

M. Ponnana

Crop Improvement Division, ICAR-National Rice Research Institute, Cuttack, Odisha, India

Department of Plant Physiology, College of Agriculture, Odisha University of Agriculture and Technology, Bhubaneswar, Odisha, India

N. Rajesh · R. Vadde

Department of Biotechnology and Bioinformatics, Yogi Vemana University, Kadapa, Andhra Pradesh, India

S. K. Rathore

Department of Zoology, Khallikote Autonomous College, Ganjam, Odisha, India

P. Pati

District Headquarter Hospital, Ganjam, Odisha, India

T. Mohapatra

Secretary (DARE), and Director General (ICAR), Government of India, New Delhi, India





Manoj Kumar Gupta, Gayatri Gouda, Ravindra Donde, S. Sabarinathan, Piyali Goswami, Goutam Kumar Dash, N. Rajesh, Pallabi Pati, Sushil Kumar Rathode, Ramakrishna Vadde, and Lambodar Behera

## Abstract

All cellular structures are heterogeneous. Thus, investigating true cell heterogeneity is highly required to further understand cellular connectivity and accountability within a disease or normal conditions. Because of its rapidly decreasing costs, the Next-Generation (NGS) sequence is widely used to analyze various biological data. However, these approaches may fail to provide detailed insight into cells' true heterogeneity. Recently developed single-cell RNA sequencing (scRNA-seq) technology tries to tackle these bulk NGS issues by linking transcriptomic, epigenomic, proteomic, and molecular sequences to a specific cell. Thus, in this chapter, the author addresses the process involved, relative strengths, possible uses, and limitations of scRNA-seq techniques methods. Information obtained revealed that cell isolation methods may be broadly divided

M. K. Gupta · G. Gouda · R. Donde · G. K. Dash · L. Behera (✉)

Crop Improvement Division, ICAR-National Rice Research Institute, Cuttack, Odisha, India

S. Sabarinathan

Crop Improvement Division, ICAR-National Rice Research Institute, Cuttack, Odisha, India

Department of Seed Science and Technology, College of Agriculture, Odisha University of Agriculture and Technology, Bhubaneswar, Odisha, India

P. Goswami

Department of Biotechnology, IIT Kharagpur, Kharagpur, West Bengal, India

N. Rajesh · R. Vadde

Department of Biotechnology and Bioinformatics, Yogi Vemana University, Kadapa, Andhra Pradesh, India

P. Pati

District Headquarter Hospital, Ganjam, Odisha, India

S. K. Rathode

Department of Zoology, Khallikote Autonomous College, Ganjam, Odisha, India





# Computational Approaches in Identifying Long Non-coding RNA

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Manoj Kumar Gupta, N. Rajesh, S. Sabarinathan, Gayatri Gouda, Ravindra Donde, Menaka Ponnana, Goutam Kumar Dash, Pallabi Pati, Sushil Kumar Rathore, Ramakrishna Vadde, and Lambodar Behera

## Abstract

Long non-coding RNA (lncRNA) is the largest non-protein and functional RNA. The majority of lncRNAs are functionally uncharacterized. Thus, researchers are employing both experimental as well as computational approaches to characterize unknown lncRNAs. Recently, the majority of lncRNAs have been characterized using transcriptome sequencing datasets under different conditions. The information on these transcripts was mainly restricted to genomic loci and expression

S. Sabarinathan, Gayatri Gouda, Ravindra Donde, Menaka Ponnana and Goutam Kumar Dash contributed equally with all other contributors.

M. K. Gupta · G. Gouda · R. Donde · G. K. Dash · L. Behera (✉)  
Crop Improvement Division, ICAR-National Rice Research Institute, Cuttack, Odisha, India

N. Rajesh · R. Vadde  
Department of Biotechnology and Bioinformatics, Yogi Vemana University, Kadapa, Andhra Pradesh, India

S. Sabarinathan  
Crop Improvement Division, ICAR-National Rice Research Institute, Cuttack, Odisha, India

Department of Seed Science and Technology, College of Agriculture, Odisha University of Agriculture and Technology, Bhubaneswar, Odisha, India

M. Ponnana  
Crop Improvement Division, ICAR-National Rice Research Institute, Cuttack, Odisha, India

Department of Plant Physiology, College of Agriculture, Odisha University of Agriculture and Technology, Bhubaneswar, Odisha, India

P. Pati  
District Headquarter Hospital, Ganjam, Odisha, India

S. K. Rathore  
Department of Zoology, Khallikote Autonomous College, Ganjam, Odisha, India

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M. K. Gupta, L. Behera (eds.), *Bioinformatics in Rice Research*,  
[https://doi.org/10.1007/978-981-16-3993-7\\_21](https://doi.org/10.1007/978-981-16-3993-7_21)





# Expression Profiling and Discovery of microRNA

# 20

N. Rajesh, Manoj Kumar Gupta, Ravindra Donde, S. Sabarinathan,  
Gayatri Gouda, Goutam Kumar Dash, Menaka Ponnana,  
Lambodar Behera, and Ramakrishna Vadde

## Abstract

miRNAs, on average comprised of 22-nucleotides with small non-coding RNAs, regulate the gene expression of targeted genes. Thousands of miRNAs have been identified, having biological significance in many pathways. These microRNAs have also been used as biomarkers for diagnostic and agricultural purposes. Thus, this chapter attempts to describe in brief miRNA biogenesis pathways, miRNA profiling methods, and bioinformatics tools of miRNA profiling. Additionally, we will discuss the role of mi RNA and its applications. miRNA biogenesis can be broadly categorized into canonical and non-canonical pathways. There are various sample types and miRNA extraction procedures. miRNA sequences, once extracted, can be subjected to various computational tools that may aid in understanding its structure and functions. However, few researchers have suggested that there is still scope for developing these tools with appropriate algorithms for avoiding false positive results.

N. Rajesh · R. Vadde (✉)

Department of Biotechnology and Bioinformatics, Yogi Vemana University, Kadapa, Andhra Pradesh, India

M. K. Gupta · R. Donde · G. Gouda · G. K. Dash · L. Behera

Crop Improvement Division, ICAR-National Rice Research Institute, Cuttack, Odisha, India

S. Sabarinathan

Crop Improvement Division, ICAR-National Rice Research Institute, Cuttack, Odisha, India

Department of Seed Science and Technology, College of Agriculture, Odisha University of Agriculture and Technology, Bhubaneswar, Odisha, India

M. Ponnana

Crop Improvement Division, ICAR-National Rice Research Institute, Cuttack, Odisha, India

Department of Plant Physiology, College of Agriculture, Odisha University of Agriculture and Technology, Bhubaneswar, Odisha, India

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M. K. Gupta, L. Behera (eds.), *Bioinformatics in Rice Research*,  
[https://doi.org/10.1007/978-981-16-3993-7\\_20](https://doi.org/10.1007/978-981-16-3993-7_20)





# Microsatellite Markers from Whole Genome and Transcriptomic Sequences 18

Manoj Kumar Gupta, Ravindra Donde, S. Sabarinathan, Gayatri Gouda, Goutam Kumar Dash, Pallabi Pati, Sushil Kumar Rathore, Ramakrishna Vadde, Priyadarsini Sanghamitra, C. Parameswaran, and Lambodar Behera

## Abstract

Microsatellites (MS) or simple sequence repeats (SSRs) is a DNA sequence set comprising of tandemly repeated motifs. SSRs with codominant inheritance, higher amounts, moderately conservative flanking sequences, and rich polymorphism are commonly distributed throughout the plants and animals' genome. MS has already been employed in several crop plants for determining their seed lots' genetic integrity and to evaluate the capacity of plant varieties to defend their intellectual property. Thus, the key objective of this chapter is to include a revised and comprehensive overview of the SSR marker and its applications in various biological domains. Additionally, we have discussed genomic occurrence and the advantage/disadvantages of employing microsatellites as genetic markers in agricultural research.

M. K. Gupta · R. Donde · G. Gouda · G. K. Dash · P. Sanghamitra · C. Parameswaran · L. Behera (✉)

Crop Improvement Division, ICAR-National Rice Research Institute, Cuttack, Odisha, India

S. Sabarinathan

Crop Improvement Division, ICAR-National Rice Research Institute, Cuttack, Odisha, India

Department of Seed Science and Technology, College of Agriculture, Odisha University of Agriculture and Technology, Bhubaneswar, Odisha, India

P. Pati

District Headquarter Hospital, Ganjam, Odisha, India

S. K. Rathore

Department of Zoology, Khallikote Autonomous College, Ganjam, Odisha, India

R. Vadde

Department of Biotechnology and Bioinformatics, Yogi Vemana University, Kadapa, Andhra Pradesh, India





# Mapping Algorithms in High-Throughput Sequencing

# 14

Manoj Kumar Gupta, Gayatri Gouda, S. Sabarinathan,  
Ravindra Donde, Ramakrishna Vadde, and Lambodar Behera

## Abstract

The launch of high-throughput sequencing led to the production of billions of DNA fragments of several organisms from the vast array of the biological specimen in one run. Because of the significant rise in the sequences number, most of the analytical time that was earlier expended processing biological information is now devoted to identifying where the reads in the study come from. More reads are being mapped back to the reference sites, thus disclosing the type, quantity, and composition of DNA sequences present within the biological specimen. This stage, which includes the correct mapping of reads into a reference sequence, is vital since it decides how good the downstream analyses are. Thus, in this chapter, the authors attempt to understand the underlying mechanism of mapping algorithm and how they are employed in biological studies. Information retrieved suggested that the algorithms employed for mapping are known as mappers, whose key job is to locate the true position of each sequence/sequence alignments from a theoretically massive quantity of reference data while allowing for anomalies and structural variance. Based on index property, alignment

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M. K. Gupta · G. Gouda · R. Donde · L. Behera (✉)  
Crop Improvement Division, ICAR-National Rice Research Institute, Cuttack, Odisha, India

S. Sabarinathan  
Crop Improvement Division, ICAR-National Rice Research Institute, Cuttack, Odisha, India

Department of Seed Science and Technology, College of Agriculture, Odisha University of  
Agriculture and Technology, Bhubaneswar, Odisha, India

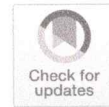
R. Vadde  
Department of Biotechnology and Bioinformatics, Yogi Vemana University, Kadapa,  
Andhra Pradesh, India

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Ltd. 2021

M. K. Gupta, L. Behera (eds.), *Bioinformatics in Rice Research*,  
[https://doi.org/10.1007/978-981-16-3993-7\\_14](https://doi.org/10.1007/978-981-16-3993-7_14)

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# Gene Ontology and Pathway Enrichment Analysis

# 12

Manoj Kumar Gupta, Gayatri Gouda, S. Sabarinathan, Ravindra Donde, Goutam Kumar Dash, Ramakrishna Vadde, and Lambodar Behera

## Abstract

Over the past 10 years, gene set analysis has been the first option for studying gene expression and gene interaction for gaining insights into the fundamental dynamic biology of disease/traits. It, therefore, reduces the complexity of traditional statistical research and increases the illustrating strength of the outcomes achieved. Although approaches to gene set analysis are commonly utilized in gene expression analytics, the statistical framework and steps generally employed in these methods have not yet been thoroughly explored, restricting their usefulness. Thus, in this chapter, the authors include an outlined statistical framework and steps for the analysis of gene set used for various genome studies, ranging from microarrays, RNA sequencing, and the analysis of genomic widespread association results. The drawbacks of these approaches and strengths have also been addressed depending on their separate components such as their gene score, null hypotheses, and essential evaluation methods. The authors believe that a standardized approach for testing the methods of gene set analysis can also be used for correcting the lack of agreement on the method of preference for a specific experiment. The benchmark expression data sets will reflect actual expression data characteristics and prevent oversimplifying conclusions, such

M. K. Gupta · G. Gouda · R. Donde · G. K. Dash · L. Behera (✉)  
Crop Improvement Division, ICAR-National Rice Research Institute, Cuttack, Odisha, India

S. Sabarinathan  
Crop Improvement Division, ICAR-National Rice Research Institute, Cuttack, Odisha, India

Department of Seed Science and Technology, College of Agriculture, Odisha University of Agriculture and Technology, Bhubaneswar, Odisha, India

R. Vadde  
Department of Biotechnology and Bioinformatics, Yogi Vemana University, Kadapa, Andhra Pradesh, India





Manoj Kumar Gupta, Gayatri Gouda, S. Sabarinathan,  
Ravindra Donde, Pallabi Pati, Sushil Kumar Rathore,  
Ramakrishna Vadde, and Lambodar Behera

## Abstract

Structural proteomics identifies three-dimensional (3D) protein structures at an atomic resolution on a genome-wide scale to better understand the interaction among protein sequence, structure, and function. The 3D structure of proteins is mostly estimated via x-ray crystallography or nuclear magnetic resonance spectroscopy. However, for the overwhelming majority of protein sequences, no experimental structure is available to date. This gap in structural proteomics can be overcome by computational approaches. The prediction of protein structure through computational approaches may be addressed in three major ways: (1) computer simulation focused on empirical energy calculations; (2) knowledge-based approaches that employ information obtained from structural-sequence relationships retrieved from already available experimentally defined 3D protein structures; and (3) ab initio methods. Irrespective of all these, the creation of an exact model is not often feasible and may sometimes generate

M. K. Gupta (✉) · G. Gouda · R. Donde · L. Behera

Crop Improvement Division, ICAR-National Rice Research Institute, Cuttack, Odisha, India

S. Sabarinathan

Crop Improvement Division, ICAR-National Rice Research Institute, Cuttack, Odisha, India

Department of Seed Science and Technology, College of Agriculture, Odisha University of Agriculture and Technology, Bhubaneswar, Odisha, India

P. Pati

District Headquarter Hospital, Ganjam, Odisha, India

S. K. Rathore

Department of Zoology, Khallikote Autonomous College, Ganjam, Odisha, India

R. Vadde

Department of Biotechnology and Bioinformatics, Yogi Vemana University, Kadapa, Andhra Pradesh, India





Manoj Kumar Gupta, Gayatri Gouda, Ravindra Donde,  
Piyali Goswami, N. Rajesh, Pallabi Pati, Sushil Kumar Rathore,  
Ramakrishna Vadde, and Lambodar Behera

## Abstract

One of the significant forms of molecules present in living cells is ribonucleic acid (RNA). RNA structural elements moderate various biological process, including epigenetic function, modify mRNA stability, and alternate splicing. The study of the secondary structures of RNA is, therefore, crucial for interpreting the role as well as the regulatory mechanism of RNA transcripts. But experimental methods are tedious, time-consuming, pricey, requires special equipment, and, thus, cannot often be implemented. Methods for statistical simulation are an option and parallel to experimental approaches. Additionally, the findings from the RNA-Puzzles, joint research on the estimation of RNA structures, suggest that computational methods can be employed for effective RNA modeling. However, there is still space for improvement. Considering this, in the chapter, authors attempted to understand the various forms of RNA and how computational approaches can be employed to predict their structure more precisely. The RNA

M. K. Gupta · G. Gouda · R. Donde · L. Behera (✉)

Crop Improvement Division, ICAR-National Rice Research Institute, Cuttack, Odisha, India

P. Goswami

Department of Biotechnology, IIT Kharagpur, Kharagpur, West Bengal, India

N. Rajesh · R. Vadde

Department of Biotechnology and Bioinformatics, Yogi Vemana University, Kadapa, Andhra Pradesh, India

P. Pati

District Headquarter Hospital, Ganjam, Odisha, India

S. K. Rathore

Department of Zoology, Khallikote Autonomous College, Ganjam, Odisha, India





Manoj Kumar Gupta, Gayatri Gouda, S. Sabarinathan,  
Ravindra Donde, N. Rajesh, Pallabi Pati, Sushil Kumar Rathore,  
Lambodar Behera, and Ramakrishna Vadde

## Abstract

In this chapter, the authors attempt to understand the underlying phylogeny principle and how researchers implement diverse methods to discover the appropriate phylogeny. Results obtained revealed that phylogenetic trees reflect evolutionary past as a canonical framework. Phylogenetic tree building step essentially comprises of five steps: (a) selecting molecular markers; (b) multiple sequence alignment; (c) determining the best evolutionary model; (d) determination of tree building method; and (e) assessment of tree reliability. Phylogenetic trees have various functional uses in different biological fields, such as conservation biology, epidemiology, forensics, cancer evolution, HIV transmission, gene expression prediction, protein structure prediction, and drug design. However, researchers face different challenges for generating a more accurate tree, like memory efficiency and implementation and optimization of the likelihood function. The authors believe, in the near future, the development of exciting new

M. K. Gupta · G. Gouda · R. Donde · L. Behera  
Crop Improvement Division, ICAR-National Rice Research Institute, Cuttack, Odisha, India

S. Sabarinathan  
Crop Improvement Division, ICAR-National Rice Research Institute, Cuttack, Odisha, India

Department of Seed Science and Technology, College of Agriculture, Odisha University of  
Agriculture and Technology, Bhubaneswar, Odisha, India

N. Rajesh · R. Vadde (✉)  
Department of Biotechnology and Bioinformatics, Yogi Vemana University, Kadapa, Andhra  
Pradesh, India

P. Pati  
District Headquarter Hospital, Ganjam, Odisha, India

S. K. Rathore  
Department of Zoology, Khallikote Autonomous College, Ganjam, Odisha, India





# Sequence Alignment

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Manoj Kumar Gupta, Gayatri Gouda, N. Rajesh, Ravindra Donde, S. Sabarinathan, Pallabi Pati, Sushil Kumar Rathore, Ramakrishna Vadde, and Lambodar Behera

## Abstract

The sequence analysis is one of the most effective and commonly applied methods (explicitly or implicitly) in biological research. Thus, in this chapter, author attempted to understand the basics of sequence analysis and how researchers implement various computational tools to achieve them. Information obtained revealed that alignment can be either global and local or pairwise sequence alignment and multiple sequence alignment. For performing these alignment, various algorithms like dynamic programming, heuristic algorithms, or probabilistic methods have been developed. Sequence analysis helps us to detect evolutionary relationship as well as scan motifs by taking into consideration of various events, such as mutations, insertions, deletions, and reordering under some circumstances. Thus, sequence alignment serves as an essential requirement for the most of the biological research ranging from genomics to proteomics. However, our perception of alignment biases remains primitive.

M. K. Gupta (✉) · G. Gouda · R. Donde · L. Behera  
Crop Improvement Division, ICAR-National Rice Research Institute, Cuttack, Odisha, India

N. Rajesh · R. Vadde  
Department of Biotechnology and Bioinformatics, Yogi Vemana University, Kadapa, Andhra Pradesh, India

S. Sabarinathan  
Crop Improvement Division, ICAR-National Rice Research Institute, Cuttack, Odisha, India  
Department of Seed Science and Technology, College of Agriculture, Odisha University of Agriculture and Technology, Bhubaneswar, Odisha, India

P. Pati  
District Headquarter Hospital, Ganjam, Odisha, India

S. K. Rathore  
Department of Zoology, Khallikote Autonomous College, Ganjam, Odisha, India





## 3000 Genome Project: A Brief Insight

# 5

Manoj Kumar Gupta, Gayatri Gouda, Ravindra Donde,  
S. Sabarinathan, Goutam Kumar Dash, N. Rajesh, Menaka Ponnana,  
Pallabi Pati, Sushil Kumar Rathore, Ramakrishna Vadde, and  
Lambodar Behera

### Abstract

The main food of half the world's population is rice, *Oryza sativa* L. By 2030, rice production must increase by at least 25% to meet global food demand of ever growing human population. In order to reduce the impact of climate change and arable land loss and ensure stable global food supplies, accelerated genetic gains during rice improvement are highly required. Since this process is complicated, we first need to have detail information regarding the genetic diversity of the

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S. Sabarinathan, Goutam Kumar Dash, N. Rajesh and Menaka Ponnana contributed equally with all other contributors.

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M. K. Gupta · G. Gouda · R. Donde · G. K. Dash · L. Behera (✉)  
Crop Improvement Division, ICAR-National Rice Research Institute, Cuttack, Odisha, India

S. Sabarinathan  
Crop Improvement Division, ICAR-National Rice Research Institute, Cuttack, Odisha, India  
Department of Seed Science and Technology, College of Agriculture, Odisha University of  
Agriculture and Technology, Bhubaneswar, Odisha, India

N. Rajesh · R. Vadde  
Department of Biotechnology and Bioinformatics, Yogi Vemana University, Kadapa, Andhra  
Pradesh, India

M. Ponnana  
Crop Improvement Division, ICAR-National Rice Research Institute, Cuttack, Odisha, India  
Department of Plant Physiology, College of Agriculture, Odisha University of Agriculture and  
Technology, Bhubaneswar, Odisha, India

P. Pati  
District Headquarter Hospital, Ganjam, Odisha, India

S. K. Rathore  
Dept of Zoology, Khallikote Autonomous College, Ganjam, Odisha, India

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M. K. Gupta, L. Behera (eds.), *Bioinformatics in Rice Research*,  
[https://doi.org/10.1007/978-981-16-3993-7\\_5](https://doi.org/10.1007/978-981-16-3993-7_5)





# Brief Insight into the Evolutionary History and Domestication of Wild Rice Relatives

# 4

Manoj Kumar Gupta, Gayatri Gouda, S. Sabarinathan, Ravindra Donde, Goutam Kumar Dash, Menaka Ponnana, Pallabi Pati, Sushil Kumar Rathore, Ramakrishna Vadde, and Lambodar Behera

## Abstract

Plant domestication has significantly influenced the growth of human society. The domestication of rice lists amongst the most significant historical breakthroughs. However, the sources and domestication methods are debatable. Thus, in this chapter, authors attempted to understand in brief about genetic diversity in rice, as well as a description of the processes about the domestication of rice began and at which location rice was domesticated. Information retrieved

S. Sabarinathan, Ravindra Donde, Goutam Kumar Dash and Menaka Ponnana contributed equally with all other contributors.

M. K. Gupta · G. Gouda · R. Donde · G. K. Dash · L. Behera (✉)

Crop Improvement Division, ICAR-National Rice Research Institute, Cuttack, Odisha, India

S. Sabarinathan

Crop Improvement Division, ICAR-National Rice Research Institute, Cuttack, Odisha, India

Department of Seed Science and Technology, College of Agriculture, Odisha University of Agriculture and Technology, Bhubaneswar, Odisha, India

M. Ponnana

Crop Improvement Division, ICAR-National Rice Research Institute, Cuttack, Odisha, India

Department of Plant Physiology, College of Agriculture, Odisha University of Agriculture and Technology, Bhubaneswar, Odisha, India

P. Pati

District Headquarter Hospital, Ganjam, Odisha, India

S. K. Rathore

Department of Zoology, Khallikote Autonomous College, Ganjam, Odisha, India

R. Vadde

Department of Biotechnology and Bioinformatics, Yogi Vemana University, Kadapa, Andhra Pradesh, India





## Introduction of the Databases of Rice

# 3

Gayatri Gouda, S. Sabarinathan, Ravindra Donde,  
Goutam Kumar Dash, Menaka Ponnana, Manoj Kumar Gupta,  
Ramakrishna Vadde, Lambodar Behera, and Trilochan Mohapatra

### Abstract

Rice is one of the world's most important agricultural crops and a model plant that is widely studied. The completion of the complete rice (*Oryza sativa*) genome sequence through high-throughput experimental platforms has resulted in a huge amount of data being generated and specialized databases, and bioinformatic tools for data processing, analysis, efficient organization, and visualization have been developed. In this chapter, we address a set of biological databases that host rice-specific sequence, genetic variation, gene expression, pathways, and gene–

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S. Sabarinathan, Ravindra Donde, Goutam Kumar Dash, Menaka Ponnana and Manoj Kumar Gupta contributed equally with all other contributors.

G. Gouda (✉) · R. Donde · G. K. Dash · M. K. Gupta · L. Behera  
Crop Improvement Division, ICAR-National Rice Research Institute, Cuttack, Odisha, India

S. Sabarinathan  
Crop Improvement Division, ICAR-National Rice Research Institute, Cuttack, Odisha, India

Department of Seed Science and Technology, College of Agriculture, Odisha University of Agriculture and Technology, Bhubaneswar, Odisha, India

M. Ponnana  
Crop Improvement Division, ICAR-National Rice Research Institute, Cuttack, Odisha, India

Department of Plant Physiology, College of Agriculture, Odisha University of Agriculture and Technology, Bhubaneswar, Odisha, India

R. Vadde  
Department of Biotechnology and Bioinformatics, Yogi Vemana University, Kadapa, Andhra Pradesh, India

T. Mohapatra  
Secretary (DARE) and Director General (ICAR), Government of India, New Delhi, India

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M. K. Gupta, L. Behera (eds.), *Bioinformatics in Rice Research*,  
[https://doi.org/10.1007/978-981-16-3993-7\\_3](https://doi.org/10.1007/978-981-16-3993-7_3)