POSTMODERN Voices in Indian English Literature

Editors
Dr. Anuradha
Sanjeev Kumar

This book investigates and maps out myriad layers of postmodern voices in Indian English literature. Transcending genre compartmentalization, the papers vibrantly explore the postmodern sensibility of the authors through characters and incidents that add distinctive flavour in the realm of contemporary Indian English literature. Apart from the "Introduction" by Dr Ashok Verma, that takes a bird's eye view of the major postulations of postmodernism in literature in Indian context, the collection has papers on prominent authors including Salman Rushdie, Amitav Ghosh, Manju Kapur, Shashi Deshande, Anita Nair, Sujata Vijayaraghavan, Gita Hariharan, Chitra Benarjee Divakarurni, Poile Sengupta, Girish Karnad, etc. thereby, projecting the richness and depth of Indian English literature that was once ridiculed as "Matthew Arnold in a Sari." Indeed, the book is another significant river contributing to the great sea of Indian English literature that shall further augment the learning experience and knowledge of the readers in multiple ways.

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Postmodern Women's Consciousness in Shashi Deshpande's *That Long Silence*

Bodavula. Syam Sundar Bhagavan

In the postmodern period, women continued to come out of the cocoon and began to lose their terror. Their literature was substituted by excellence, innovation, honesty, creative skill, and individuality. The postmodern revolution not only brought gender disparity to light, but also encouraged women's spirits and bravery to communicate their difficulties. Creative work was often highlighted in their work.

Postmodernism is the age of modernism. It comprises important advances in writing, science, film design, art, and community. In the postmodern period, perception plays a critical role; truth falls into existence only by understanding. Postmodernism relies on direct knowledge with abstract ideas. It is "post" since it rejects the existence of any ultimate concept and ignores the features of the so-called "modern" mentality. The word "postmodernism" was first invented in the 1870s. The concept was used to define different styles of art and music. In 1942, H.R. Hays identified it as a modern literary genre. It was, though, first used by Arnold J. Toynbee as a historical campaign in 1939. Later, anyhow, the word was used to describe dissatisfaction with modern architecture and led to the movement of postmodern architecture, which is sometimes referred to as the International Style.

Postmodernism is defined by Walter Truett Anderson as one of four typological world views: postmodern-ironic, scientific-rational, traditional, social, and necromantic. In the late 20thcentury,

postmodernist theories of thought, culture and environment intensified the significance of critical theory. Postmodernity, however, is described with a shift in the understanding of the Western belief structure. It is a word which refers to an opinion or trend which is used interchangeably with the word poststructuralist from which postmodernism has evolved. Proper interpretation of postmodernism or accountability towards postmodernist philosophy includes an appreciation of the poststructuralist revolution and the theories of its proponents.

Indian English literature refers to the literary work in the English language of Indian writers, though one of India's languages may be their native language. The phrase is also associated with the work of Indian diaspora leaders, such as Salman Rushdie, V.S. Naipaul, Jhumpa Lahiri and Kiran Desai who are Indian descendants. Sometimes these works are referred to as Indo-Anglian literature. In colonised countries such as India, this distinction is a part of postcolonial literature. Indian English literature is one and a half century old. Sake Dean Muhammad's *Travels of Dean Muhammad*, published in 1793, was the first book written in English by an Indian.

Indian English poetry was first inspired by Western styles of art. Raja Rao's Kanthapura and Rabindranath Tagore's works were famous works of Indian literature among the English audience. Dhan Gopal Mukerji, Nirad C. Chaudhuri and P. Lal were remarkable writers popular with the English audience. Women authors in Indian English literature have made a tremendous effort to keep the pace of the planet. Women's literature explores the internal distress of a depressed housewife, a theme that deals with the marginalised and impoverished lives of lower-class people contained in native languages. Their practice displays a great deal of originality in presenting the issues of women and the community to which they belong. Their delicate depiction of women's roles shows an overwhelming sense of flesh and blood. A sense of dignity is provided by women of the middle and upper classes, mixed in everyday life situations. The international literary front has left its

mark on writers such as Kamala Markandaya, Nayantara Sahgal, Anita Desai, Kiran Desai, Arundhati Roy, and Shashi Deshpande.

Kamala Markandaya raises her voice through her novels about the society of India, which sheds light on the complications of the postcolonial and conventional Indian social order. Nayantara Sahgal's novels see women as hostages trapped in society in their search for belonging. The friction between family and the alienation of middle-class people is discussed by Anita Desai. Through her novels, she focuses on her female protagonists' inner emotions. Kiran Desai, Anita Desai's daughter, points out the difficulties and the problems faced by women considered being a mere weapon.

Arundhati Roy works on topics of social justice and economic injustice. Post-independence has shifted the pattern in the subject and therapy. Writers underscored the relational problems with family and work in the 1980s. Deshpande belongs to this community of authors who have focused on the psychological elements, even though she depicts her characters in a believable manner. The characters come from the traditional Brahminical family, subjected to social pressures and internalised patriarchy. The joint family also plays an important role, with its own set of laws and regulations, in the Indian establishment. Thus, the family plays a key role. The educated Indian women of the middle class feel the friction between this tradition and modernity. In their work, these conflicts are prominent.

The 21st century has seen a huge rise in women of exceptional self-confidence. They also turned themselves from the victim of patriarchal control into an autonomous individual. Their prose has entered a point where their words are heard vibrating throughout nations. A few authors have done their hardest to be self-emergent writers free of this conventional cocoon. Among the women novelists in Indian English literature, Deshpande has taken women's writing seriously. The family and community norms are too restrictive for a woman writer to risk a great deal for her work. The present study reflects on the issues confronted by writers-women protagonists. It is quite plain that this woman writer, with her

knowledge of the challenges she encounters in her life and in her profession, put in better texts in the writer characters she portrays.

Literature has been applied several diverse and practical aspects. A strong elementary education, self-realisation, celebration of multiculturalism and intellectualism have been recorded in post-modern India. It plays a pivotal role in our lives, representing the truth of coping with societal issues and struggling with the dullness that existence offers. However, despite the country's success, there are a few simple items that need to be modified, discussed, and addressed. One of the most critical issues that need to be considered is the topic of women's marginality and their position in contemporary society.

Literary changes have been brought about by national and social changes. However, and with the advancement of a nation, there are some problems that a country continues to resolve, react to, and alter. One such need is oppressed women and their position in today's culture.

Women's postmodern consciousness and crisis achieve room in the writing of many women artists. Shashi Deshpande speaks against the pit of society. The concepts of marriage incompatibility, identity dilemma, imbalanced family ties and patriarchal focus will be discussed with care. Deshpande highlights the crisis faced by women, the answers to the challenges they face and the need for emancipation, even as she look at these topics through contemporary lenses. *That Long Silence*, *The Dark Holds No Terrors and The Little Remedies* by Shashi Deshpande, highlight the struggle and trauma of the shackled female characters and their journey from darkness to enlightenment. The novels present the challenges that women face at both the domestic and social levels.

Shashi Deshpande focuses on showing women a way that is also quite important for a healthy existence by creating the environment and room for women to breathe in the domain of life. Indian English fiction is dedicated to the disclosure of fact. Women continue to endure this loneliness and modesty even in the postmodern period, whether by their own side, which is dominated

by themselves or by the community in which they reside. Literature has created a place for women in a hunt, but this hunt for women's discovery persists still today. Postmodern literature discusses these problems that are still unchanged today. Deshpande has chosen her studies because of her contemporary voice and her concern about the plight of a woman in society to retain her identity as an individual, as a student, as a daughter, as a mother and, above all, as a human being. Indeed, the preferred woman writer does not accuse men, but rather stresses the need to merge partnerships, to allow room and freedom to express themselves. There is a persistent turmoil between patriarchy, self-expression, autonomy and freedom in Deshpande's novels. Her novels focus on the notions of martial incompatibility, identity dilemma, imbalanced family dynamics and patriarchal gaze. Deshpande's female protagonists, thus, vary from self-darkness to self-awareness.

Women are economically and mentally marginalised, even as they continue to rise despite all odds but are constrained in the name of community. Shashi Deshpande, right across the scope of her artistic horizon, often makes it a point for her characters to have a separate room. While Deshpande does not want to be called a feminist writer, she focuses primarily on women-related issues. Mukta Atrey and Viney Kirpal claim, "This experimental usage of the postmodern methodology of deconstructing the oppressive society and traditions and exposes them to be manmade systems" (15). Deshpande sees the need to harmonise the partnership between men and women as equal spouses. Dodiya asserts:

> Deshpande attempts to intimately analyse man-woman relationship within the ambit of family and society. She is primarily concerned with the intriguing problems and the suffocating environs of her female protagonists, who struggle hard in this cruel and callous male-dominated world to discover their identity. Deshpande has thrashed women's problems and situations in a fast-changing social scenario. (67)

The novels of Shashi Deshpande deal with the plight of women at the crossroads of a society dominated by men. She depicts the problem of trained women caught within the

transformative periods of modernity. Deshpande, across all her characters, reflects on the fact and honesty of women. Essentially, she communicates the plight, anger, dissatisfaction, pain and trauma endured by women. In her novels, the woman is caught between custom and modernity, family and career, community, and environment. The characters of Shashi Deshpande are content and refuse to sacrifice their individuality for the sake of adopting society's traditional role models. In her novels, women seek to redefine the roles they play in society and to establish an identity for themselves.

That Long Silence is a passive threat against a culture run by men. Shashi Deshpande is a very strong voice against the male's oppression and a voice against the laws and norms man-made. She symbolises 'victory' ironically but is meant to lead a life like "Sita following her husband into exile, Savitri dogging death to reclaim her husband, Draupadi stoically sharing her husband's travails..." (TLS 11). As there is no meaning in the moment, she does not regard them as a role model. Jaya often serves her spouse, but it is not voluntarily but through the compulsion of culture. Legendary women followed their husbands gladly.

It reveals the tradition that overtakes her, without ever encouraging her to make her own choices. She is compelled to obey her spouse, no matter whether she likes it or not. Therefore, Sarita is a reflection of the traits of a woman who is bound by the nuptial tie, even as she struggles to be compassionate to those she encounters.

That Long Silence is, in truth, an honest yet brutal recognition of the events of civilisation. Two bullocks were yoked together... allowing them to travel in the same direction is more convenient. "Sita following her husband into exile, Savitri dogging death to reclaim her husband, Draupadi stoically sharing her husband's travails..." (TLS 11).The horrific cruelty committed in the name of marriage brings out Jaya. Deshpande does not just focus on the state of Jaya, but on the whole of womanhood. She knows that the only concern is the girl's brother. The option is that male children

are permanent members of the family, the inheritors of the family name. Male children are granted primary priority in the patriarchal culture, and women are simply cast out. The chain of command in the family are the males. In Nayana's words, this is quite clear when Jaya asks her, "why do you want a boy so much?... Why give birth to a girl, behanji, who'll only suffer because of men all her life? Look at me! My mother loved me very much, she wanted so much for me... a house with electricity and water, shining brass vessels, a silver waist chain, silver anklets... and what have I got? No, No, behnji, better to have a son... she gave a contemptuous shrug with the pronoun and I knew it meant her husband, 'he says he'll throw me out if I have another daughter'" (TLS 28).

Deshpande illustrates the most critical issue here: what is a woman's liability when a child is born? Jaya's ultimate aim is the separation from femininity. Her womanhood stifles her; her independence is suffering, and she feels like she is in the gaol. The problem of the women is her survival. She seeks to tell what breaks her lengthy silence. She says that, "I will have to speak, to listen; I will have to erase the silence between us" (TLS 192). She is able to sacrifice her individuality and honour her spouse. Thus, Deshpande discusses in this modern society the plight of any woman. The players are fully conscious and aim for independence in order to build a room for themselves because they are women in a male-controlled culture. Rajiv K. Mallik remarks, they are aware of the social and cultural disabilities to which they are subjected in the male-dominated society. They want to rebel against them in their search for freedom and identity, but they find themselves up against well-entrenched social inertia, conscious of the predicament of a woman in a male-dominated society... She finds them caught in a conflict between their family and professional roles, between individual aspiration and social demands. (138). They are the victims of their own lives.

Deshpande communicates the isolation and bottled up thoughts of the contemporary Indian housewife. Jaya continues to keep quiet and hide her emotions because she prioritises her role as a good wife rather than a good book. Her husband needs her to

avoid blogging, and she still needs to. She says: "I had been ashamed. It had sounded too pretentious, as if I had been taking something that was after all only a hobby too seriously. And so, I had been silent. And I looking at his stricken face, I had been convinced I had done him wrong. And I had stopped writing after that" (TLS 144). Jaya is on the way to progress and about to build a legacy of her artistic profession, she finishes her fiction.

For the pleasure of her family, she compromises her own self. Jaya lives in accordance with the desires and dreams of her spouse, but she ends up just silenced and hollow. By seeking to become a perfect wife and mother, she sacrifices her real life. When she performs self-inspection, she knows this. She sees a long pause that, between her and her husband, has shattered her happiness. Her concerns about herself make her write under the pen name 'Seeta'. But, her stories, one after another, are dismissed. Kamat, her friend, makes her realise the reason behind the successive rejection of her stories due to the lack of strong emotions. She says, "Why? Because no woman can be angry. Have you ever heard of an angry young woman?" (TLS 147). Jaya condemns her feelings and emotions because Mohan her husband sees it as a really poor and unwomanly element. Deshpande's impotence takes a lady out here. Jaya is caught up to take the test and not to escape from the truth. She is a trapped survivor in a culture run by men. She later brings emotions and feelings into her column. Jaya says, 'Seeta' had been born... she had been the means through which I had shut the door, firmly, on all those other women who had invaded my being, screaming for attention; women I had known I could not write about, because they might-it was just possible-resemble Mohan's mother, or aunt, or my mother or aunt. Seeta was safer. I didn't have to come out to write about Seeta. I could stay there, warm, and snug.... (TLS 149)

It makes a point of ignoring its inner consciousness so as not to risk its union. Even if she is well educated, culture does not give way to a woman. It must comply by conventional laws and regulations and the wishes of its family.

Jaya is also very quiet and does not rebel at her marriage against even changing her name from Jaya to Suhasini. In a way to keep her husband happy, she embraces it. She says, "So many subjects were based that the silence seemed heavy with uneasiness" (TLS 27). Nearly all women are confronted with the same situational change that comes from male influence, traditions, and practices that in turn propagate male law. It is even clear when Vanitamami counsels her saying, "A husband is a sheltering tree... without the tree, you're dangerously unprotected and vulnerable... And so, you have to keep the tree alive and flourishing, even if you have to water it with deceit and lies" (TLS 32). Deshpande focuses on how women struggle because of the so-called discrimination between male and female. It is clear when the family tree is seen in Ramukaka's terms. Jaya is stunned when she hears that female genders are omitted from their family tree. She asks, "I'm not here! 'You!' He had looked up, irritated by the interruption impatient at my stupidity. 'How can you be here? You don't belong to this family! You're married; you're now part of Mohan's family. You have no place here'... 'But, but...I'd stammered...And I had swallowed my questions- the questions I'd wanted to ask Ramukaka too, but hadn't dared for no one ever questioned Ramukaka, the head of the family." (TLS 143)

In reality, all women in this culture have heard the very terms. They move unknowingly around their position here and there. Deshpande lifts her voice against the existing patriarch. In this book, Deshpande rejects the idea that men, also in this modern society, are treated as main and secondary. Women's liberation is not enough, and men's preference is provided.

Jaya is a woman caught in a war between submission and validation. She has been threatened with her husband's persistent accusations and claims that when she defies him, it comes out harshly against him. She understands finally that it was not Mohan who was sorry, but herself for her pain and triumph. She thinks she has time to leave the victimised soul's pit behind. It is up to her to be the original Jaya. At the end of the book, she chooses to rupture the isolation that opens the universe to her true selves, from desperation

to expectation, from self-abandonment to self-assertion. When she speaks, her resolve is well established, "I will have to speak" (TLS 192). Jaya is like any woman living according to the society's whims and expectations. She lives her life as planned. She is an average woman who sacrifices to the family and, in exchange, is hollow. Jaya is a theoretically smart lady, but she conceals up with the dogma that swallows civilisation.

Shashi Deshpande gives a really clear message through Jaya: women should take responsibility for what they are. They will start transforming their life and resolving their challenges in the way of change through self-analysis and self-understanding. *That Long Silence* is the preparation of a woman towards the voicing which will break the silence and offer solutions because "Life has always to be made possible" (TLS 193).

Jaya turns her affection and anger, loves, and dislikes towards her husband and her entire life circumstances. Her courage sweets you and she is a fresh, independent, disobedient lady, self-confident. Many of these attributes label women's postmodern characteristics. But Jaya's spirit is not generous or full of this new position.

The internal turmoil she is dealing by. Shashi Deshpande helps her to analyse her own silence and ruin her emotions. She even says about Mohan, "He accused me of not caring about the children, of isolating myself from him and his concerns, even of some obscure revengeful feelings that were driving me to act this way" (TLS 120) Through placing Jaya's true identity at the heart of the book, Deshpande made it quite obvious.

Jaya is a paradigm of patience, courage, loyalty, integrity, fear, trust, and rebellion. In Jaya, the conventional passive woman contrasts with Jaya's modernist individuality. Jaya performs two parts, one as a faithful wife, and one as a modern woman and the CE's wife for the sake of her life. Jaya is shown to be her husband's wife. Deshpande's novels have demonstrated a woman's reluctance to compose and use literature as a free form for interacting with others. Jaya knows that the culture she works in is muted by her speech.

She lives within the boundaries of her self-expression through her observation. When Mohan publishes her tale in a magazine, which received an award, he says, "They will know, all those people who read this and know us, they will know that these two persons are us... How could you write these things?"(TLS 143)

Jaya, too, observes her servant Jeeja's frail existence. Her husband had a decent career at the mine, but he lost it following a strike at the mine. The man became a drunkard and Jeeja was alone and started running the household. Jeeja thus became a devoted girl, a stupid slave who was burdened with supplying his family with bread and butter. The book binds modernity and its structures. A subservience which suppresses them in the degree to which they have spent their whole existence before understanding, as Jaya does, that they have not started their existence yet as their functions in society have not been fulfilled. This subservience has gained the approval of women and makes them mute. Patriarchy, without status or any particularity, is the popular enemy.

At the end of her contemplation, Jaya recalls how women's protagonists did not speak in Sanskrit, but in Prakrit in Sanskrit. This brings her to the conclusion that she had incorrectly read her own subjectivity. Jaya has experienced the silence forced on her in the novel. She is now revising her view of herself as a silenced topic. She realises that what had been imposed on her is not silence, but a 'different language': "I have been speaking Prakrit myself" (TLS 193).It is not because of 'silence,' not because of passive subjectivity, if they have both felt unheard. That is because the "normative" debate, the oppressive institution of correspondence, runs against the "alien" vocabulary. In this way, her reflection of her subjectivity as practised in the Patriarchal Dialogue falls to her with this understanding. If she was quiet in Prakrit, it means her vocabulary is "unheard," rendered not just ignorant but often "unsounded" by men's debate. Now, if she herself viewed her life as silenced, "I will have to erase the silence between us" (TLS 192). It is so because she too had not recognised the nature of her language.

When Mohan condemns her not as a dutiful wife, Jaya notices that she cannot contain her laughter. She continues to talk to her husband and children as he leaves her. Her determination is very clear when she says, "I will have to speak, to listen; I will have to erase that long silence between us" (TLS 192). Jaya describes the life and concessions of Jaya, a middle-class woman who leaves her future for the sake of family unity and harmony. She is a really sincere representation of women who stand out and pose numerous everyday concerns.

Through the end of the novel, Jaya wonders what she had achieved by the writing and concludes saying, "I'm not afraid anymore. The panic has gone. I'm Mohan's wife. I had thought and cut off the bits of me that had refused to be Mohan's wife. Now I know that kind of fragmentation is not possible" (TLS 192).

Jaya would dismiss her impression of happiness because her fantasy image of a very happy family is different from the real image, she has of a very violent family partnership. As she knows that in this culture she is like a sparrow. Jaya figured if she stayed home taking care of her children and being far from the word, that it would be safer. She says, "I know better now. I know that safety is always unattainable. You're never safe" (TLS 17).

Jaya now views herself in an entirely different light. In her own way, she looks at things. She even says, "This in not Mohan's story entirely. I'm writing it down, I have put together so many things-things he told me, things he left unsaid as he told me this story, things I have imagined myself, and the expression on his face as he spoke to me"(TLS 34). Jaya's improvement is well shown in her phrases.

Shashi Deshpande stands apart as an Indian woman novelist, for she writes about a specific concern in her own way. Her writing, with unique observations and finesse, links the relationship of the author to her work. Shashi Deshpande's main concern is to reflect the distress and tension of the new educated Indian woman, caught between patriarchy and tradition on the one hand, and self-expression, individuality, and independence for women. She

analysed a series of popular domestic crises that sparked the hunt. Deshpande's interest and compassion are mainly for women. While revealing the struggle of women to gain self-respect and self-identity for themselves, the author indirectly exposes the different forms of injustice in our society, including sexual oppression faced by women.

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Chapter 3

EVOLUTION OF CRYPTANALYSIS TECHNIQUES: A REVIEW

***Mohammad Sirajuddin*[1,*] *and Ande Prasad*[2,†]**
[1]Department of C.S.E, Koneru Lakshmaiah Education Foundation (KLEF), Guntur, Andhra Pradesh, India
[2]Department of C.S, Vikrama Simhapuri University, Nellore, Andhra Pradesh, India

ABSTRACT

Cryptanalysis is the process of determining the decryption scheme without the knowledge of the algorithm and the key used. This chapter brings out a discussion on the cryptanalysis of various prominent security algorithms. This chapter also describes recent cryptanalysis schemes along with future challenges. The role of advanced concepts like AI and DNA computing in designing cryptanalysis schemes are also explained in this chapter.

* Corresponding Author's Email address: siraj.cs@gmail.com.
† Corresponding Author's Email: prasadjkc@yahoo.co.in.

Keywords: cryptanalysis, DNA computing, security

1. INTRODUCTION

The concept of Cryptography plays a vital role in ensuring secure communication in various domains. Due to the popularity of machine learning and deep learning techniques, many researchers are developing security frameworks in various domains by incorporating these advanced techniques to ensure secure and reliable communication. Cryptanalysis is also having equal importance as cryptographic schemes because cryptanalysis is required to test and determine the weaknesses of existing cryptographic schemes. The fundamental concept behind the cryptanalysis is to determine the decryption process without knowing the cryptographic algorithm and key employed for encryption.

2. METHODS

2.1. Cryptanalysis of Block Ciphers

The design of Block ciphers is a well-established research area since its inception. The design of block ciphers with adequate security levels against differential and linear cryptanalysis is always been a challenging task [10].

This section explains the advances made in the cryptanalysis of block ciphers. First, we explain Linear, differential and integral cryptanalysis schemes.

Differential analysis is the most prominent attack on block ciphers. This concept brought into light by Biham and Shamir around 1990. The main objective of the differential analysis is to determine the key based

on the differences between input and output patterns. Variations in the mapping of plaintext to ciphertext are used to determine the key. In concise, a fixed differential of any plaintext is chosen first and then output the differential of the ciphertext, assigning them with different keys according to different probabilities. By analyzing the ciphertext, the legitimate key can be determined.

Provable security against differential cryptanalysis can be accomplished by finding differential probabilities upper bounded by small enough value [10].

Linear Cryptanalysis comes under known plain text attack. It uses the concept of linear approximation expression between plaintext, ciphertext and the key. Linear approximation can be determined as *ciphertext = f(plaintext,key)* where an attempt is made to find a linear approximation of f. It uses a chain of XOR operations between plaintext and ciphertext bits which are assumed as a linear relationship between plaintext, ciphertext and key bits. It is represented as

$$P[X_1+X_2+\ldots.+X_N] \oplus C[Y_1+Y_2+\ldots.+Y_M] = K[K_1+K_2+\ldots.+K_R]$$

where $X_1,X_2,\ldots.X_N$ *are plaintext bits and* $Y_1,Y_2,\ldots.,Y_M$ are the ciphertext bits.

Multiple approximation cryptanalysis is an advancement of linear cryptanalysis because it reduces plaintext pairs that are needed by the ciphertext.

We refer hybrid cryptanalysis as the combination of linear and differential cryptanalysis. The fundamental idea is:

a. To determine some linear approximation.
b. Produce the output differential features pair according to linear approximation making the probability of linear expression correlated with existing linear expression equal to 1.

c. Combining the linear approximation with differential properties leads to the restoration of some key bits.

Integral Cryptanalysis

It is applied to block ciphers that employs bijection component. The fundamental principle of this attack is to restore the key bits by analyzing the values obtained during several rounds of the key transformation [10].

2.2. Cryptanalysis of RSA

RSA is a very popular cryptosystem in use since 1978. It is an asymmetric algorithm whose security levels rely on factoring large numbers. Due to this reason, the cryptanalysis of RSA takes more time or even months and years. This cryptanalysis can be accomplished in a sophisticated amount of time by using an advanced distributed environment or by using some machine learning schemes. Vikrant et al., [9] cryptanalyzed RSA algorithm for any length of key by sharing the workload of cryptanalysis in a distributed environment. They proved that the use of sufficient number of resources will reduce the cryptanalysis time. In their work, they used Quadratic Sieve Factorization Algorithm over a distributed network to reduce the time of cryptanalysis. In this work, they used aglets which are java mobile agents responsible for finding the factors of given n value in a distributed way. These aglets are allowed to communicate with one another by passing messages. In this propounded framework Quadratic Sieve Algorithm (QSA) is executed in a distributed way with the practical implementations of aglets. The process of cryptanalysis is shown in the figure below [9].

It is impractical to use a single system for the cryptanalysis of RSA. Usage of mobile agents for sharing of factorization tasks in a distributed

environment will reduce the processing time required for cryptanalysis. This system can cryptanalyze the RSA with any size of keys. Increasing the number of systems reduces the time of cryptanalysis task.

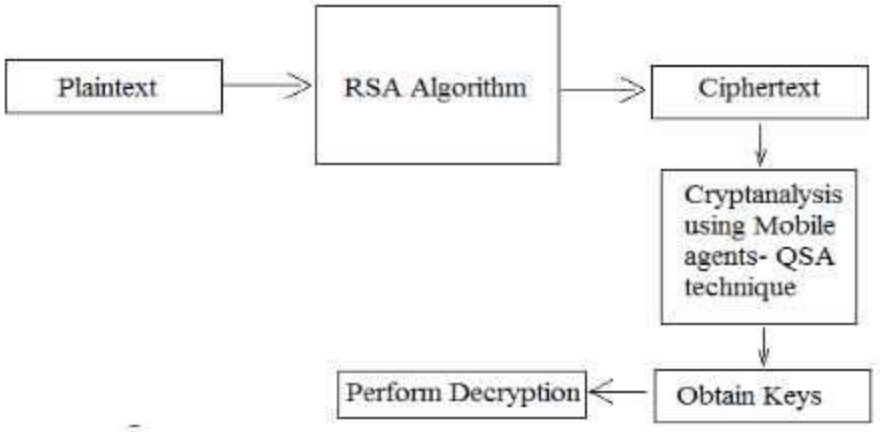

Figure 1. Cryptanalysis of RSA using QSA.

The cryptanalysis results were shown in the following table.

Table 1. Cryptanalysis performance [9]

Value of N	p	q	Number of Systems	Time in Seconds
16843009	257	65537	1	0
			2	0
8030434459	8581	935839	1	10
			2	7
			3	5
123712084919	325309	380291	1	115
			2	74
			3	50

Usage of cloud environment along with machine learning schemes will automate the cryptanalysis tasks within a short span of time. These

advanced schemes can be used to make the cryptosystem more powerful than the existing ones.

2.3. Neural Cryptanalysis

Today neural network concepts became prominent in most of the applications. They are not only used for data analysis tasks but also employed in the process of cryptanalysis. Artificial neural networks can be used to automate the task of cryptanalysis. This helps the cryptanalyst to determine the weakness of the cryptosystem being used.

Riccardo Focardi et al. proposed a threat model to determine the weaknesses of classical ciphers [6]. They accomplished the cryptanalysis of these ciphers by introspecting the statistical structure of ciphertext. The neural network was trained by providing statistical features along with the key. With the help of this data, the neural network can predict the key from the given ciphertext. This propounded model automated the cryptanalysis of modern ciphers.

i. Cryptanalysis of Ceaser Ciphers:

This section explains how neural networks can be trained to restore the key by supplying relative frequencies of ciphertext letters to the model. In this model, the frequencies of the characters of ciphertext are measured and frequency histogram was obtained. This obtained histogram was the circular shift of the plain text histogram. From this, it was analyzed that the brute force approach is not required instead a neural network can be trained to determine the relative shift for the frequency histogram. The approach followed is represented by the following steps [6].

a. Consideration of large dataset of English plaintexts encrypted using random keys

b. Computation of frequencies of each letter in the ciphertext.
c. Training of neural network by giving the frequencies as input and corresponding keys as output.
d. Testing of the network on various independent datasets.

ii. Neural Cryptanalysis of substitution cipher:

Substitution cipher involves the substitution of each letter in plaintext with another. Typically the key is considered as permutation of characters. In this n-grams statistics are maintained. This property is important from an attacker's point of view and it gives the foundation for an attack.

A neural network can be employed to verify the weakness of substitution cipher. Riccardo Focardi et al. used a neural network based on n-grams to introspect how far a given text is from an English one, such that it gives a possibility of applying better substitution, e.g., swapping of two characters [6]. Also, n-grams are required to define a score function that specifies the quality of a given key i.e., how good a given key is and also permits searching for a better one through random swaps. The following steps were used in this model.

a. Considered a big data set of English plaintexts encrypted using random keys.
b. Determine the frequencies of n-grams of both plaintext and ciphertext.
c. Train the neural network by providing the frequencies as input and one bit of output: 1 when the input is plaintext and 0 when the input is ciphertext.
d. Test the neural network on independent datasets.

They also considered an attack strategy that picks a random key, decrypts the ciphertext and uses the neural network to estimate how close the obtained plaintext is to English and, consequently, to the target plaintext. This strategy swaps random letters searching for a

suitable plaintext. If the neural network produces a better score then the new key is considered, otherwise again random swap is performed. Goodness value is used to determine how better the new key is. In this way, a neural network can automate part of the cryptanalytic attack.

2.4. AI Based Cryptanalysis

Today, Artificial Intelligence (AI) is the predominant technology used everywhere for automation and analysis tasks irrespective of domains. In this section, some cryptanalysis schemes based on AI techniques are reviewed. Research has been carried out in automating the task of cryptanalysis by using machine learning algorithms. Usage of machine learning algorithms not only determines the weakness of cryptosystem but also assists in the development of strong cryptosystems to ensure a high level of security.

Shaligram Prajapat et al., illustrated the concept of cryptic mining by employing AI techniques [1] [3]. They explained AI enabled cryptosystem that accepts ciphertext and produces the corresponding plaintext. This scheme is recommended in a situation where cryptanalysis intends to obtain plaintext from the ciphertext. AI enabled cryptanalysis scheme proposed by Shaligram Prajapat et al. used on substitution cipher [1], [3]. The problem of generating plaintext from ciphertext comes under the category of intractable problems. In the recommended system a knowledge base is used which comprises of grammar related rules, spellings, vowels, consonants, etc., and also the rules for generating possible combinations of meaningful plaintext from the given ciphertext. This knowledge base is used to perform substitutions in iterations n-grams wise starting with n-gram=1. A pattern matching concept is also employed to generate suitable three word letters. The process of recommended cryptanalysis is shown in Figure 2 below.

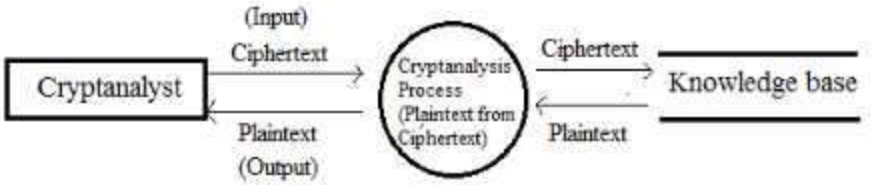

Figure 2. Process of Cryptanalysis.

In Figure 2, cryptanalyst gives ciphertext as input to the cryptanalysis process which in turn gives ciphertext to the knowledge base and then various procedures are executed with respect to the given ciphertext to obtain the meaningful plaintext. The obtained plaintext is the output of the recommended cryptanalysis scheme [1, 3].

Limitations:

a. Works only for substitution and transposition ciphers.
b. Considers only English language based cryptanalysis.
c. It doesn't consider special characters during cryptanalysis.
d. Supports only n-gram < = 3.

To perform better cryptanalysis this machine learning algorithms must be used.

Jayachandiran proposed a novel model based on neural networks to perform cryptanalysis on a lightweight cipher called Simon cipher [8]. In this technique, a neural network takes plaintexts along with corresponding ciphertexts to produce the key used for encryption. To accomplish this task neural network is trained to predict the key of plaintext-ciphertext pair. This prediction is made approximation function computed by neurons. This recommended model works well with one round of the Simon cipher [8].

ML algorithms can be used in cryptanalysis to extract the keys from the ciphertext. Similarly, ML algorithms can be merged with the existing cryptanalysis techniques for improving the efficiency in finding the weakness of cryptosystems.

2.5. DNA Based Cryptanalysis

It is one of the most prominent concepts in the field of information and network security. It is an interdisciplinary field that demands DNA based parallel computing infrastructure. As today most of the modern cryptosystems are broken by the use of advanced concepts, the DNA based cryptosystem opens up a new door for ensuring information security [4, 5]. DNA based cryptosystem involves complex bimolecular computations. These biomolecular computations require biological methods that could be implemented through parallel computation. By using this scheme strong cryptosystems can be developed. According to Sattar B et al., biological computations can be performed to produce variants of DNA models [4]. These DNA models could address various NP class of problems. Due to the parallelism nature of DNA models, DNA based cryptanalysis can analyze the cryptosystem in less amount of time. Sattar B et al., also outlined the challenges in this domain which are listed as follows:

a. Transformation of principles of biological concepts from the biological environment to the digital environment.
b. Supports limited ciphers and not tested for other available ciphers.
c. Minimizing the cost of implementation of DNA based computation.
d. It difficult to convert DNA functionality from the bio-environment to the digital-environment.
e. Representation of available data.

As the power of computation is increasing day to day, even advanced cryptographic schemes can be easily broken by the cryptanalyst. In fact, there is a huge demand for innovative and strong algorithms for ensuring information security. To determine the strength

and weakness of complex cryptosystem within less time the DNA based cryptanalysis is required. This concept of DNA cryptanalysis lacks the strong and acceptable theory and practical contributions which are nevertheless still a challenging problem to design efficient DNA cryptanalysis schemes.

As DNA computing has many advantages (like parallelism, requires minimum storage, minimum power and long storage time) it can serve the field of cryptanalysis. More research has to be carried out in DNA based cryptography and cryptanalysis [4, 5].

3. FUTURE CHALLENGES

This section flashes the light on the advanced techniques that can be used in cryptanalysis.

- Quantum computing is still in the early phase of research. Applying quantum computing in cryptanalysis of quantum/ post quantum cryptosystems is a challenging task [7].
- ML techniques can be used to determine the keys from the ciphertext. Still, more work has to be done in this area.
- As mentioned earlier, DNA-based computing in cryptanalysis requires more study and gives a new direction of research in cryptanalysis.
- Novel Optimization algorithms can also be used for cryptanalysis. Mohamed Abdel Basset et al. proposed a Novel Whale Optimization Algorithm for cryptanalysis in the Merkle-Hellman cryptosystem.

CONCLUSION

In this chapter, the importance of cryptanalysis was explained along with some recent cryptanalysis schemes. This chapter also outlined the future direction of research in the domain of cryptanalysis and how advanced and emerging techniques can be used for analyzing the complex cryptosystems.

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WOMEN IN CONTEMPORARY SOCIAL REALM: NEW PREDICAMENT AND EMERGING STRATEGIES

Edited by

Dr. VANKAYALAPATI VENKATESWARLU

CONTENTS

HEALTH AND WELL-BEING OF ELDERLY: NEED OF SOCIAL WORK INTERVENTION

***K. Sumeetha and **B. Venkata Subbareddy**
*Assistant Professor, Dept. of Social Work,
Vikrama Simhapuri University, Nellore
**Academic Consultant, Dept. of Social Work,
Vikrama Simhapuri University, Nellore

Abstract

Health is the most important factor for well-being of the elderly since they are prone to diseases due to degenerative changes. Coronary heart disease, digestive problems, visual and locomotor disabilities are widely reported by the elderly. Healthy life style is necessary to maintain good health status. Geriatric services are yet to develop in India and the available health system is inadequate in meeting the needs of a large group of the elderly.In this context a study has been carried out at a village in Nellore Rural Mandal, Nellore district with certain objectives such as to assess the health status of the elderly, to explore the impact of psycho-social changes on health of the elderly and Identify the significance of social work intervention in improving their health .Interview schedule, focus group discussions were used to elicit information regarding socio-economic and demographic status. Inventory to assess health status (Ramamurti, 1996) was administered on respondents to elicit information regarding their health. Data was processed with the help of SPSS 20 .0 and the result of the study revealed that most of the elderly are possessing poor health status . Spouse andoffspring's are taking care of the aged while they are ill. Further study indicated that there is a significant association between psycho-social changes and elderly health status. Eventhough the aging process cannot be stopped, being aware of the changes and adopting a healthy lifestyle can enhance the overall health of the elderly.

Introduction:

Ageing is a natural phenomenon; it refers to a multidimensional process of physical, psychological and social changes.One out of every ten people on the planet is now 60 + years. The population of elderly (especially very old) is increasing rapidly throughout the developed and developing world. The Indian society has experienced far reaching changes in its social, economic and political set up. Changes in social spheres during old age such as retirement, widowhood, loneliness, role change (role reversal) and multiple losses create many problems for elderly. This clearly indicates that the elderly wellbeing is associated with the psycho- social and their physical status.

Physical changes due to aging can occur in almost every organ and can affect elders' health and lifestyle. Psycho-social issues also play a role in physical

- More awareness is to be created through print and electronic media to promote elder well being.
- Sensitizing the community about elder abuse and promote wellbeing.

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GENDER DISCRIMINATION:
Equity and Justice

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Dr. VANKAYALAPATI VENKATESWARLU

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CONTENTS

GENDER DISCRIMINATION OF ADOLESCENT GIRLS WITH DISABILITIES (ASD): EXPERIENCES AND PERCEPTIONS OF PRIMARY CARE GIVERS: IMPACT OF SOCIAL CASE WORK INTERVENTION

Dr.R.Madhumathi
Assistant Professor, Department of Social Work,
Vikrama Simhapuri University, Nellore

Introduction

National data reveals that an overall, 2.21% of Indian population has one or the other kind of disability and approximately 2.68 crore people in India are disabled. Among the disabled population 56% (1.5 Cr) are males and 44% (1.18Cr) are females. In the total population, the male and female populations are 51% and 49% respectively. (Census, 2011 updated 2016).

Evidence from the literature and the field study shows that, due to gender discrimination, the girl child hated even before birth in many cultures. On birth she is either killed or exploited (Sherwani, 1998). A girl child has never been considered an equal to male child and right from her birth she has to face a society which considers her inferior and as a liability. They are treated with contempt and deprived of the love, care and affection (Chatterjee,1980).

The practice of gender discrimination has its roots in the society, and it is reinforced by norms, values, culture, caste, class and religion. Gender discrimination begins early in life, with female infants having a lower chance of survival than male infants, owing largely to the parental neglect of female infants. It is double, when female child has disabilities. The Girl's need for education, food, love, and care is underestimated and many parents consider it a sheer waste of money (Sherwani,1998). Biases started from birth and girls are given secondary status in every stage (Devasia and Devasia,1991). In the study of Parveen (2007) it is mentioned that rural areas thought to be the root cause for gender discrimination. And in the study of Aslam (2007), further elaborates that generally, parents select comparatively better schools, in context of quality, for their sons. Daughters are ignored or enrolled in the schools having lower fees and fewer facilities. Significant gender discrimination is found in health care spending for children while the households face resources scarcity (Asfaw, Klasen, Francesca & Lamanna,2007)

Due to gender discrimination, many social issues crop up like feticide, infanticide, low school enrollment, child marriage, dowry harassment and domestic violence, decrease in sex ratio, kidnapping, Rapes etc. It is more severe, when girl or women who are having disabilities either physical disability or mental disability. This paper tries to explaining about the problems of Adolescent girls with disabilities with special reference to Autism Spectrum

Disorders, and study and explores the experiences and perceptions of primary caregivers of girls with disabilities about gender discrimination and their worries and fears about the future of their children from the community setting of Chittoor district of Andhra Pradesh.

Adolescent Girls with disabilities face many obstacles in their struggle for existence. Many girls and women with disabilities face double discrimination, due to disability and being women. The women with disabilities are typically seen as helpless, dependent, victimized and passive. To date , the situation of girls and women with disabilities in India has not been given the visibility and political importance it deserves and requires. Although on the one hand, problems relating to girls and women and on the other, problems relating to people with disabilities are being addressed separately with increasing attention and urgency, so serious approach has yet been taken to tackle the dual form of discrimination to which girls and women with disabilities are subjected.

There is still an insufficient level of awareness of the existence of this twofold source of discrimination, its effects have been largely unresearched. It remains masked behind each of its constituent parts and any measures taken appear to be based on the idea that the two aspects of the discrimination should be dealt with separately.

Autism Spectrum Disorder is a neurological pervasive developmental growing disorder 1 in 59 are affected with this disorder.(CDC,2018). They are diagnosed fundamentally based on behaviour and they have core impairments in social interaction, communication as well as restricted and repetition behaviour.Society is treated autism as disease or disability. It does not understand the problems of adolescents with ASD and their families. Stigma is attached to it. There is no cure for ASD, and no global consensus regarding which intervention strategies are most effective. Chronic management, often using multiple treatment approaches may be required to maximize functional independence and quality of life by minimizing the core ASD features, facilitating development and learning, promoting socialization, reducing maladaptive behaviours and educating and supporting families. There are very few support services available for children with Autism. Many services (special Education, Therapies, Vocational Training etc) facilities are accessible at cities than semi urban and rural areas. Though there are support services for individuals with developmental disabilities through Sarva Siksha Abiyan, (SSA) programme, but support from these services are not adequately utilized or meet the challenges of children and families of individual with Autism.

Review of literature traces that less data on therapies for adolescent or young adults exists than for younger children and such research is increasingly important as the prevalence of ASD continues to grow and as children with ASD diagnoses reach adolescence.

The present study is an attempt to explore the case studies of primary care giver's experiences and perceptions about gender discrimination of Adolescent girls with disabilities (Autism Spectrum Disorders) in community settings of Chittoor district of Andhra Pradesh.

Aim of the Study:

The aim of the study was to explore the experiences & perceptions of the primary caregivers of adolescent girls with disabilities (ASD)

Objectives of the study:

The specific objectives that sought to be addressed were;

1. To understand the psychological issues affecting primary care givers of adolescent girls with Autism Spectrum Disorders (ASD) with reference to gender discrimination.
2. To Know the social and economic encounters of primary care givers of adolescent girls with ASD with reference to gender discrimination.

Methods and Materials:

Taking in to consideration of the research objectives, mixed method research design was adopted in which higher weightage was given to qualitative methods. The present study was extracted from the Major Research Project entitled "Efficacy of Social Work Interventions for Children with Autism Spectrum Disorders and their Families" funded by ICSSR, New Delhi, conducted in Nellore and Chittoor districts of Andhra Pradesh.

Sample:

The researcher by adopting purposive sampling method only 3 cases were presented based on the severity of gender discrimination faced, from a sample of 40 cases of main study with children with ASD. Out of which 55% of children are 6-11 years and 45% of children are 12-18 years. Among these groups 20% are females and 80% are males with autism. Among 20% of females, 3 cases were extracted for present paper to analyze gender discrimination among girls with disabilities (ASD)

Tools for Data Collection:

The following research instruments were used for the present study

S.No.	Tool
1	Intake Form (Socio-demographic Information Schedule)
2	Indian Scale for Assessment of Children with Autism (ISSA)
3	Case studies – recorded and transcribed
4	Functional Assessment Checklist for Programming(FACP)

Data Collection:

With the support of Sarva Siksha Abiyan data, cases were identified from the community settings of Chittoor district. The researcher contacted the parents over phone with the support of Inclusive Education Resource Teacher (IERT),

before attending them in home explained about the purpose and nature of study. The interview's were planned according to the convenient time of the primary care giver (mother).Interview method and observation methods were adapted for data collection, where a detailed face to face interview was carried out . Each interview took around 45 minutes to 1 hour to complete. An informal verbal consent was taken from the respondents and assured that the data will be used only for the purpose of research. After 14 sessions data saturation was reached. The researcher and her team (two Research Assistants) visited the homes of adolescent girls with ASD periodically for a period of 9 months. Interventions were given based on assessment by using FACP . Interaction with parents and families of Adolescents with ASD, goals and objectives were selected.(Social case work sessions were conducted with the Primary caregivers of adolescent girls with ASD and pre and post intervention scores explained about the importance of social case work in reducing gender discrimination and involve all the family members in giving training to the adolescent girls with ASD and improvements were noted.

Case Studies:

Case-1

Case 1, Aged 13 years girl with moderate level Autism Spectrum Disorder, residing in Chittoor district of Andhra Pradesh. Born as eldest daughter to rural, middle class (Rs.15,000/- per month), Hindu , nuclear family. She has younger brother studying 3rd class. Parents studied up to graduation. Mother revealed that they identified the problem at the age of 30 months.By observing language and interaction difficulties attended Christian Medical College (CMC).Vellore and undergone training for 3 months. After identifying the problem in case 1, there were conflicts in the family. Parents came to Chittoor from their village in the year 2009 for education of their children.

Case 1- mother felt that her husband favoured her son and not shown interest towards daughter and did not treat them equally. In the words of mother "*My husband not at all shows interest towards my daughter. He always likes my son I am getting angry about my family members attitude. My mother –in-law is the main person, and she is residing with my sister-in-law in neighbouring house. She did not like to see my daughter's face. She always tells to my husband your daughter is waste. No use. You have to head down in the society because of your daughter. For all these, your wife is the responsible. At any time son will look after you and the family*"

He thought that it is the responsibility of the mother to look after the girl and has unenthusiastic attitude towards daughter and more interested towards his son. Mother suffered with emotional trauma during her pregnancy due to adjustment problems with her mother-in-law, sister–in-law and her husband.

Mother (42 years) of case -1 also expressed that "whenever *my daughter shows any improvement, when I told to my husband he is not at all shows any interest.*

He told that you and your daughter enjoy it. For me my son is enough. For him son is the only person living in the home. my daughter and I not shown to his eyes"

Further she added that, whenever he bought any food items, he did not share it to his daughter. I only have to share food to my daughter.

Mother mentioned that I would like to take my daughter to social gatherings but due to various comments from my family and in-laws, and my husband and other relatives I do not want take my daughter to outings as well as functions"

I have planned to commit suicide with my daughter . I was alive because of my father, mother and sister. They told that you have two children one daughter and one son. Son also your child. Do not get aversion to him. As his father told disinterest, he also shows disinterest towards his sister. It is very pricking to me"- Mother of case 1 revealed.

There is history of medication and changing of schools, and finally they attended Bhavitha centre (Community Centre for Special Education) at Chittoor, but not attending regularly and have dissatisfaction about services available at the centre.

Case-2

Case 2 – is a 15 years girl with moderate autism, who is youngest daughter of her parents. She has elder brother. Residing in a joint family (6 members),at Renigunta near Tirupati belongs to Hindu religion and monthly income of family is Rs.20,000/-Father doing work in Railways, mother house wife. Both the parents are educated,(degree). Normal delivery, pre-mature baby (one week).Birth weight 3.5.k.g., after delivery 3 days in hospital (incubation). Diagnosed as ASD at the age of 24 months. Case 2 Shows aggression, over activity, language difficulties, feels more appetite.

Mother (40 Years) of case 2 revealed that[1] *"I have lot of pressure to look after household activities. My son is in 10th class. My In- laws are more conscious and attentive about my son.Due to my daughter problem I was not able to cope with. No one help me. I was the only person look after the needs of whole family. My husband is relative to me(Consanguous marriage-2nd grade). In my family I have to supply coffee, tiffins, lunch and dinner time to time to my mother-in-law and father-in-law. My daughter has behavioural problems. My mother in law did not allow my daughter to go to SSA, because she is a girl.By sitting and eating in home without activity, my daughter became obese. My family is blaming me for my daughter's behaviour. They did not give me freedom to control my daughter. They over pampered at early age, no schooling, now they are blaming me. Every day morning I worried how the day is going to be and no service help us to overcome this"*

Case-3

Case 3 – is a 14 years girl with moderate autism, who is youngest daughter of her parents. She has elder sister. Residing in a extended family (5 members),at Juvvala Dinne, K.V.Palli mandal near Piler , belongs to Hindu religion and

monthly income of the family is Rs.6,000/-. Case -3 was a Pre-mature baby born with normal delivery at Government hospital, Madana Palli, after delivery baby and mother was hospitalized for two days.(Incubation). Problem was diagnosed at the age of 8 years. Both parents have no formal education. Eldest daughter is studying 8th class at KV Palli. Whole family involved in agricultural works, mother- in -law died, father –in-law look after Sheep rearing (2 in number)
Parents have no knowledge about disability. Enrolled at SSA, but not sending the daughter to Bhavitha Centres, irrespective of many remainders.
In the words of Mother (38 years)- *We are very poor. Daily we have to work. For my elder daughter school teachers provide Mid-day meal. Sir (IERT teacher) asked to send my youngest daughter to school. I am the only one look after the needs of the family. My husband goes to the fields morning. I have to prepare food and take it to my husband and father in-law. I became tired with Cleaning, cooking, watering, washing clothes, look after younger daughter and go to the fields. No time for me to send my daughter to Bhavitha school which is 5 kilometre away. Being a girl, and innocent, do not know anything. How can I send? If she were a boy, I would have send. I am worried about abuse and harassment towards my daughter. Days are not good. My daughter is infront of my eyes, It is enough for me.*"
From these episodes we can observe the gender discrimination and also disability discrimination in the families of adolescent girls with ASD.

Intervention:

From the above pieces of episodes with primary care givers of adolescent girl with Disabilities(ASD),It was found that gender discrimination was observed and being a girl, and being women, the primary care givers also struggled with social roles and humiliation, over burdened and stigmatized.

Researcher and her team started the intervention by explained the purpose and need of visit to the primary care givers of adolescent girls with ASD. Explain the importance of training and education, and how it influences the future of their daughters. After 3 to 4 sessions, all the primary care givers agreed and accepted to involve in the training programme of their daughters. Along with visits, phone calls are made both sides to maintain rapport. Confidentially was maintained. Task analysis, prompts, one-on –one training, reinforcement for every successful attempt, every day training for a period of 3 hours helps the girls with adolescents to improve. After 3 months (1st,2nd &3rd month) they observed the improvement in selected Self Help skills of their children which motivates the family members to show interest in the training programme. In Second phase of time i.e.in 4th,5th and 6th months involved elder and younger siblings in self help skills(Brushing, Grooming, and in academics) except in case-2(Where the elder sibling is studying 10th class and not disturb him, instead of it mother in law agreed to look after breakfast to their family members with the support of servant aid, during that time mother of case -2 involved in training programme of their

daughter. By the third phase all the mothers are willing to come to Bhavitha centre and arrange autos to take their daughters to Bhavitha centres initially for two half days in a week and slowly 4 days in a week with the support of other parents of children with disabilities.By the end of 9 months(7^{th},8^{th} and 9^{th} Month) there was a tremendous change in the attitude of primary care givers and as well as family members in accepting the child and involve in training programme of the child at their free time or relieve the mother from her household work and make mother to involve in the training programme. Negative comments were reduced. Interactions with other mothers Sharing feelings and knowledge were improved. Now the parents are getting emotional support from each other and also from other parents of Special Needs Children, IERT teacher and other professionals. Evaluation at 3,6,9 months point of time and revealed the findings. Fallow up was done for a period of 3 months through phone call. All the primary caregivers are involving in the training programme with the support of family members is continuing.

Major Findings of the study:

- **The socio-demographic profile of the adolescent girls revealed that**
- Majority 66.6% of children are in the age group of 13 to 15 years.
- 66.66% of parents diagnosed autism in their children at the age 36 months
- 66.6 % of children have born on second birth position.
- 66.6% of children with Autism born with birth weight of 3 k.gs and above.
- 66.6% of mothers suffer with emotional problem during pregnancy
- 33.3% families are belongs to low income group.
- 66.6% of children have language difficulties
- 33.3% of children have temper tantrums and aggression

Demographic details of primary care givers

- Majority (67%) of parents are in the age group of 40 - 45 years.
- Majority (67%) of parents (Fathers) education levels is Degree.
- Income: Majority (67%) of parents monthly income is between Rs.15,000/- to Rs:20,000/-.
- Majority (100%) of the parents are Hindus in this study.

Improvement in functional skills of Adolescent girls with ASD after intervention:

After involvement of primary care giver and family members of adolescent girls with ASD in the training programme with social case work intervention for a period of 9 months and the results shows the improvement in functional skills of cases are as follows:

Case 1 improved in eye to contact while talking with strangers(75%), informing about her toilet need in outside home (100%),washing hands(100%), mixes rice with curry(100%), removes and wears kurtha

(75%), identifying yellow and red color(100%), writes father name, mother name and phone number and address(100%), involved in textile work(75%).

Case II improved in brushing skill(100%), Grooming (85%), tying pyjama (90%), selection of dress(100%), Cooperates in walking along with mother and grandparents(80%),Sweeping the floor(60%), sitting in yoga class and practicing asana(75%), involving in gardening, watering plants(80%).

Case III improved in her brushing skills(100%), dressing skills (tying pyjama(100%), toileting skills(cleaning self(100%),reducing wondering behaviour and involving in drawing activities(80%), writing name ,mother name, father name and address(100%), Sweeping the floor (70%).

Suggestions for the wellbeing of caregivers of adolescent girls with ASD:

- Families of ASD need to ventilate their emotions with the professionals and attend the professionals as early as possible once the parents identified the signs and symptoms of ASD.
- Parents and grandparents of children with Autism need to develop reciprocal relationships with other parents of disabilities.
- Involve all the family members including siblings in the training programmes of persons with disabilities, which reduces burden and fear among primary care givers as siblings are future caregivers for persons with disabilities especially girls and women with disabilities.
- Awareness among the family members help them to develop social net work with close relatives (majority maternal side) and friends, which helps them to overcome the problems of rearing of individuals with disabilities.
- Develop self determination and decision making among parents of ASD by interacting with other parents of special Needs Individuals.
- Specialized knowledge is required to solve the problems and provide appropriate rehabilitation measures to girls and women with disabilities.(ASD)

Conclusion:

- The study proved that Social Case work intervention with behaviour principles with 17 sessions (14 Individual Sessions and 3 group sessions) can improve the functional level of adolescent girls and reduces the gender discrimination among the families by creating awareness, knowledge about the disability, teaching of training techniques, and build up the confidence and self esteem among primary care givers and provided opportunities to the adolescent girls with ASD to learn and become independent in some self help skills.

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In the present work the basic aspects for the creation of the database were analyzed and an attempt is made for the required software development from the results obtained by sequencing the blood samples using 16 STR markers covering both dry and wet lab work. Programming languages essential for the creation of the data were to be examined and to develop the web application for the maintenance of the allelic data which otherwise represents the DNA database or DNA fingerprint identity (as every person has the unique DNA) with user friendly interface having multi functionality for uploading the allelic data and personal information of the individuals as it gives individual identity, with a search option within the database for obtaining results of the query.

G. Vidya Sagar Reddy
Ch. Vijaya

Isolation and Genotyping of Random Human Blood Samples

For DNA Profile Data Base

Dr. G. Vidya Sagar Reddy, Ph.D, is currently working as faculty in Department of Biotechnology at Vikrama Simhapuri University, Nellore, A.P. India.

Dr. Ch. Vijaya Ph.D, is currently working as Associate Professor and Head, Dept.of Marine Biology, Vikrama Simhapuri Univresity, Nellore, A.P, India.

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Dr. Vijaya Chalamcherla

Dr. Vijaya Chalamcherla, presently working as Associate Professor and Head, Dept. of Marine Biology of Vikrama Simhapuri University, Nellore completed post graduation in Appl. Microbiology from Sri Padmavathi Mahila Viswa Vidyalayam, Tirupati, and PhD in Biotechnology from JNTU, Hyderabad. She has published more than 40 research articles/ editorial in reputed National and International Journals and presented research papers in more than 50 National and International Conferences/Seminars including Malaysia. Organised 2 National level Workshops and 2 National Conferences. Serving as a reviewer for 3 International Journals. Worked as a Co-investigator for a Ministry of Forestry and Environment, New Delhi funded research project and completed a minor institutional project FRGS. Serving as research supervisor and guiding scholars for PhD and two PhD students were awarded. Member of Scientific academic bodies like AMI (Association of Microbiologists of India); BRSI (Biotech Research Society of India), NIUCBD (Network of Indian Universities on Cultural Biodiversity), SBC (Society of Biological Chemists). Resource Person and delivered talks at National Conferences/Seminars. Received three Academic Awards for securing highest percentage of Marks in Graduation. Paper setting, evaluation and Viva -Voce Examiner for various Universities. Received Global Peace Award -2016, Distinguished Scientist award- 2016, and SENIOR WOMAN EDUCATOR & SCHOLAR AWARD -2017. Authored one book entitled Fish and Fisheries: Current Issue (2016) SBW Publishers, New Delhi.

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Dr. Vijaya Chalamcherla

PRINCIPLES OF IMMUNOLOGY

This book covers various fundamental aspects of microbial Biotechnology starting from scope of the subject to the recent applications. Aspects of microbial fermentation technology, detailed production process of economically important microbial products like glutamic acid, citric acid, acetone and other foods-beverages etc., were included in the book. Recent advancements like Single Cell Protein, Mushroom production, Biofertilizers, Biopesticides, vaccine production, biofuels were mentioned in detail. Environmental biotechnology concepts like bio bio-leaching, bio-remediation and waste water treatment were also given importance and were explained in this book. More over this book may serve as instant notes for Under Graduate and Post Graduate Biotechnology students who study microbial biotechnology during their course.

Dr. Ch. Vijaya, M.Phil., Ph.D., is currently working as an Associate Professor and Head in the Department of Marine Biology, Vikrama Simhapuri University (VSU), Nellore, A.P, India.
Dr. G. Vidya Sagar Reddy, Ph.D., is currently working as Academic Consultant (Teaching faculty) in the Department of Biotechnology, VSU, Nellore, A.P, India.

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Fundamentals of Microbial Biotechnology

Vijaya Chalamcherla
Vidya Sagar Reddy Gundarapu

Fundamentals of Microbial Biotechnology

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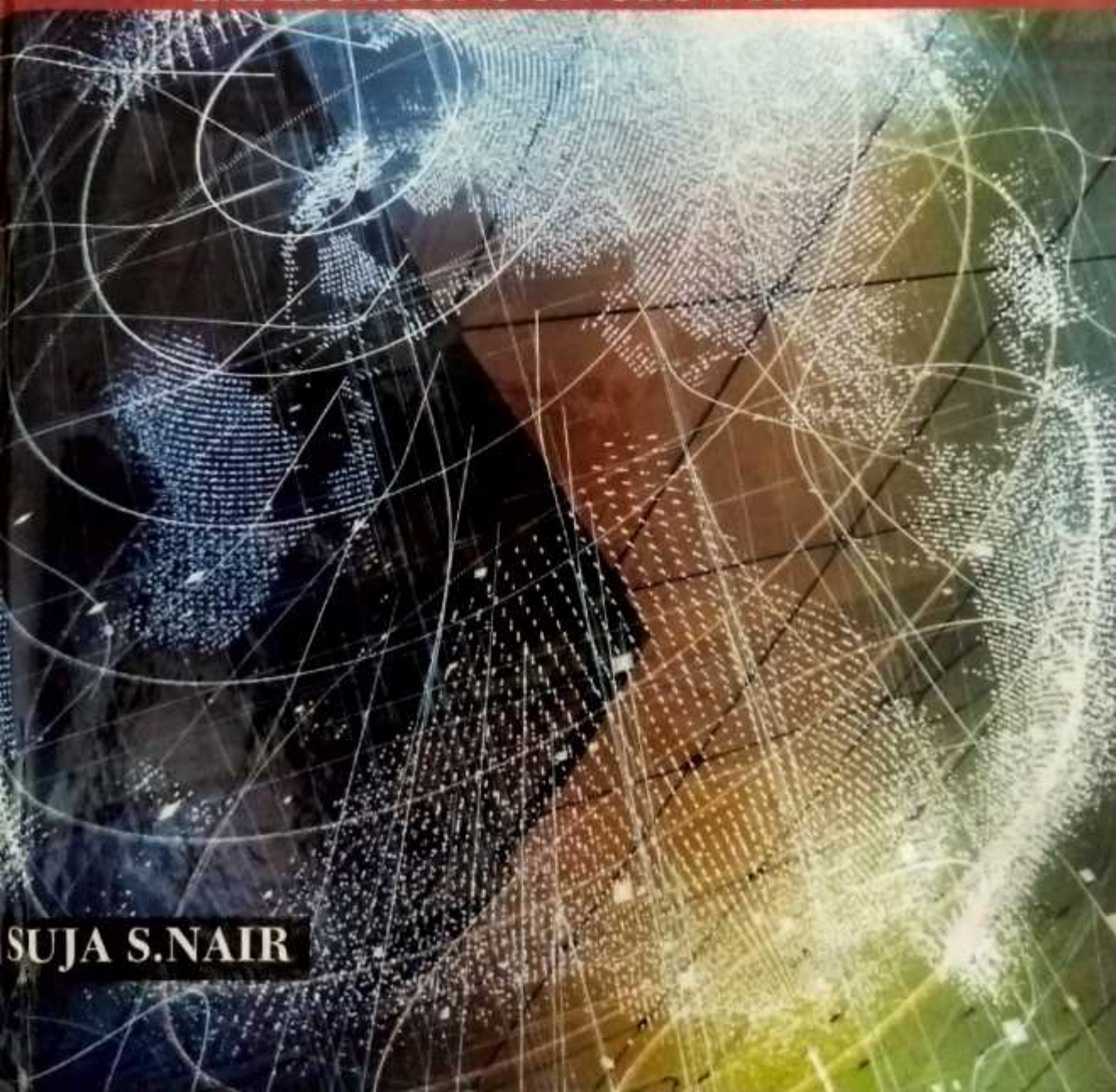
IMPACT OF GLOBALIZATION ON MSME'S

PROSPECTS, CHALLENGES AND POLICY IMPLICATIONS ON GROWTH



SUJA S.NAIR

95

Small to Medium Enterprises in Fisheries to Alleviate Poverty and to Strengthen Blue Economy in India: An Overview

Dr. Vijaya Chalamcherla
Dept. of Marine Biology, Vikrama Simhapuri University, Nellore, A.P. India-524320

ABSTRACT

With its coastline of about 4,800 km having an Exclusive Economic Zone (EEZ) of 200 nautical miles, the marine wealth in EEZ belongs to our county. The fisheries and aquaculture sector offers great promise to the Indian economy. It has experienced an incredible 11 fold increase in fish production over the length of just six decades, from 0.75 MT in 1950-51 to 9.6 MT during 2012-13. This has placed the country as one of the frontrunners in global fish production, second only to China. This sector stimulates growth of numerous subsidiary industries and provides livelihoods to over 14 million economically backward workers, fishermen especially. Also, the silver sector's huge growth potential and export capacity has triggered foreign exchange earnings in the value of over $3.5 billion. Notwithstanding such impressive growth, the Indian fisherman's average annual production is only two tonnes per person compared to 172 tonnes in Norway and 72 tonnes in Chile. Besides, the fisheries sector is fraught with several other structural and developmental challenges. Yield optimisation and development of sustainable technologies are among the more disconcerting bottlenecks. These factors adversely affect industrial growth and make performance unreliable and difficult. This further prejudices investment opportunities and makes entrepreneurs reluctant to participate or contribute on any substantial scale. Consequently, the subsidiary sectors of navigation, oceanography, aquarium management, breeding, processing, export and import of seafood also underperform. The importance of addressing these issues and taking effective developmental measures cannot be overstated. It is required to make necessary structural and administrative changes to ensure that these hindrances don't keep us from fully realizing the potential of this promising sector.

Key Words

Aquaculture, MSMEs, Blue economy, Food security, Sustainable ...

Introduction

Fisheries and aquaculture is an important sector for food ... the country. The sector provides nutritional security to ... contributes to agro exports and provides employment to ... Indian fisheries and aquaculture contributes to ... fish production, 1.1 per cent of the GDP and ... GDP. Seafood exports from India have increased by ... past 15 years to touch $6.5 billion, making India the ... seafood exporter (National population commission (NPC), ...).

The National Fisheries Authority like all governmental agencies is tasked to implement government's overall policy objective to alleviate poverty and provide income opportunity to the bulk of the population. The authority promotes sustainable use of fisheries, aquaculture and marine ecosystem resources in line one of the commitments of APEC's Ocean and Fisheries Working Group through the license process in issuing fish buying and factory licenses. This strategy is effective in connecting fisheries resources at rural coastal areas to cash through to both domestic and export markets for fish, prawns, lobster and reef fisheries.

On the other side, fishery scientists have stressed the need for strengthening entrepreneurship initiatives in aquaculture sector to improve the health of blue economy in the country. They also said that small scale entrepreneurs, especially women self-help groups, can play an important role in boosting the domestic aquaculture production (Adegbite and Oluwalana, 2004; Ugwumba, 2010). Women aquapreneurs can play a key role in developing the fish farming sector in the country by setting up small scale entrepreneurial initiatives in ornamental fish culture and fish seed rearing. Besides, they can also go for the culture of live feed for fish larvae, crab fattening, crab seed rearing, shell craft industry and pearl culture, and user-friendly equipment developed by CIFA such as FRP portable hatchery and automatic feed dispenser have helped the farmers to become entrepreneurs and self-reliant and thus aquaculture is the better source for ensuring the food security (Olowosegun et al. 2004).

Strategic Focus

SME has been identified as a vehicle to deliver broad government policy objective of poverty alleviation and income generation for the rural population through developing coastal fisheries and aquaculture that have access to export market through ecologically friendly harvesting methods (Adegbite et al, 2008; Adeogun et al, 2008).

To ensure re vitalization and growth is experienced in all SME fishing

industry through identification of effective development and marketing strategies/concepts;

Realizing the potential for the development of the industry through appropriate technology, logistical efficiency and infrastructure at all stages from harvesting to retail;

To ensure there is harmony in all what is done by the GoPNG through NFA to growing the SME Fishing Industry.

Principles for Investment in Aquaculture

Designing investments to target the specific opportunities and overcome the constraints of each location. Although the role that aquaculture can play in alleviating poverty and creating wealth is increasingly understood, actions must nonetheless be location and context specific.

Adopting a sustainable livelihoods approach (SLA) to identify livelihood opportunities and key constraints, and to identify and manage risks, especially with regard to the abilities of users to operate and sustain aquaculture. Decision support tools and post-hoc analysis of aquaculture hot-spots complement SLAs in identifying opportunities for aquaculture to improve resilience and create wealth.

Pursueing technologies that increase productivity, protect environmental flows and minimize the consumption of environmental services. For aquaculture to be sustainable it must adopt an ecosystem approach and be mainstreamed into coastal zone and watershed management planning. Codes of Conduct and Best Management Practices must be promoted.

Conducting market analysis to identify current and future opportunities and understand that markets can evolve rapidly. Securing access to input and output markets is essential for sustained uptake and benefits. Access of poor aquaculturists to export markets can be limited because of low food safety standards and because prevailing traceability and certification schemes are top-down and favor larger businesses.

Understanding the roles of services, facilities and support infrastructure and the policy environment. Where there is weak governance and an unfavourable enabling environment it may be necessary to build compensatory strengths in the community, civil society, private sector, NGO s etc., in order to maximize sustainable and equitable benefits. Public-Private Partnerships may provide a cost effective and efficient means to address market deficiencies (Bello,2000; Ayinde et al.,2002).

Expanding Opportunities for Aquaculture

Micro, Small and Medium aquaculture Enterprises (MSMEs): While adopters of small scale cage aquaculture, IAA and rice-fish culture are more resilient to external shocks such as climate change and market

fluctuations, they secure limited economic benefits. Some small-scale aquaculturists choose to specialize in fish farming and make the transition from household-based economies to MSMEs; others do so by specializing in hatcheries, feed production and trading. The proportion of small-scale farmers that take this route remains comparatively small however, and the rate of adoption is slow and dependent on long-term support (Dada, 2004).

Private Public Partnerships: PPPs are increasingly viewed as an effective means of conducting research, developing new technologies and deploying new products for the benefit of small-scale producers. For example, access of Vietnamese river catfish farming MSMEs to European markets was initially facilitated by public sector support of a PPP between farmers, an organic certification scheme and importers. In a decade this has developed into a million tonne export oriented industry.

Export-oriented aquaculture: Where large volume, low cost export commodities, such as tilapia (Lake Kariba) or river catfish (Vietnam), are being produced benefits to the poor are largely through limited employment opportunities and greater availability of affordable food. Recent studies have shown that the poor can derive benefits by engaging in the aquaculture of high value species such as grouper and shrimp, but there are nonetheless considerable barriers, particularly in terms of accessing export markets. Food safety, traceability and certification are increasingly important but few schemes provide equitable benefits. As subsectors mature, intensification, consolidation and a top-down approach to certification and the costs of compliance tend to exclude the poorest, other than in terms of low-wage employment (Olomola, 1988; Olaoye, 2007).

Further, NFA has realised the importance of SME in bringing economic development to the communities. Therefore even in remote areas where people lack market access NFA has assisted SMEs by partnering with major resource developers such as mining, agriculture and forestry to assist with power and other facilities to get fishing and processing up so that fishers can sell their catch. Easy access to finance is one key components of starting or running a business. NFA has created a revolving facility of K15 million with National Development Bank in 2007 with first instalment of K5 million remitted to NDB for fisheries business operators to borrow money(Olaoye, and Odebiyi, 2010). Considerable demand is placed on NDB by small fishers but they cannot access due to stringent requirements. Therefore NFA through its Board has approved K10 million in 2014 budget to be rolled out through Nationwide Micro Bank Limited and PNG Microfinance Limited with K5 million each. On the training and capacity, these areas will be covered including business planning, accounting package for small businesses, business contracts, audit and certification and export through creation of niche market for example eco-labelling (Mueller, and Jansen, 1988; Kherallah Edward and Olawale, 2000).

NFA has been supporting SMEs in the fisheries sector in the following areas:

1. Organises SME fisheries consultation meetings for interaction and information sharing bygovernment and industry players.
2. Export market awareness through seafood exposition programs
3. Project Development Funding under the SME category of funding
4. Training of SME operators in post- harvest operation courses, and HACCP
5. Export market development through product branding that is eco-labelling
6. Piloting fisheries co-operatives to tie fragmented fishers into groups amendable to moving volume to markets and for extension services
7. Set up inshore fish aggregating devices (IFAD) in various fishing areas in order to reduce over use of reefs and improve catch
8. Build fish markets, jetties, and ice plants.
9. Pilot trap net fishing techniques also for coastal fisheries
10. Funding provincial fisheries with logistics and infrastructure under Provincial grants

The current SME fisheries development strategy has been synchronised with the National SME Master Plan which is orchestrated by the current PNG Government.

Constraints

The key constraints affecting SME as identified by NFA includes;

- Access to finance
- Access to markets
- Access to business infrastructure and facilities
- Access to information
- Access to skills development
- Access to appropriate technology

Table1. Industry Wise Distribution of Enterprises and Employment of Micro, Small and Medium Enterprises as per Fourth All India Census 2006-07 (At 2-Digit Level of NIC-2004)

NIC Code	*Characteristics/ Industry*	*Number of Enterprises(in Lakh)*	*Employment (in Lakh)*
05	Fishing incidental to fishing, Aquaculture service activities	00(Regd) 0.01(Unregd) 0.01(Total)	00(Regd) 0.03(Unregd) 0.03(Total)

Table 2. Industry Group-Wise Distribution of Number of Entrepreneurs Memorandum (EM-II) Filed by Micro, Small and Medium Enterprises (At 2-Digit Level of NIC-2004) 2007-08 to 2011-12

	No. of EM-II filed				
Description	*007-08*	*2008-09*	*2009-10*	*2010-11*	*2011-12*
Fishing, Aquaculture service activities incidental to fishing	28	05	34	15	13

Summary

The Department of Animal Husbandry, Dairying and Fisheries is the main authority for development of the fisheries sector in India. It undertakes various production, input supply and infrastructure development programmes and welfare-oriented schemes, besides initiating appropriate policies to increase production and productivity in the fisheries sector. However, The State's efforts to optimise production and productivity, augment export of products, generate employment and cater to the fishermen's needs all play a cardinal role towards holistic development of the sector. It is most important for the State to implement rational and preemptive policies, attract public and private investments, govern properly and efficiently and form a sustaining ecological resource base. Also, the attention of foreign investors needs to be captured and their involvement needs to be made easier by cultivating an environment conducive to business ideas and innovations.This can be facilitated by steering clear of the various intervening layers of middlemen in the sector and making business investment easier and more transparent. Development of infrastructural facilities and EEZs for foreign investors will tremendously benefit the fishing industry by plugging the gap of inaccessibility into remote and obstructed corners of the sector, thereby fully facilitating growth potential and enhancing foreign exchange earnings. A liberalized, well-organized and transparent business route will also reduce the risk of diminished returns and provide a sound policy base of foreign capital investment. A well-performing fishing sector will also induce growth in subsidiary sectors and ultimately bolster the economy.

Besides, fish care and product developments are areas that need to be looked into. Inputs to marine fisheries development such as improving marketing of fresh fish internally, improving cold storages and ice plans and cold chains need to be made. Product development and fish care also involves catering to the needs international organizations like the EU; large-scale funding is needed to provide infrastructure at fishing harbours and landing centers to improve fresh fish handling and provide sanitation and other assistance for quality processing of the produce. Most major stocks have been fully exploited and India's marine fisheries production has reached a plateau. However, further exploitation has to come from deep sea resources, like inland production, exploitation of deep sea resources also has to come from aquaculture. Aquaculture is the principal factor in this development.

Conclusion and the way forward

The strategic goals that have been identified to move the sector forward can be summarized as follows:

- Sustainable utilization of the resources
- A profitable, competitive and innovative SME Industry sector
- A governance framework to support the modernization of the sector
- Empowerment of coastal fishing communities

However, there has not been a mention of 'blue revolution' in this year's budget, a subject dear to Prime Minister. Today, fisheries or aquaculture do not enjoy benefits of agriculture, even though the sectors come under the purview of Department of Animal Husbandry, Dairying and Fisheries (DADF), which is a department in the Ministry of Agriculture. This needs to be corrected. The country still needs the services of partner members of APEC to promote its mostly wild capture fishery through niche market development and promotion of the products for export. That will only unravel cash income opportunity and resource management at the community level. Investment into conservation of aquatic resources and genetic biodiversity and research is another thrust area for the future.

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Skill Enhancement for

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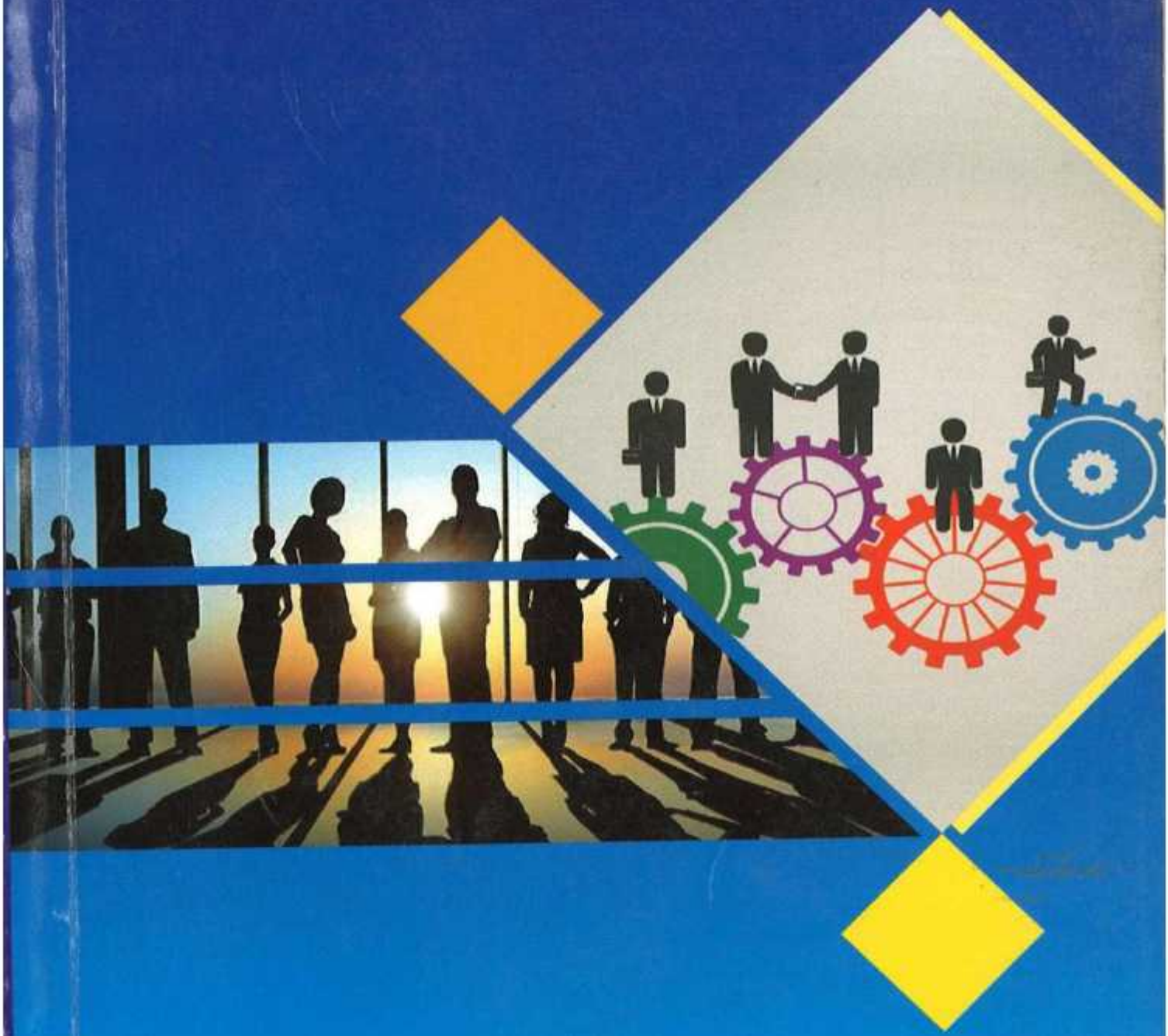

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Core Employability Skills for Human Resource Development

Kusuma .A

Introduction

Employability skills can be considered as one of the components of human capital. Human capital is closely related to skills and abilities of an individual. It has been conceptualized as competency, attitude and behaviour embedded in an individual. Employers perceive that skill set of an employee is an economic value which has been measured as human capital. Skill development will improve their productivity and earnings as well. Employers want to employ people who are productive. During the recruitment process, the employers identify productive candidates by assessing the employability skills of the candidates. Vocational and technical skills are essential, but employers are seeking applicants with much more than these basic requirements. They want employees who can continue to learn and adapt; read, write and compute competently; listen and communicate effectively; think creatively; solve problems independently; manage themselves at work; interact with co-workers; work in teams or groups; handle basic technology, lead effectively as well as follow supervision. These core skills for employability are both important to employers' recruitment and to enhance an individual's ability to secure a job, retain employment and move flexibly in the market as well as to engage in lifelong learning. Employability entails much more than the ability to get that first job. It has the capacity to network and market oneself, navigate through a career and remain employable throughout life. It requires the ability to ask questions, acquire new skills, identify and evaluate options, understand rights at work including the right to a safe and healthy work environment, adapt successfully to changing situations and the courage to innovate.

Employability Skills can be defined as the transferable skills needed by an individual to make them 'employable'. 'Employable Skills' are mostly soft skills. Employability skills build upon and strengthen those developed through basic education, such as reading and writing, the technical skills needed to perform specific duties, and

professional/personal attributes such as honestly, reliability, punctuality, attendance and loyalty. Core work skills are often neither certified nor formally recognized.

Need for Employability Skills

Employability skills are important because the labour market is intensely competitive, and employers are looking for people who are flexible, take the initiative and have the ability to undertake a variety of tasks in different environments. From the viewpoint of employers, employability skills are more of a service that employees offer to the company. Employability skills act as a performance indicator for employers and these are employee's contribution to the development of the company.Employability skills enable an employee to fulfil the needs of the employer and the company and to combat challenges faced by the company.

Components of Employability Skills

Employability skills can be categorized into eight sets of skills. The most important employability skills are

1. Communication Skills: Communication skills relate to listening & understanding, speak clearly & directly, write to the needs of the audience, use numeracy effectively, establish & use networks, persuade effectively, negotiate positively, empathize forcefully, being assertive, share information and read independently.

2. Teamwork Skills: Teamwork skills relate to the ability of the employees to lead a group and to work with others effectively. These skills contribute to enhance the productive working relationships and outcomes, work with people of different ages, gender, race, religion or political persuasion, know how to define a role in the team, apply teamwork skills to a range of situations, identify the strengths of team members, coaching, mentoring and giving feedback

3. Problem Solving Skills: Apply problem-solving strategies across a range of areas, develop creative and innovative solutions, develop practical solutions, show independence and initiative in identifying problems and solving them in teams, apply a range of strategies to problem solving, use mathematics including budgeting and financial management to solve problems, test assumptions relevant to the specific

situation, and resolve customer concerns in relation to complex project issues.

4. Self-Management Skills: Employees with self-management skills will have a personal vision and goals, evaluate and monitor their own performance, have knowledge, ideas and confidence in their owndecisions and come forward to take responsibility.

5. Planning and OrganizingSkills: Planning and Organizing skills comprise skills tounderst and short-term and long-term planning, manage time and priorities – set timelines, coordinate tasks for themselves and with others, take initiative and make decisions, adapt resources to cope with contingencies, establish clear project goals and deliverables, allocate people and other resources to tasks, plan the use of resources including time management, participate in continuous improvement and planning processes, develop a vision and a proactive plan to accomplish it, predict –weigh up risk, evaluate alternatives and apply evaluation criteria, collect, analyse and organize information, and understand basic business systems and their relationships.

6. Technological Skills: Technological skills consist of a range of basic Information Technology (IT) skills that can be applied to management and to organize data. The employees with basic IT skills will be willing to learn new IT skills to ensure that their skills are up to date. The employees should aware of the impact of technology on the chosen field of activity.

7. Learning Sills: The employees should have enthusiasm for ongoing learning, manage their own learning and open to new ideas and techniques. They should be prepared to invest time and effort in learning new skills, acknowledge the need to learn in order to accommodate the change. They should also be willing to learn in any setting – on and off the job, contribute to the learning community at the workplace, use a range of mediums to learn – mentoring, peer support, networking, information technology & courses and applying learning to technical issues and people issues.

8. Initiative Skills: This skills enable the employees to translate new ideas into action, identify opportunities not obvious to others, adapt to new situations, and develop a strategic, creative and long-term vision. They will be creative to generate a range of options and initiate innovative solutions.

How to acquire employability skills?

A holistic approach is needed to develop and acquire these skills. The following are the important approaches to acquire the employability skills:

1. Formal Education: The formal education and training systems will play a greater in developing core employability skills and ensuring lifelong learning for all. This presents major challenges for education and training systems. It is crucial to ensure quality education and it can be acquired through learning practices to equip people for work with more emphasis on learning by doing, working in teams and thinking creatively, developing reliable and efficient assessment methods so that the skills developed are recognized by employers. The core skills can be acquired through good quality primary and secondary education, complemented by relevant vocational training and skills development opportunities, prepare future generations for their productive lives, endowing them with the core skills that enable them to continue learning. Secondary school is an important channel through which young people acquire skills that improve opportunities for good jobs.

2.Academic Curriculum: Cognitive research suggests that the key employability skills, such as critical thinking and problem-solving, are dependent on deep content knowledge and hence these cannot be taught in isolation. So, teaching such skills requires innovative ways of delivering the academic curriculum.

3. Project-Based Learning Approach: A project-based learning approach simulates the workplace so that people will gain real world and acquire the core skills.

4. Mentoring: Organizing and mentoring programmes link students with professionals or young workers to give students access to networks is another way to acquire employability skills. The opportunity to practice communications skills is equally essential.

5. Using Social Media: Social media canen rich the training process and facilitate the management of internships and placement of youth in formal jobs.

Ways to Improve the Employability Skills

Skill improvement and development is essential for increasing the productivity and sustainability of enterprises and improving working

conditions and the employability of workers. Accordingly, the following are the ways for improving the employability skills:

1. Adaptability: Change is vital for the people to be adaptable. The more adaptable, it is easier to the people to understand the job and work accordingly. Adaptability is one aspect that will keep anyone a step ahead of his or her close contenders and make work easier even if there is a considerable amount of change.

2. Familiarity with the latest technology: At present most companies make use of the latest technology. Hence, updating and keeping familiarity with the latest technology will immensely help a person in remaining employable.

3. Soft skills: The technical skills are vital in getting employed and the soft skills are important in being employable throughout the peoples' career. They are important to maintain a good rapport with co-workers and to help maintain harmony.

4. Constant learning: It is important for the people to keep learning the latest developments of the trade in order to be up to date with the market. It is the right time to gear up to face the realities and demands of employment and job market.

5. Self-evaluation: Self-evaluation will help the people to understand their positions better by indicating what their strengths and weaknesses. It also helps the people to analyze the areas in which they must improve. It's always good to be aware of their strong points and how they can build on them through their professional journey.

6. The training addresses: The employees should be aware of the key features of employment contracts, social security systems, occupational safety, health issues and conditions of work. The identification of hazards in the workplace and measures to minimize those risks would enable the young workers to manage the conflicts, if any, in the workplace.

Conclusion

Human capital is referred to as a process of acquiring training, education and professional initiatives to improve the knowledge, skills, abilities, values and social assets that will lead to employee job satisfaction and performance while improving the performance of the company. Employability skills are very important to the present day. At

present, the government of India initiated skill development policy which will improve the employability skills and this policy will be very useful to the present youth. The future of employability skills in vocational education for young people and unemployed you this bright. Enhancing the employability skills will motivate the Indian graduates to produce their best and to achieve their goals in global labour market.

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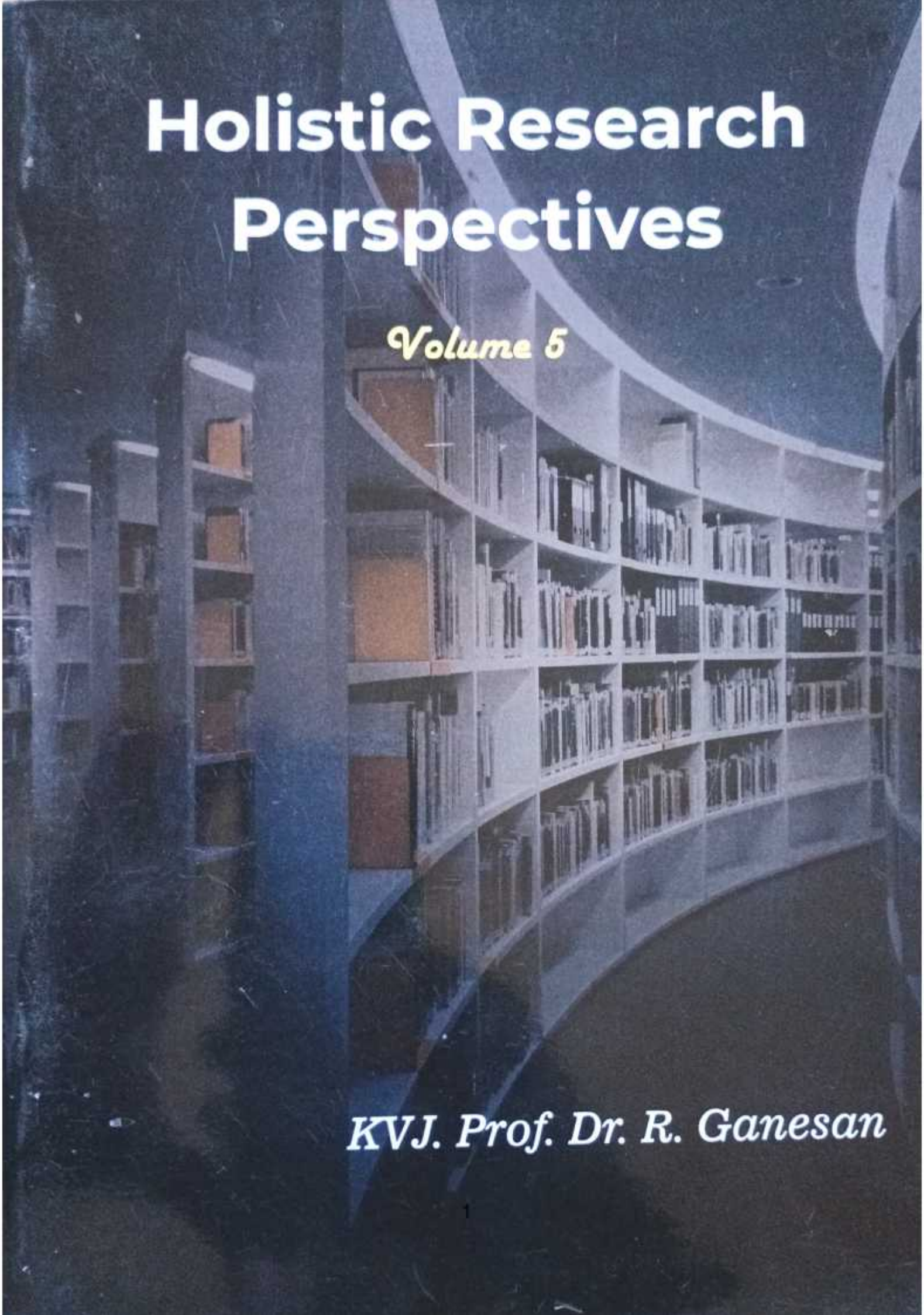

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Coimbatore - 641012, Tamilnadu, India.

E-mail: publications@centivens.com

Website: www.centivens.com

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Effect of Jeevamrutham on the Growth and Development of Amaranthus Viridis

Dr. Sailaja. V.
Assistant Professor of Zoology
Vikrama Simhapuri University P.G. Centre
Kavali, SPSR Nellore District
&
Dr. Seethamma. G.
Lecturer in Zoology
Government College for Men, Kurnool
&
Dr. Madhava Reddy
Associate Professor
Department of Physiotherapy
Kugler Physiotherapy Degree College
Guntur, Andhra Pradesh, India

Abstract

Organic farming is a holistic agricultural system that enhances soil quality. Amaranth viridis is a popular a nutritious leaf vegetable that contain gluten-free grain which provides plenty of fiber, proteins and micronutrients which is used in herbal medicine. An organic fertilizer called Jeevamrutham is developed by using cow dung, cow urine, jiggery and pulses flour. Application of this fertilizer Amaranthus fields enhanced the physicochemical properties of the soil such as pH, EC, N, P, K, and organic carbon content. Microbes such as Azospirillum and Actinomycetes are enhanced in experimental soil. The quantity of phytohormones like indole acetic acid, Gibberlic acid, Abscisic acid and kinetin are also increased. In total there is an increase in biomass, shoot length and root length in Amaranthus Viridis plant with Jeevamrutham. Thus, Jeevamrutham can be efficiently used organic fertilizer to improve growth and development and yield of Amaranthus Viridis.

Keywords: Organic Farming, Jeevamrutham, Soil Fertility, Amaranthus Viridis.

Introduction

Amaranthus Viridis is an annual herb with an upright, light green stem that grows to about 60–80 cm in height. Numerous branches emerge from the base, and the leaves

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are ovate, 3–6 cm long, 2-4 cm wide, with long petioles of about 5 cm. The plant has terminal panicles with few branches, and small green flowers with three stamens (Tanaka & Van Ke, 2007). The plant is often harvested from the wild as a source of food and medicines for local use. It is sometimes cultivated in the Tropics for its edible leaves and is often sold in local markets. Amaranthus viridis leaves and young plants (before they come into flower) are occasionally eaten as a cooked vegetable. The plant is also a good cattle fodder and green manure. The leaves are diuretic and purgative, and are used in poultices (fresh or as dried powder) to treat inflammations, boils and abscesses, gonorrhea, orchids and hemorrhoids. In Nigeria, an infusion of the whole plant is used to purify the blood and the pounded root is applied against dysentery. Amaranthus Viridis contain amino acids like lysine, arginine, histidine, cystine, phenylalanine, leucine, isoleucine, valine, threonine, methionine, tyrosine, etc. It also contains biologically active constituents like saponins, tannins and phenols, flavonoids, alkaloids, cardiac glycoside, steroid and triterpenoids and have some chemical constituent that exhibits potent anti-inflammatory, antihepatotoxic, antiulcer antiallergic, antiviral actions. This is also used in Indian and Nepalese traditional system to reduce labour pain and act an antipyretic. The Negritos of the Philippines apply the bruised leaves directly to eczema, psoriasis, etc. and other traditional uses range from an anti-inflammatory agent of the urinary tract, venereal diseases vermifuge, diuretic, anti-rheumatic, antiulcer, analgesic, antiemetic, laxative, improvement of appetite, antiepileptic, treatment of respiratory, eye problems and asthma respectively (Reyad-ul-Ferdous et al. 2015). Also, some of the problems encountered by Amaranth growers include decreasing soil fertility and quantity of manure required for optimum crop productivity (Sanni, 2016; Adeyemi, Komolafe & Akindele, 1989). Moreover, inadequate supply of chemical fertilizer and lack of capital to buy them in other countries are some of the problems (Adeyemi, Komolafe & Akindele, 1989; Olufolaji et al. 1987). Synthetic Chemical fertilizers, which we provide to plant as plant nutrient, are harmful for the soil health. Therefore, there is, need to find an alternative for these synthetic fertilizers. The only solution for this problem is use of organic fertilizers, which is called as "Organic Farming. " Itis not a new concept of farming, it is been practiced in India since thousands of years. Agriculture is practiced by using organic technique, where the fertilizers, pesticides, etc., were obtained from plant and animal products.

Organic farming works at grass root level preserving the reproductive and regenerative capacity of the soil, good plant nutrition and produces nutritious food rich in vitality, which has resistance to diseases. Due to high prices of inorganic inputs, organic forming has become the main motivating factor for farmers in India. Thus, the farmers are being encouraged to grow organic produces. Successful organic crop production is still seeming to be a big challenge before farmers. This type of farming is often presented as a more biodiversity-friendly practice, but the generality of beneficial effects of organic farming is debated, as the effects appear often species and context dependent. Keeping these in view, the current research

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has highlighted the need to quantify the relative effects of local and landscape scale management on farmland biodiversity. The investments in agriculture went on increasing whereas the yields had constantly decreased which pushed the farmers into debt trap. The excessive use of chemicals has polluted water, soil, and environment. The modern agriculture has become cost intensive and the soil has become unproductive because of indiscriminate use of chemicals. The mono cropping and mechanization of farm equipment have affected the cattle population, which again led to infertile soils. In this backdrop, to overcome crisis in Agriculture and to ensure survival of small farmer, the only solution is organic fertilizers that builds humus in the soil and improves soil fertility Therefore, there is need to investigate into locally available, cheap organic fertilizers for vegetable production.

Jeevamrutham

Jeevamrutham is a culture,which enhances microbial activity in soil and thereby improves soil fertility and makes crops healthy. It is prepared using local cow dung, cow urine, jiggery, and pulses flour. It improves local earthworm activity and if used regularly as per protocol it replaces chemical pests and fertilizers efficiently

Literature Review

Organic farming has its roots in traditional agricultural practices that evolved in countless villages and farming communities over the millennium (Veni et al. 2020). The organic farming systems are diverse and occur throughout the world. In many countries organic farming now has a clear legislative basis and certification schemes for production and processing (Stockdale et al. 2001). Furthermore, to sustain soil health and benign environment there is a need for standardization. The conjunctive use of organic sources and biofertilizers is to increase the productivity and alternately improving soil health (Bahadur et al. 2006). Organic liquid fertilizer is the product of fermentation process, constituting efficient living soil. Moreover, the microorganisms and improves plant growth, productivity through supply of easily utilizable nutrients. Such fertilizers are cost effective and eco-friendly bio-inoculants having great potential to enhance agricultural production in sustainable way. Biofertilizers are grouped into different types based on their function such as nitrogen fixing, phosphate solubilizing and other plant growth promoting biofertilizers by different mechanism. Nutrient uptake increases significantly and consistently with addition of organic manures. From the chemical point of view, the use of organic fertilizers such as cattle manure, maintains or increases soil organic matter contents and provides plants with nutrients However, very high rates may disturb the balance between nutrients and increase salt contents in the soil, which can hamper vegetable yields.

Leafy vegetables, as well as other vegetables, are considered nutrient-demanding because they require relatively large amounts in a relatively short period of time

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.Thus, applications of high rates of organic and mineral fertilizers are common in the cultivation of leafy vegetables Jeevamrutham is the best alternative that we can use in place of chemical fertilizer. Jeevamrutham is completely organic and can be used in the organic farming. Jeevamrutham serves as the rich source of the microorganism that fixes nitrogen, solubilize phosphorus. Also, it is the rich source of carbon, nitrogen, phosphorus, potassium and many micronutrients (Devakumar et al. 2014; Sreenivasa et al. 2010). Jeevamrutham is the rich source of the beneficial micro-organism such as nitrogen fixing and phosphate solubilizing bacteria. Moreover, it was found that Jeevamrutham is efficiently used between 8^{th} and 12^{th} days of preparation. The addition of such organic liquid manure would help to improve efficient microbial consortia thereby increasing NPK content and plant growth promoting factors. The use of Jeevamrutham is the best alternative to chemical fertilizer and our bio-enhancer could be potent source to improve soil fertility, crop productivity and quality (Kulkarni & Gargelwar, 2019).

Relevance

Amaranthus Viridis has been selected as the test crop because they are the most commonly consumed leafy vegetables by 86 percent of the population in a country like India. Hence, the study has selected this particular leafy vegetable for wider understanding.

Objective

To assess the beneficial effects of Jeevamrutham in organic farming and especially towards cultivation of leafy vegetables

Materials & Methods

Preparation of Jeevamrutham (10Litres)

The preparation shall be made by taking a container and place the mixed 0.5 kg cow dung, 500ml cow urine, 100 mg jaggery and 100 mg basin powder in 2.5 litres water then stir the contents with stick to 7 litres of water so as to prepare 10 litre of liquid Jeevamrutham. Keep, this container outside under the shade/under the tree covered with a cotton cloth is covered on it. Also, stir the liquid in the container every day in the morning and evening for about 15 minutes. Jeevamrutham is made in 48 hours and can be used directly to plants. The vegetables were cultivated in a randomized block design with two replicates each with 1.5-cent plot area. They were cultivated along with control, which is of normal soil. Initially, the soil plot is divided into two sub-replicates. One plot is sprinkled with normal tap water and labeled as control. The second plot is sprinkled with Jeevamrutham and labeled as test. After one hour, the seeds of green amaranth are weighed equally for the two plots and sown at the same time. The seeds of green amaranth (Amaranthus Viridis)

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were purchased from the Department of Agriculture, Nellore District, Andhra Pradesh.

Biometrical Analysis & Yield Attribute

The green amaranth biometric analysis such as Biomass, plant height (shoots & root length) was measured at 10 days interval. Furthermore, at each observation 20 plants were randomly selected and recorded.

Soil Physico-Chemical Analysis

The soil from various treatments such as control and Jeevamrutham applied soil are analyzed for physic-chemical properties such as pH, EC, N, P, K, and OC (organic carbon).

- P^H and conductivity- P^H Meter
- Organic Carbon by Rapid Titration Method (Walkley & Black, 1947)
- Nitrogen- Kjeldahl procedure (Cole & Parks,1946)
- Phosphorous- Dilute Acid-Fluoride Bray and Kurtz P-1 Method (Tandon, Motto & Kurtz, 1967)
- Potassium- Flame photometry (Murugesan & Rajakumari, 2019)
- The microbial analyses of soils (such as control, Jeevamrutham applied soil) were done by using standard viable count technique using hemocytometer or a digital colony counter.
- The media such as, yeast extract manitol agar medium with Congo red for Rhizobium, Azospirillum isolation Jensen's medium, Actinomycetes isolation agar medium were used for the enumeration of the total bacteria, Rhizobium, Azospirillum and Actinomycetes. All the experimental analyses were carried out in triplicates and the average value was used in these studies.

Analysis of Phytohormone

Quantity of phytohormone like indole acetic acid (IAA), Gibberlic acid (GA), kinetin 3 and Abscisic acid in the manure samples by modified extraction method proposed by Unyayar, Topcuoglu and Unyayar in 1996.

Results& Interpretations

The experimental results are categorically indicated in below tables and interpreted accordingly.

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Table 1: Impact of Jeevamrutham on Soil Quality

S. No.	Parameter	Control	Jeevamrutham Treated	Increase or Decrease over Control (Percentage)
1.	PH	8.0±0.2	7.7±0.02	-3.75($p<0.01$)
2.	EC	0.04±0.001	0.18±0.7	+350($p<0.0001$)
3.	N	0.05±0.012	1.96±0.23	+3836($p<0.00001$)
4.	P	17.8±0.71	20.0±1.01	+12.36($p<0.001$)
5.	K	116±4.6	127±8.7	+9.48($p<0.01$)
6.	Organic Carbon	7.80±0.7	24.50±2.3	+214.10($p<0.0001$)
7.	Moisture Content	8.6±1.8	18.4±0.34	+113.95($p<0.0001$)

(Mean, ± S.D. + or – indicate percent change over control. Values are mean of 10 observations. 'p' denotes the level of significance and N.S. No significance)

The data on the impact of Jeevamrutham on the soil quality is presented in Table 1. It has been found that there is a significant increase in EC (+350), N (+3836), P (+12.36), K (+9.48), organic carbon (+214.10) and moisture content (+113.95).

Table 2: Impact of Jeevamrutham on Microbial Analysis

S. No.	Parameter	Control	Experimental	Increase or Decrease over Control (Percentage)
1.	Total viable count	$170x10^6$	$290x10^6$	70.59
2.	Rhizobium	$71x\ 10^6$	$177x10^6$	147.89
3.	Azospirillum	$20x10^6$	$125x10^6$	525
4.	Actinomycetes	$18x10^6$	$42x10^6$	133.33

(Mean, ± S.D. + or – indicate percent change over control. Values are mean of 10 observations. 'p' denotes the level of significance and N.S. No significance)

The data on the impact of Jeevamrutham on the soil microbial content is presented in Table 2. The results revealed that there is a significant increase in total viable count (70.59), Rhizobium (147.89), Azospirillum (525) and Actinomycetes (133.33).

Table 3: Impact of Jeevamrutham on Phytohormones

S. No.	Phytohormone	Control	Experimental	Increase or Decrease over Control (Percentage)
1.	IAA	0.459±0.23	3.0±0.34	+553.59($p<0.0001$)
2.	GA3	0.554±0.033	0.77±0.06	+40.43($p<0.001$)
3.	ABA	0.001±0.0001	0.778±28.8	+77700($p<0.000001$)
4.	Kinetin	0.001±0.00011	0.477±0.034	+47600($p<0.001$)

(Mean, ± S.D. + or – indicate percent change over control. Values are mean of 10 observations. 'p' denotes the level of significance and N.S. No significance)

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The data on the impact of Jeevamrutham on the soil phytohormone content is presented in Table 3. The results indicated that there is a significant increase in indole acetic acid (+553.59), Gibberlic acid (+40.43), kinetin (+47600) and Abscisic acid (+77700).

Table 4: Yield Attributes of Green Amaranth in Various Soil Samples

S. No.	Parameter	Control	Jeevamrutham Treated	Increase or Decrease over Control (Percentage)
1.	Biomass(gms)	10±1.1	18±1.8	80($p<0.001$)
2.	Shoot length(cm)	3.6±0.3	4.3±0.34	19.44($p<0.001$)
3.	Root lengh(cm)	0.65±0.1	1.1±0.25	69.23($p<0.001$)

(Mean, ± S.D. + or – indicate percent change over control. Values are mean of 10 observations. 'p' denotes the level of significance and N.S. No significance)

The data on the impact of Jeevamrutham on the yield attributes is presented in Table 4. The results showed that there is an increase in total biomass (+80), shoot length (+19.44) and root length (+69.23).

Discussion

Jeevamrutham includes two words "Jeeva" and "Amrutham" which are derived from Sanskrit and are the most used by Hindus. The word "Jeeva" means a living organism and the word "Amrutham" stands for an elixir of life which has the capability to extend the life of any living organism. It is one of the best ways for the improvement of the number of microorganisms. Organic liquid fertilizer is the product of fermentation process, constituting efficient living soil microorganisms and improves plant growth, productivity through supply of easily utilizable nutrients. Such fertilizers are cost-effective and eco-friendly bio-inoculants shaving great potential to enhance agricultural production in sustainable way. Biofertilizers are grouped into different types based on their functions such as nitrogen fixing, phosphate solubilizing and other plant growth promoting bio-fertilizers by different mechanism. The excessive use of the chemical fertilizer has disadvantage over the fertility of the soil. Jeevamrutham is the best alternative that we can use in place of chemical fertilizer. Jeevamrutham is completely organic and can be used in the organic farming. Jeevamrutham serves as the rich source of microorganism that fixes nitrogen, solubilize phosphorus, also it is the rich source of carbon, nitrogen, phosphorus, potassium and many micronutrients. Jeevamrutham is low cost improvised preparation that enriches the soil with indigenous microorganism required for mineralization from native cow dung, cow urine, horsegram and jiggery. The Jeevamrutham in acidic soil when applied increases pH and in alkaline soil decreases pH. Thus, creates favorable condition for availability of maximum nutrients to plants, pH6.5 to 7.8. This condition increases the crop yield and cuts

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down the entire expenses of chemical fertilizer. The plant growth promoting Rhizo bacteria, Bacillus Pumillus and Bacillus Licheniformis produce high amount of physiologically active Gibberellins Copious amount of Jeevamrutham can be used for best results. The environment which is ideal for the microorganisms to survive is that the soil temperature which is in between 24°C to 30°C, the humidity of 88 percent and maintaining moisture in the soil. This type of climate is available only in the monsoons, wherein in one can also make this happen through mulching. Mulching will help in the creation of micro-environment which will help in the improvement of microorganisms, which will, in turn, result in the formation of humus. Fermentation of organic manure as in Jeevamrutham would help to remove lignin, tannic acid, oil which are present in plant based organic raw material and are harmful to root sand inhibit the growth. However, fermenting the organic raw material might eliminate the problem. For the fermentation of fertilizer comparatively dry materials are mixed with very wet materials to obtain the preferred moisture content at a given mass. Furthermore, the aeration is very necessary factor for quality fermentation to take place. At the early stage of fermentation, a lot of oxygen is required. The effect of oxygen shortage and excessive carbondioxide can be very serious. The optimal period of fermentation can be 40 days. According to him, greater availability of nutrients occurs with a longer period of fermentation because in short period sufficient decomposition of biofertilizer does not occur to release nutrients. Jeevamrutham is a most efficient biofertilizer in the enrichment of soil nutrients, improvement of biomass, root length, shoot length, maintenance of soil texture and soil microbial quality and Phytohormones etc., and indicated the factors that influence the growth of the plant and production of high yield (Moreira et al. 2018). The important effect of Jeevamrutham is stimulation and growth of fine hair roots. Plants sprayed with Jeevamrutham invariably produce bigger leaves and denser canopy (Bama & Somasundaram, 2017). Jeevamrutham serves as the rich source of the microorganism that fixes nitrogen, solubilize phosphorus and also it is the rich source of carbon, nitrogen, phosphorus, potassium and many micronutrients (Devakumar et al. 2014, Sreenivasa, Naik & Bhat, 2010). Jeevamrutham is low cost improvised preparation that enriches the soil with indigenous microorganism required for mineralization from native cow dung, cow urine, horse gram and jiggery (Gores & Sreenivasa, 2011). Jeevamrutham in acidic soil when applied increases pH and in alkaline soil decreases pH. Thus, it creates favorable condition for availability of maximum nutrients to plants with pH ranging from 6.5 to 7.8. This condition increases the crop yield and cuts down an entire expense of chemical fertilizer. The plant growth promoting Rhizobacteria, Bacillus Pumilus and Bacillus Licheniformis produce high amount of physiologically active Gibberellins. Moreover, the higher microbial population of the liquid formulation made them as potent source to maintain soil fertility and to enhance the nutrient availability in faster decomposition of bulky organic manures.

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Suggestions

Jeevamrutham can be used as efficient organic fertilizer for rowing amaranths viridis. It can be used to increase the availability of high-quality Amaranths throughout the year. It minimizes the purchase chemical fertilizer during farming.

Conclusion

Jeevamrutham is the rich source of the beneficial micro-organism such as nitrogen fixing and phosphate solubilizing bacteria. It has been observed from the study that Jeevamrutham is an efficient organic fertilizer, which improves soil quality. The addition of such organic liquid manure would help to improve the microbial content thereby increasing NPK content and plant growth promoting factors. The use of Jeevamrutham is the best alternative to chemical fertilizer.

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Short-Term and Long-Term Effect of Acidic and Alkaline p^H on the Mortality, p^H Tolerance, Growth and Development Pattern of Shrimp (Litopenaeus Vannamei)

Dr. Suneetha. T.
Lecturer in Zoology
Government Junior College, Kondapuram, Kavali
&
Dr. Ramanamma. T.
Village Fishery Assistant
District Fishery Centre, North Amuluru
&
Dr. Ramana Reddy. G
Lecturer in Zoology
Jawahar Bharathi Degree College, Kavali
&
Dr. Sailaja. V.
Assistant Professor of Zoology
Vikrama Simhapuri University P.G. Centre, Kavali
SPSR Nellore District, Andhra Pradesh, India

Abstract

In recent years, drastic alterations in hydrogen ion concentrations of the aquatic systems leading to environmental acidity and alkalinity, posing a severe problem to aquatic life causing decline and disappearance of many inhabitants in different parts of the globe, especially sustenance of shrimp culture. Hence, Short-term (24 hours) and long-term (90 days) effect of acidic and alkaline p^H on the mortality, p^H tolerance, growth and development pattern of Litopenaeus Vannamei has been studied. The sub-lethal limit was determined after exposing Litopenaeus Vannamei for 168 hours in all p^H media. Furthermore, from the experimental results, it has been observed that sub-lethal limit was from $6.5p^H$ to $8.5p^H$. The growth of shrimp was studied from 10 days up to 90 days period at different ranges, wherein the maximum reduction has been found in the first ten days only. However, at the end of the experiment there has been 12.41 percent decrease in the body weight at $8.5p^H$ and in total 16.58 percent productivity get decreased.

Keywords: Acidic, Alkaline, p^H, Short term, Long term, Sub-lethal.

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Introduction

A dynamic equilibrium exists in aquatic ecosystems between biotic and abiotic factors. The chemical and physical demands of life in water impose vigorous constrains on aquatic species. In aquatic habitats, variations occur usually in abiotic factors such as temperature, salinity, photoperiod, pH, turbidity and gaseous contents daily and seasonally. Each of these factors, single or together if altered can impose a considerable load of stress on the physiology of aquatic living beings. Stress is a best descriptive term for environmental pressures, which require physiological compensation in living material. The pesticides, organic pollutants, organic and inorganic acids from different sources frequently enter the aquatic systems and create a type of stress condition to the organisms.Shrimps perform all their bodily functions in water. This is because they are very dependent upon water to breathe, feed and grow, to excrete wastes, to maintain a salt balance, and to reproduce. Understanding the physical and chemical qualities of water is critical to successful aquaculture. Largely, water determines the success or failure of aquaculture operation. Very high (> 9.5) or very low (< 4.5) p^H values of media are unsuitable for most aquatic organisms. Young and immature stages of aquatic insects are extremely sensitive to p^H values. Moreover, high p^H levels (9.0 to 14.0) may cause harm to shrimps by denaturing cellular membranes. Changes in p^H can also affect aquatic life indirectly by altering other aspects of water chemistry. To the contrary, low p^H levels accelerate the release of metals from rocks or sediments in the stream. These metals can affect animal's metabolism and their ability to take water in. At high p^H (>9) the ammonium in water is converted to toxic ammonia, which can kill organisms. Moreover, cyanobacterial toxins can also significantly influence the animal populations. Thus, p^H is important in aquaculture as a measure of the acidity of the water or soil. In addition, it is to be noted that aquatic organisms may not survive in waters below p^H 4.0 and above p^H 10.0 for long periods. The other major reason for the death of shrimp at altered p^H media was due to damage to the gill structure and due to broken gill lamellae. Another possible reason for mortality due to extreme acidic p^H may be due to loss of bicarbonate ions causing acidic and death of shrimp. Similar studies have reported causing the loss of sodium, calcium, chlorides and carbonate ions under altered p^H conditions (Beamish et al. 1975). In total, one can conclude that the mortality of shrimp was due to toxic effect hypoxia or ionic imbalance or both. The survival of shrimp varied at different p^H ranges. The stress for the animal is more at extreme p^H range. Moreover, it is also true for any toxin. In this experiment, the survival time of animal depends upon the intensity of lethality as found in the evidence through extreme p^H variations. It is because of its commercial and nutritive value several studies have been conducted on prawn (Itami, Takahashi & Nakamura, 1989; Lavilla-Pitogo et al. 1990; Itami et al. 1991; Vera et al. 1992; Lee et al. 1997) in various countries such as Australia (Pizzutto & Hirst, 1995), India (Karunasagar, Pai & Malathi, 1994), Indonesia, Thailand (Jiravanichpaisal, Miyazaki & Limsuwan, 1994), the Philippines (Baticados et al. 1990) and Taiwan. However, much work

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needs to be undertaken in order to assess the effects of altered pH medium on the mortality, growth and production of Litopenaeus Vannamei.

Literature Review

Altered pH medium also exerts equal stress condition on the aquatic living beings like temperature, salinity, oxygen and other physical conditions (McDonald et al. 1980). The important food organisms of aquatic animals are also affected by the acidification of lakes. Many studies have dealt with the relationships between mortality and the various environmental conditions in prawns, such as anatomical works on the general description of white shrimp (Young, 1959), the branchial organ of the tolerance and respiration of prawn on exposure to air (Egusa, 1961; Defur et al. 1988; Whiteley & Taylor, 1990; Whiteley, Al-Wassia & Taylor, 1990; Nakamura, 1994; Samet, Nakamura & Nagayama, 1996), relative humidity effect on kuruma prawn (Samet & Nakamura, 1997), histology with fine structure of the gills of various penaeid species (Talbot, Clark & Lawrence.1972; Couch, 1977).

The range of concentrations or intensities of environmental factors are variable within which an animal is able to survive for its approximate average survival time has been defined as the zone of tolerance (Fry, 1971).The resistance of various fresh water animals to strong alkalies in distilled and natural waters has been studied by many investigators (Eicher, 1946; Bhaskar et al. 1984). Other studies on the survival and mortality of fishes in response to pH stress include (Hill & Hampton, 1969; Beamish & Harvey, 1972; Dunson & Martin, 1973; Daye & Garside, 1975; Robinson et al. 1976; Speir, 1987; Hall Jr. et al. 1993). It is through the considerable data available on this aspect it can be generalized that the approximate lethal limits of pH ranges between 3.7 to 5.4 in acidic waters and between pH 9.5 to 11.1 in alkaline waters for different aquatic animals.

Other studies have determined the pH tolerance capacities of various developmental stages in different fish (Speir, 1987; Hall Jr. et al.1993) species such as larvae, young fry, embryos, and eggs (Mount, 1973; Daye & Garside, 1976; Daye & Garside, 1980) and tolerance to other stress conditions were reported in prawn (Defur et al. 1988; Whitely & Taylor, 1990; Samet, Nakamura & Nagayama, 1996; Samet & Nakamura, 1997). Although a number of studies exist on the mortality and survival of fishes due to the relative toxicities of various acids, much less work has been done to determine the physiological changes associated with pH stress of aquatic animals, especially prawns exposed to low environmental pH. At low pH, suffocation and excessive mucous secretions have also been reported by several workers (Daye & Garside, 1976). Decreased respiration was also reported in prawn under other stress conditions (Taylor & Whiteley, 1989; Whiteley & Taylor, 1990; Nakamura, 1994; Samet, Nakamura & Nagayama, 1996). The decreased ability of aquatic animals to extract oxygen from low pH waters is attributed to the decreased blood pH in acidic waters (Neville, 1979). The influence of pH on the exchange of

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sodium in fresh water animals is well-documented (Leivestad & Muniz, 1976).

Reduced growth of animals on exposure to acidic media was reported a number of workers (Menendez, 1976). Mount in 1973 demonstrated that both egg production and hatchability were reduced in Zebra fish. Acidic surface waters in combination with selected trace metals become toxic to various biological groups, particularly fish. Results from various studies have demonstrated that several anadromous and semi- anadromous (migratory) fishes to Chesapeake Bay may be adversely affected by surface water acidification (Buckler et al. 1987; Hall, 1987; Hendrey, 1987; Janicki & Greening, 1988).

Relevance

Litopenaeus Vannamei has been selected as the test animal because it is having high commercial and nutritive value along with tolerance capacity towards stress conditions. Hence, the study has selected to understand the short- term and long-term effect of altered pH on mortality, growth, and production of Litopenaeus Vannamei.

Objective

To assess the short-term and long-term effect of altered pH on mortality, growth and production of Litopenaeus Vannamei.

Materials & Methods

The shrimp Litopenaeus Vannamei has been selected for the present study in view of its high tolerance capacity towards different stress conditions, commercial and nutritive value. The shrimp has been exposed to different p^H levels in both acidic and alkaline media and determined the mortality and survival p^H ranges. In acidic medium p^H3.5 to 7.0 was observed, whereas in alkaline medium 7.0 to 10.5 p^H was recorded. The mean survival time of shrimp was drastically reduced at extreme p^H ranges and no mortality was observed at sub-lethal ranges which envisage the lethal p^H is more toxic. A dropping method has been designed for the maintenance of constant p^H in the medium, I N HCL has been used for the acidic medium and I N NaOH used for alkaline medium (Bhaskar et al. 1982) respectively. All animals were maintained at the rate of 50 animals for cubic meter water.

Results & Interpretations

In control shrimp, there was no mortality and mean survival time was found to be 166 hours (Table 1). In the acidic range at 6.5p^H also no mortality was observed. The mean mortality time was also same (166 hours). Interestingly, 50 percent mortality was noticed at 5.5p^H with mean survival time of 13 hours, but at 4.5p^H the

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mortality was 75 percent with a mean survival time of seven hours. At $3.5p^H$ all shrimps died within 1.69 hours. The sub-lethal limit was determined after exposing Litopenaeus Vannamei for 168 hours i.e., 7 days in all p^H media. It has been observed from aforementioned experimental results that sub-lethal concentrations of shrimp Litopenaeus Vannamei were found to be from $6.5p^H$ to $8.5p^H$. In case of alkaline media, 100 percent mortality was noticed at $10.5p^H$but at 9.5 p^H 50 percent mortality was found. No mortality was recorded at $8.5p^H$ even after 6.9 days in alkaline media. The mean survival time has been 1.75 hours at $10.5p^H$, but at $9.5p^H$ the mean survival is only 76 hours.

LC50 values

The 100 percent survival has been recorded only between the 6.5 to 8.5 p^H after13hrs. In addition, LC 50 values are noticed in acidic media at $5.5p^H$, but in alkaline media, at $9.5p^H$. THE ANOVA results showed that there was a significant difference in the results between columns but not rows. Data on the effect of altered p^H media on the weight of Litopenaeus Vannamei during chronic exposure at different p^H values has been presented Table 1.2. It is during shrimp rearing, the growth of Litopenaeus Vannamei as indicated by the body weight in grams has been recorded. The data were collected at a frequency of 10 days up to 90 days period at different ranges. The results showed that at p^H levels 3.5, 4.5, 6.5, 9.5 and 10.5 all animals died, wherein the shrimp did not survive for even for 10 days. However, at 7.5 and $8.5p^H$, all animals survived until the completion of the life cycle that is 90 days. In addition to this, under normal conditions (control) body weight was found to be 14.5 grams after completion of rearing for 90 days (Table-2). The data showed that body weight at $8.5p^H$ has been lesser than that of the body weight at $7.5p^H$ (control). It is after 10 days of rearing, there was 27.8 percent reduction in the body weight at $8.5p^H$. The maximum reduction was found in the first ten days only. However, at the end of the experiment there has been 12.41 percent decrease in the body weight at $8.5p^H$. The data regarding the economic characters such as productivity of shrimp at different p^H levels are indicated in Table 3. The shrimp count was 68.96 at $7.5p^H$, but it increased to 78.74 at $8.5p^H$. The survival of the shrimp was 86 percent at $7.5p^H$. However, survival was only 80 percent at $8.5p^H$. The total feed consumed for 1000 shrimps was 0.948 kg, but for the same number at $8.5p^H$, consumed (1.23 kg.). This clearly shows that at higher p^H we have to give more food (1.285 kg). The productivity also decreased at 8.5 p^H (1.016 kg.), when compared to productivity of 1.218 kg at $7.5p^H$. In total 16.58 percent, productivity was decreased. The total food conversation ratio was 1.28 at $7.5p^H$. However, the same was found to be 0.823 at $8.5p^H$. There are -35.95 percent reductions in the food conversation ratio at $8.5p^H$. All the economic characters of the crop that were studied statistically decreased (significant at $p<0.005$).

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Table 1: Percentage Mortality and Mean Survival Period of Shrimp Litopenaeus Vannamei in both Acidic and Alkaline p^H Media

S. No.	p^H Media	p^H Value	Percent Mortality	Mean Survival Time (Hours)	Mean Survival Time (Days)
1	Control	7.5	0	166	6.910
2	Acidic	6.5	0	166	6.910
3		5.5	50	13	0.542
4		4.5	75	7	0.297
5		3.5	0	1.67	0.069
6	Alkaline	8.5	0	166	6.190
7		9.5	50	76	3.166
8		6.5	100	1.75	0.070

Table 1.1.: ANOVA

Source of Variation	SS	Df	MS	F Value	P Value	F Crit.
Rows	4803.889	7	686.2699	0.218146	0.974822	2.764199
Columns	28297.41	2	14148.7	4.497475	0.031008	3.738892
Error	44042.91	14	3145.922			
Total	77144.21	23				

Hypothesis

H_0: There is no significant difference between the data of rows and columns.
Result: Null hypothesis H_0 is rejected

Table 2: Effect of Altered p^H Media on Growth of Litopenaeus Vannamei during a Prolonged Period of Exposure

S. No	P^H Media	P^H	Number of Days of Exposure								
			10	20	30	40	50	60	70	80	90
			Weight In Grams								
1	Control	7.5	2.88	5.34	6.7	7.3	8.45	10.3	11.7	12.5	14.5
2	Acidic	6.5	AD	AD	AD	AD	AD	AD	AD	AD	AD
3	Acidic	5.5	AD	AD	AD	AD	AD	AD	AD	AD	AD
4	Acidic	4.5	AD	AD	AD	AD	AD	AD	AD	AD	AD
5	Acidic	3.5	AD	AD	AD	AD	AD	AD	AD	AD	AD
6	Alkaline	8.5	2.1	4.2	6.23	6.9	7.9	9.43	10.3	10.4	12.7
7	Alkaline	9.5	AD	AD	AD	AD	AD	AD	AD	AD	AD
8	Alkaline	10.5	AD	AD	AD	AD	AD	AD	AD	AD	AD
Percentage Change Over Control at 8.5p^H			- 27.0	- 21.3	- 7.01	- 6.5	- 6.51	- 8.45	- 1.97	- 6.80	- 12.4

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Table 3: Change in the Productivity of Shrimp Litopenaeus Vannamei during Chronic Exposure of Altered p^H Media

S. No.	Parameter	p^H 7.5 (Control)	p^H 8.5 (Experimental)	Percentage Change Over Control
1	Initial Stocking (Numbers)	1000± 43	1000± 23	NS
2	Density/m^2	50	50	NS
3	PL Stocking (Days)	PL15	PL15	NS
4	Harvest Size (gm)	14.5 ±0.7	12.7±1.2	-12.41 (P< 0.001)
5	Count (Numbers / Kg)	68.96 ±3.5	78.74 ±4.2	14.18 (P< 0.001)
6	Survival (%)	86 ±5.4	80±4.3	6.98 (P< 0.001)
7	Total Feed (Kg)	0.948 ±0.003	1.234 ±0.02	30.17 (P< 0.001)
8	Production (Kg)	1.218 ±0.021	1.016 ±0.012	-16.58 (P< 0.001)
9	Food Conversion Ratio	1.285 ±0.112	0.823 ±0.0065	-35.95 (P< 0.001)

± - Standard Deviation; P-Level of Significance; NS-Not significant

Discussion

The p^H plays a vital role in the growth and development of shrimp. In the present study, an attempt was made to know the impact of the change in the p^H media on the growth and development of Litopenaeus Vannamei. It has been observed from the results and understood that no mortality was recorded in p^H range of 5.5 to 9.5 during the entire rearing period. The LC50 value was found to be $5.5p^H$ on acidic medium and $9.5p^H$ on basic medium. Moreover, 75 percent mortality was found at $4.5p^H$. Impact of altered p^H media on aquatic animals was carried out by several investigators (Lloyd & Jordon, 1964; Murthy, Reddanna & Govindappa, 1981).

All the studies confirmed the impact of altered p^H on the metabolism and the growth and development. The severe morphological changes have been observed in the shrimp in altered p^H media, wherein they changed their colour. A large amount of mucus has been accumulated on the body and gills, wherein, their body got irritated due to extreme p^H media. Occasionally, the movements of the animal were irregular due to irritation of the eye. Bhaskar in 1982 carried out a research study on the effect of altered p^H media on different aquatic animals and their metabolism, wherein they found that the main reason for mortality of shrimp in extreme p^H ranges was due to the accumulation of mucus in the gill and decreased oxygen supply to the animal. This hypoxia brings changes in the p^H at hemolymph. It is

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fairly evident that oxygen carrying capacity decreases due to changes in the altered p^H of hemolymph, which is known as Bohr Effect, wherein researchers have exhaustively studied this phenomenon. This decreased haemolymph p^H has been due to the entry of H^+ ions into gill from outside of the environment, particularly at gill surface. Moreover, the increased mucus secretion over the gill decreases the air diffusion across the gill membrane has been observed by various research studies. The present study recorded that survival time of Litopenaeus Vannameis has been very less (almost an hour) at extreme p^H such as 3.5 and 10.5. This result has been supported by a study conducted by Packer and Dunson in 1972. The tolerance of p^H is not exactly same in the acidic or basic environment, wherein the tolerance of shrimp was little more on alkaline side than on acidic side. Furthermore, it shows that stress is more on the acidic side than at alkaline p^H. Total shrimp survived at 7.5 and $8.5p^H$. Therefore, the researchers continued to study the effect of p^H stress in these animals during their entire life period. At the two p^H ranges, the animals survived only for 90 days as per the experimental study at different p^H ranges.

The data also showed that the animals survived better at $7.5p^H$ when compared to $8.5p^H$, wherein the food consumption was more at $8.5p^H$.However, the animal growth was lesser and productivity has been low at $8.6p^H$. The important economic parameter of food conversion ratio has been more than$7.5p^H$ when compared to $8.5p^H$. The increased intake of food and decreased productivity may be due to increased basal metabolic rate. During stress conditions, the metabolic rate will be increased to compensate the stress, wherein energy consumption may be high. This may be the reason for low productivity $8.5p^H$. Apart from these p^H interferences with microbial environment of the surrounding media changes the nutrition of animals. The gut microbial flora might have changed. Moreover, at increased alkaline p^H the oxygen consumption was more, which might have burned the excess calories in the body.

Suggestions

The p^H can be maintained properly through appropriate control mechanisms for consistent growth and production of Litopenaeus Vannamei, which ultimately lead to high economy.

Conclusions

The optimal p^H is highly essential for shrimp growth and productivity. Short term and long-term pH modifications influence the economy of shrimp crop. However, during severe acidic and alkaline conditions metabolic rate will be increased to compensate the stress, wherein the energy consumption may be high. This might be the reason for low productivity. Hence, perfect water quality management system is essential for Litopenaeus Vannamei culture.

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Karma Veer Jyoti. Professor Dr. R. Ganesan earned his doctorate from the reputed IIT Delhi with a special focus on Entrepreneurship Development. He possesses more than two decades of research experience in the field of entrepreneurship and management. He has served in different academia ranging from Deemed Varsities, Engineering Colleges, Arts & Science Colleges, B-Schools and International Varsities. He has more than 70 research contributions to his credit, which are published in refereed and indexed journals, books, book chapters, monographs and conferences. He is a global author in Women Entrepreneurship, whose research papers are listed in Google Scholar and indexed in ISI (AHCI), MLA Citations, Scopus, EBSCO, ASOS, Cabells' Directory etc. He has authored two books on women entrepreneurship development and insurance management, which have been published at Germany. He is serving as editorial member and reviewer for numerous journals and possesses more than 17 years of editorial experience. He has edited more than 500 research articles to his credit, which includes his editorial experience across refereed and indexed journals, conferences and book chapters at national and international levels. He has organized and hosted 3 refereed and indexed national conferences and 2 international conferences (including one web conference) and conducted 26 faculty development programmes (FDPs), which include national and international webinars focusing on Research & Development (Research Insights, Research Structuring, Publication Strategies, Statistical Insights, Crafting Literature Review and Publication Prospects), Entrepreneurship Development, Digital Marketing, etc. at national and international levels. He is the Founder and Chairman of the renowned National Foundation for Entrepreneurship Development (NFED), Coimbatore, Tamil Nadu. He has delivered more than 160 sessions on Research Insights and Publication Strategies, Entrepreneurship, Managerial Skills, Career Development, Employability Skills, etc. across the nation. In commemorating his laudable academic, research and societal transformational services through upbringing entrepreneurship development he has been conferred with the prestigious title Karma Veer Jyoti (KVJ) by Indian Confederation of Non-Governmental Organizations (iCONGO), New Delhi, India on 22nd March 2015. He is the recipient of PFLA Excellence Award for his 'Outstanding Service to Education and Entrepreneurs' community from People First Leadership Academy (PFLA), Bengaluru, Karnataka on 19th January 2019. He has been conferred with 'Order of Eminence' the highest honour for his global contribution to research, teaching and training in Entrepreneurship Development by the Presidium of NFED in its 10th National Teachers' Day Awards on 5th September 2019 at Coimbatore, Tamil Nadu. He has been conferred with the Prestigious MTC Global Distinguished Teacher Award in Entrepreneurship Development in the 9th World Edu Summit organized by Management Teachers Consortium (MTC) Global on 7th September 2019 at Bengaluru, Karnataka.

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Rajib Roychowdhury · Shuvasish Choudhury · Mirza Hasanuzzaman · Sangeeta Srivastava *Editors*

Sustainable Agriculture in the Era of Climate Change

Under ongoing climate changes, natural and cultivated habitats of major crops are being continuously disturbed. Such conditions impose and exacerbate abiotic and biotic stressors. Drought, salinity, flood, cold, heat, heavy metals, metalloids, oxidants, irradiation, etc. are important abiotic stressors, while diseases and infections caused by plant pathogens, such as fungal agents, bacteria and viruses, are major biotic stresses. In many instances, stresses have become the major limiting factor for agricultural productivity and exert detrimental role on growth and yield of the crops. To help feed an ever increasing world population and to ensure global food security, concerted efforts from scientists and researchers have identified strategies to manage and mitigate the impacts of climate-induced stresses. This book, summarizing their findings, is aimed at crop improvement beyond such kind of barriers, by agronomic practices (genetics, breeding, phenotyping, etc.) and biotechnological applications, including molecular markers, QTL mapping, genetic engineering, transgenesis, tissue culture, various 'omics' technologies and gene editing. It will cover a wide range of topics under environmental challenges, agronomy and agriculture processes, and biotechnological approaches. Additionally, fundamental mechanisms and applied information on stress responses and tolerance will be discussed. This book highlights problems and offers proper solutions for crop stress management with recent information and up-to-date citations. We believe this book is suitable for scientists, researchers and students working in the fields of agriculture, plant science, environmental biology and biotechnology.

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Mirza Hasanuzzaman
Sangeeta Srivastava *Editors*

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Springer

Chapter 18
Plant Tissue Culture and Crop Improvement

Kiranmai Chadipiralla, Pachipala Gayathri, Vemula Rajani, and Pichili Vijaya Bhaskar Reddy

Abstract Due to the drastically increasing population associated with limited natural and traditionally cultivated crops, novel methods are required to address this concern and thereby increase crop productivity. With the advent of various scientific technologies, such as plant tissue culture, crop improvement through various in vitro protocols involving genetic manipulation has come to the forefront. Plant tissue culture is an advanced in vitro protocol, through which regeneration of organs, tissues, or plant cells can be obtained on an artificially prepared nutrient medium. Employing various novel gene transfer methods, the preferred characteristic traits from one plant can be passed on to another plant simply by introducing the gene responsible for that particular character. In plant tissue culture, several techniques like protoplast fusion, anther culture, and embryo transfer have been used to produce new genetically variant cops. Tissue culture helps in mass multiplication and clonal propagation of plants from any tiny part of the plant tissue. In recent years, this technique has been vastly used for conservation of germplasm as well as in the commercialization of various crops. Cell culture techniques are playing a major role in enhancing crop improvement potential by producing somaclonal and gametoclonal variants. Several varieties of crops including but not limited to vegetable (resistant to pest and disease-free), fruits (seedless, pink fleshed), ornamental plants, and sporeless mushrooms have been developed. This was possible only due to the diverse advanced protocols that are rapidly expanding in the field of tissue culture. Keeping in view of the importance and impact of tissue culture in enhancing the quality and yield of crops, this chapter is focused on reviewing methodologies employed in plant tissue culture along with the challenges that lie ahead.

Keywords Plant tissue culture · Micropropagation · Protoplast fusion · Anther culture · *Agrobacterium tumefaciens*

K. Chadipiralla (✉) · P. Gayathri · V. Rajani
Department of Biotechnology, Vikrama Simhapuri University, Nellore, Andhra Pradesh, India

P. V. B. Reddy (✉)
Department of Life Science and Bioinformatics, Assam University, Diphu Campus, Diphu, Assam, India

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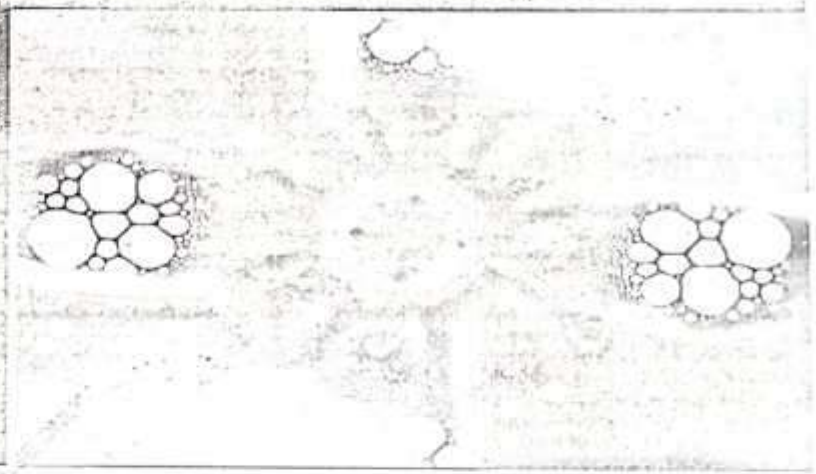
Bacillus thuringiensis (Bt) is a Gram positive spore-forming soil bacterium that produces parasporal crystal proteins or δ-endotoxin proteins (encoded by the *cry* genes) and cytolytic proteins (encoded by the *cyt* genes) during sporulation specifically toxic to many agriculturally important insect species. Another novel class of insecticidal proteins secreted during the vegetative phase includes vegetative insecticidal proteins (Vip) and secreted insecticidal protein (Sip). In the present study, presence of lepidopteran specific cry1 cry2 and vip3A type genes was investigated by polymerase chain reaction (PCR) using specially designed gene specific primers. The cry1 gene family was found to be present in ten out of twenty four native Bt isolates, while none of the isolates showed the presence of cry2 gene family and vip3 genes. A full-length 3.5 Kb cry1Ac type of gene was amplified from native Bt isolate SK729 and sequenced. The sequence of the cloned gene was 99% identical to that of the previously reported cry1AC2 gene except four nucleotides and two amino acids variation at the protein level. The sequence was deposited in the NCBI with accession no. [illegible]



Presently, Dr Uday Sankar Allam working as an Assistant Professor in the Dept. of Biotechnology, VS University, Nellore since 2013.

Uday Sankar Allam
Sarvjeet Kaur
P. Raja

Isolation of *Cry* and *Vip* genes from native *Bacillus thuringiensis*

Cry1 type and Vip3 type genes from native *Bacillus thuringiensis*

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IMPACT OF GLOBALIZATION ON MSME'S— PROSPECTS, CHALLENGES AND POLICY IMPLICATIONS ON GROWTH

Edited by:

Prof. Suja S. Nair
Head, Department of Business Management
Vikrama Simhapuri University, Nellore
Andhra Pradesh

Foreword by:

Prof. Rokkam Sudarsana Rao
Vice Chancellor
Vikrama Simhapuri University, Nellore
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GST—It's Implications on MSME

Dr. Vijetha Jadda

Assistant Professor, Department of Business Management, VikramaSimhapuri University, Nellore, AP – 524 003, email:vijethavsu@gmail.com, Mobile: 9949999110

M. Gayatri Anupama

Guest Faculty, Department of Business Management, VikramaSimhapuri University, Nellore, AP – 524 003, email:marepalli131@gmail.com, Mobile: 7036638475

Introduction

Goods & Services Tax (GST) is a taxation that was introduced in India on 1 July 2017 and was applicable throughout India offerings. GST may be a tax that must pay on provider of product & offerings. Any person, who is presenting or providing product and services, is susceptible to fee GST. Now it witnessing, however this tax reform reshapes our economy and business dynamics for Micro, Smalland Medium Enterprises. Flourishing amidst a difficult atmosphere, the Small and Medium Enterprises (SMEs) of India practiced many highs and lows within the past few years. With the Indian economy expected to emerge together of the leading economies within the worldand certain to become a $5 trillion economy by 2025, major impetus is being given to strengthen the back bone of our economy-the SME sector. This paper highlights to know the GST and MSMEs and Impact of GST and MSMEs.

Review of Literature

Anand Nayyar & Interpol Singh(2018)

The Goods and Services Tax (GST), implemented on July 1, 2017, is regarded as a major taxation reform till date implemented in India since independence in 1947. GST was planned to be implemented in April 2010, but was postponed due to political issues and conflicting interest of stakeholders. The primary objective behind development of GST is to subsume all sorts of indirect taxes in India like Central Excise Tax, VAT/ Sales Tax, Service tax, etc. and implement one taxation system in India. The GST based taxation system brings more transparency in taxation system and increases GDP rate from 1% to 2% and reduces tax theft and corruption in country. The paper highlighted the background of the taxation

the MSMEs. No doubt that GST is aimed to increase the taxpayer base, majorly MSMEs into its scope and will put a burden of compliance and associated costs to them. But in the long run, GST will turn these MSMEs more competitive with a level playing field between large enterprises and them. In fact, recently government has also formed a special committee to look after the issues faced by MSMEs sector in GST. It is urged to the industry that they proactively highlight the above issues and obtain the relief prior to advent of GST as once GST is implemented; the chances of respite would be very minimal for the sector.

The tax on goods and services (GST) is one of the most important issues since its introduction in India. GST, despite the many responses received from general practitioners and the general public and the main business and actually implemented in April 2015. The new tax policy that has been introduced has led to a change of state, especially in tax administration systems and business transactions. That is why this study investigates the impact of GST implementation on micro and small companies.

Conclusion

MSME is a growing sector where enterprises enter and exit the market frequently, so the implementation of GST has had a great effect on the survival in the market. Some enterprises found it beneficial but majority faced difficulty in accepting it. For existing enterprises, GST simplified the tax structure, unified the market hence improved the overall operational efficiencies of MSME, so far the unorganized MSMEs were growing fast than the organized ones because of the tax avoidance, with GST in effect, it has made the taxation system transparent thus making the entities liable for tax payment. For a new entrepreneur, the application of GST, made the registration for taxation easy, relieved them from previous VAT registration. The Government has implemented GST with a view of long-term better prospect for the country by various aspects. The goods and services tax (GST) makes the tax system easy and thus contributing in the growth of the country. The Government applied GST by summing up of various taxes under CGST & SGST, transparent taxation, reduced raw material cost, to bring down the cost of goods and services and the ease of doing business in India. Initially there was huge chaos regarding the enactment of GST, but many successful businesspersons supported it and considered it as a boon for the long-term development of the nation.

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