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It is heartening to note that our journal is able to sustain the enthusiasm and covering various facets of knowledge. It is our hope that IJMER would continue to live up to its fullest expectations savoring the thoughts of the intellectuals associated with its functioning. Our progress is steady and we are in a position now to receive evaluate and publish as many articles as we can. The response from the academicians and scholars is excellent and we are proud to acknowledge this stimulating aspect.

The writers with their rich research experience in the academic fields are contributing excellently and making IJMER march to progress as envisaged. The interdisciplinary topics bring in a spirit of immense participation enabling us to understand the relations in the growing competitive world. Our endeavour will be to keep IJMER as a perfect tool in making all its participants to work to unity with their thoughts and action.

The Editor thanks one and all for their input towards the growth of the Knowledge Based Society. All of us together are making continues efforts to make our predictions true in making IJMER, a Journal of Repute.

Dr. K. Victor Babu
Editor-in-Chief
THE ROLE OF RELATIONSHIP MARKETING ON CUSTOMER LOYALTY AND RETENTION: A CASE STUDY OF ABAY BANK IN DESSIE REGION IN ETHIOPIA

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Abstract:
Customer loyalty in banking has been a major concern for practitioners due to severe competition and higher customer expectation. The main purpose of this paper is to explore the role of relationship marketing variables on customer loyalty and retention. The main objective of the research study is to explore the role of relationship marketing on customer loyalty and retention in Abay bank, Dessie region customers in Ethiopia. Descriptive survey method is the research method selected for this study. Primary data has been gathered from customers using structured questionnaire prepared for the study. Convenient/available sampling technique has been used to collect data. The study has also used secondary data compiled from books, bank documents, articles etc... The data obtained has been analyzed using descriptive method of data analysis. The result of the survey unfolds that the bank provides effective, efficient and prompt service to customers. Employees of the bank are willing to solve customers’ problems. Further, the bank’s employees and customers have established warm and enviable relationship with each other. They even chat for few minutes, during service delivery process, about family and personal issues. Bank’s convenient access to use the service, its reliable service, friendly and polite behavior of employees, employees advice on business dealings made customers develop trust which in turn develop the feeling of safety in their relationship with the bank. The finding also shows that customers of the bank are so satisfied that they pass message of their evaluation of the services from time to time to their colleagues and
friends so that they can prefer and use the bank services. Besides to this, customers of the bank are highly satisfied by the services offered by the bank. Customers always choose this bank than other competing banks because of best customer service, branch availability, friendly and polite behavior of employees, competence of employees and extended business hours. Finally, customers of the bank are comfortable with the services provided by the bank. So, they do not have any intention to leave the bank in the near future. The finding of the study clearly indicates that the bank’s customer loyalty and customer retention strategies have been properly implemented and produced tangible results for the bank.

**Key Words:** Relationship marketing, customer retention, customer loyalty

### 1. Introduction

As it is apparently known, the banking industry is highly competitive and banks are facing intense competition and a lot of challenges in delivering banking services to their customers. Customers have a lot of ample opportunities to choose and if need be, to switch to another service provider as long as it provides the best services to them. Hence, relationship marketing has been recognized as a possible strategy for firms to build and maintain relationships with clients in order to continuously enhance their performance. Also, customer loyalty and retention is considered as an important strategy for banks as it promotes maintaining of current and profitable banking clients. A large number of researchers argue that a 5% improvement in customer retention can result in an increase in profit of between 25 and 85 percent depending on the industry (Christopher et al, 1991). Therefore, it is essential for banks to focus on retention of their customers because it is more profitable to retain a customer than to obtain a new customer (Payne and Frow, 2005).

Furthermore, service firms like banks can benefit from superior relationship marketing practices because while interacting with the service provider firm, customers mainly focus on the service aspect as there is no physical product involved in the interaction. Yet, there is no doubt that the effective and efficient practice of relationship marketing is important to the success of a firm (Parvatiyar and
Sheth, 2002). The authors also added that most firms adopting this practice highly benefit from it (Parvatiyar and Sheth, 2002). On the other hand, in the words of Robson (2012), inefficiency is observed in the most empirical banking system in Ethiopia. Further, Robson (2012), based on his study on some selected government and private banks in Ethiopia reached to some conclusions and revealed the inefficiency of the empirical banking system and recites the major reasons for this inefficiency: complex services and customer transaction process, dynamic external environment, and sellers are unaware or unsure of buyers wants.

In the case of Ethiopian context, banks are unable to concede and balance customer acquisition and customer retention practices. The past two decades (the 1990’s and the first decade of year 2000) observed the high expansion of the banking industry throughout the country. There are 19 government and privately owned banks in the country (www.nbe.gov.et). Thus, this results in intense competition among banks to attract a large number of first time and competitors’ customers.

However, even though there are a large number of customers who joined these banks as customers, these banks have a lot of impediments in their services. A study by Robson Mekonnen (2012) in some selected government and private banks in Addis Ababa, Ethiopia remarked that though most banks exerted a lot of effort/attempts on increasing market share and sales growth, they didn’t undertake sufficient effort to discover and meet the need of the key customers. He also noted in some of the banks studied that there was no customer centric performance standards and supervision, problems in relation to utilization of computer and banking technologies. Further, the study also indicated that in some of the banks studied, customer retention strategy is not clearly implemented.

2. Statement of the Problem/Literature Review

Relationship marketing gains a lot of importance over the last few years, as companies have realized the power of learning about their customers to increase their competitiveness, profitability and success (Egan, 2008). In an era of increasing competition, firms have resorted to employing relationship marketing as a strategic tool.
to attract, maintain and enhance customer relationships and build loyalty (Sadqi, 2012). Relationship marketing increases the productivity of marketing activities and builds up mutual values for both customer and company through growing marketing effectiveness and efficiencies (Mishra and Li, 2008). Likewise, Gummesson (1994) reflected in relationship marketing as continuing mutual relationships between the business holder and the customer that leads to enduring profitability. Meanwhile, Kotler as cited in Seyyednejad et al (2013) asserts that companies can be more profitable if they shift from the goal of short-term relationships toward long-term relationships. Based on other prior studies, relationship marketing develops business performance (Izquierdo et al, 2005).

The prime motive firms engage on relationships with consumers is economic issue/matter. Successful relationship marketing program creates wealth and sustainable growth for the firm through consolidation with customers and receiving value through relationship (Cap-Gemini and Young, 2005). In addition to this, Alexander and Colgate (2000: 939-944) denote that engagement of relationship marketing gives a number of economic benefits: Cost saving resulting from the low cost of serving the retained customer than acquiring a new one. Quality offering; good business; long-term business relationships; profitability; uncertainty reduction; business stability and close client-firm relationships, which can serve as a barrier to competitive entries due to a stable customer base. On top of that, relationship marketing creates loyal customers. These loyal customers buy in large quantity which may in turn leads to more profit and business prosperity. Furthermore, through relationship marketing, employees develop a feeling of their importance as role players in achieving and sustaining customer satisfaction (Reardon, 1990:379).

Likewise, Ko et al (2008:66) make a list of key advantages of relationship marketing: Increased profits, More customer relationships, more repurchases, accurate customer information collected, enhanced customer loyalty, improved efficiency of customer management, effect of word-of-mouth, reduced cost of new customer acquisition, greater ease in developing new products, increased sales resulted from additional purchases, reduced cost of
direct marketing, increases brand loyalty, and increased customer lifetime value.

Oliver (1999) has described loyalty as a deeply held commitment to re-buy or re-patronize a preferred product or service consistently in the future, thereby causing repetitive similar brand or similar brand-set purchasing, despite situational influences and marketing efforts having the potential to cause switching behavior.

According to Hirschman as cited in Muhiddin et al (2012) customer loyalty expresses an intended behavior related to the service or the company. This involves the likelihood of future renewal of service contracts, how likely it is that the customer changes patronage, how likely the customer to provide positive word-of-mouth, or the likelihood of customers providing voice. Furthermore, for Oliver (1997) customer loyalty is considered a vital link and aspiration to organizational success, profit and business performance.

The customers, who show the greatest level of loyalty toward the product, or service activity, tend to repurchase more often, and spend more money. Thus, loyal customers do not only increase the value of the business, but also enable business to maintain costs lower than those associated with attracting new customers (Barroso and Martin as cited in Muhiddin et al, 2012). Customer retention is a concept by which companies mitigate the customer defection and possibly retain them for a lifetime. Customer retention is given an important place in any firm’s marketing strategy, especially in a highly competitive banking industry where several firms compete to attract and retain new and existing customers. Therefore, understanding the various factors that could influence customer retention is essential to the attainment of organizational objectives. Further, according to Hull as cited in Caroline and Elizabeth (2014), the banking industry, as it is highly competitive, does not only compete with each other, but it also competes with non-banks and other financial institutions.

From the review of literature, the following research questions have been developed:

1. What are the key factors that affect customer retention in Abay bank in Ethiopia?
2. To what extent does relationship marketing contribute in attracting and retaining customers?

3. Objective of the study

The general objective of the study is to examine the role of relationship marketing on Abay bank’s employees’ job satisfaction and customer satisfaction in Ethiopia.

3.1. Specific Objectives of the Study

- To explore the key factors that affect customer loyalty and retention in the bank.
- To investigate the most influential factor towards customer loyalty and retention in Abay Bank.

4. Methodology of the study

To address the objectives, descriptive survey approach research design is used for the study.

4.1. Data type and Sources

The study has used both primary and secondary data. The primary data were collected by using a structured questionnaire designed for the study. The secondary data were collected and organized from books, articles, previous research studies and bank documents.

4.2. Sampling Technique

The target population of the study was customers found in Abay bank, Dessie region in Ethiopia. There were a total of 150,244 customers in Abay bank branches in Amhara National Regional State. Also, 36,527 of these customers were found in sampled branches of the bank. The number of branches found in Dessie region of the bank was 21. Eight of these branches which are nearly forty percent have been selected for the study using simple random sampling technique. A total of 280 customers have been selected using Fowler (2003) sample size determination formula. Customers of the bank were selected using convenient/available sampling technique. Customers who were present at the bank during data collection period were politely asked to fill the questionnaire till the required number is reached. Questionnaires were distributed to sampled branches based on proportional sampling allocation, i.e. questionnaires were allocated for each sampled branch in
proportion of the total customers of the branch. Totally, 280 questionnaires were distributed and 270 were returned. Ten questionnaires were not returned.

4.3. Method of Data Analysis

To analyze the data, the study has employed descriptive method of data analysis owing to the nature of the variables to be studied.

5. Data Analysis and Interpretation

The bank environment is generally fast-paced and demands the greatest efficiency. Customers who come to the bank need quick and efficient service that solves their problems. As each employee knows his/her tasks and roles for which he/she is responsible; he/she can serve customers without stepping on other employee’s tasks and roles so that he/she can give quick and efficient service. The response from bank customers indicates that the bank provides effective, efficient and quick service to its customers. As it is provided in figure 1 below, 94 (34.81%) of the respondents strongly agreed that the bank service is given without delay. A further 159 (58.89%) respondents also agreed on the promptness and efficiency of the employees in serving customers. They also added that employees are quick to act when the occasion demands to act. On the other hand, the other 5 (1.85%) and 1 (0.37%) respondents also answered disagree and strongly disagree respectively. They commented on the questionnaire that, due to a lot of problems faced by the bank such as intermittent power shortage and internet connection failure observed in the country, employees mostly did not provide quick and efficient service. The remaining 11 (4.67%) of the respondents withhold their reaction and remain neutral. They answered ‘have no opinion’ for the enquiry.

Currently, in this quick-service world, customers may expect to get fast and efficient service from their service providers. It is also clear that competition for a customer has become more and more severe. Thus, the bank provides effective, efficient and prompt service to customers. Employees of the bank are efficient and provide a speedy service to their customers (93.70%). This helps the bank to establish strong relationship with customers which resulted in customer loyalty and retention.
Figure 1 - Employees’ fast and efficient service to customers

Any customer who approaches the bank wants his/her problems solved by the first person he/she spoke to. Therefore, if employees are empowered, they can quickly solve customer problems without unnecessary delay and referrals. Customers were asked to assert if they witnessed employees quickly solving customers’ problems. As a result, majority of the respondents confirmed that when customers’ problems arise, employees solve it swiftly. 58 (21.48%) of the respondents strongly agreed that as customers approach and consult them their problems, employees attempt to understand the problem and engage on finding a solution for the problem.

A further 135 (50%) of the respondents agreed that when they approach employees, employees ask them what they can do for them and when customers consult them their problem, they immediately find solutions for the problems. Also, sometimes the problem may be caused by the bank. In such a case, most of the employees apologize for the inconvenience and attempt to resolve it. On the other hand 14 (5.18%) respondents disagree on the opinion of employees solving customers’ problems. The remaining 63 (23.33%) of the respondents, hold back their reaction and answered ‘have no opinion’ for the request.

Accordingly, employees of the bank are willing to solve customers’ problems. Also, when the problem was caused by someone inside of the bank, they offer their apology and exert themselves to resolve the problem (71.48%). Customers with issues that are resolved quickly can often turn into loyal customers and even advocates of the bank services. When the bank resolve customers’ problem wisely, a complaint can become very profitable. On the other hand, a considerable number of
respondents (23.33%) have no opinion for the request. This might be caused by the fact that they may not experience a problem themselves or might not witness such experience.

Figure 2 – Employees quickly resolve customers’ problems

Customers are the heart of a bank and establishing strong relationship with them is essential for business success. Capable employees build good relationships with customers because customers are important assets of the bank.

Customers were requested to confirm if they have good relationship with the bank employees and the response points out that employees and customers have admirable relationships (94.07%). To be exact, as it is presented in figure 3 below 117 (43.33%) of the respondents strongly agreed that they have friendly and cosy relationship with employees. A further 137 (50.74%) of the respondents agreed that because most of employees are friendly and sociable, they have established warm relationship with employees. They also added that they even spend few minutes in chatting personal and family affairs while receiving the service. On the other hand, 14 (5.19%) of the respondents did not say anything about relationship between employees and customers because they answered ‘have no opinion’ for the request. The remaining 2 (0.74%) of the respondents do not agree by the warm relationship between the customers and employees.

On the other hand similar question was presented to employees and the response shows that employees and customers have built warm and friendly relationships (96.8%). Actually, it takes time to build good
relationship with customers. However, consistent and warm relationship will result in the bank to grow and prosper. Accordingly, the result of the survey indicates that the bank’s employees and customers have established warm and enviable relationship with each other. During service delivery, they even chat for few minutes about family and personal issues (94.07%). Establishing good relationship with customers has importance to the bank. Customers with such a good relationship with employees repeatedly use that bank and increases in sales and improves customer loyalty and retention.

![Graph showing relationship of employees and customers](image)

**Figure 3 - Relationship of employees and customers**

In order to get trust of its customers, the bank has to develop trust in customers. When customers develop belief that their bank put their interest first, they start to trust the bank. In fact, trust is built over time and it is having faith in the exchange partner. Trust is an important ingredient to build relationship.

In the survey questionnaire, customers were asked to express their feelings whether they feel safe by their relationship with the bank. The result presented in figure 4 below shows that customers have developed trust and they feel safe in their relationship with the bank. A great majority of the respondents, 249 (92.23%) respondents acknowledge that they experience a strong feeling of safety in their relation with the bank. They added that because of its reliable services, they have developed strong trust which led them to feel safe by their relationship with the bank. On the contrary, 6 (2.22%) respondents disagree on the feeling of safety and trust on their relation with the bank. The remaining 15 (5.56%) respondents remain neutral. They have answered ‘no opinion’ for the question.
Therefore, the bank has convenient access to use its service. And also employees of the bank advise them on their business dealings. The bank provides reliable services and employees are polite and friendly. So this lot of qualities made them develop trust while in turn builds the feeling of safety in their relationship with the bank (92.23%). When customers develop trust on the bank, they will not have any eyes and ears to see and listen to competitors attractive adverts and offers to switch to them and stay loyal with the bank.

Figures 4 - Customers feel safe by their relationship

Presently, due to the high volume of promotions targeted to customers, they are overloaded and increasingly, they are becoming more and more suspicious about its content (Kotler, 1999). Therefore, many times, they prefer to make decisions without the influence of these promotions. That is why they are shifting from this to information of product evaluation gained from friends, family members and coworkers.

As it is presented in table 1 below customers of the bank were also requested to affirm whether they recommend the bank to their friends, coworkers and family members. Of the total 270 respondents, 73 (27%) of the respondents confirmed (strongly agreed) that because they are highly satisfied by the services of the bank and the behavior of the bank employees, they recommend it to anyone who requested them for the best bank. The other 144 (53.3%) also agreed that because of its efficiency in introducing different banking services from time to time,
they talk positively with their friends and colleagues about the bank when the issue of banking is discussed. On the other hand, 41 (15.2%) of the respondents answered that they have no opinion for the query. The remaining 12 (4.5%) respondents answered that they do not recommend the bank to anyone.

Thus, the finding of the survey points out that customers of the bank are so satisfied that they pass messages of their evaluation of the services and the conduct of the employees, the friendliness and courteousness of the bank’s staff, and even the extension of the working hours and efficiency in introducing different banking services from time to time to their colleagues and friends so that they can prefer and use the bank services (80.3%). This serves to get unpaid promotion to the bank. Also, the word of mouth is most believed and it is a plus to the bank.

**Table 1 - Customers recommend the bank to friends and colleagues**

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<th>Valid Percent</th>
<th>Cumulative Percent</th>
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<tr>
<td>Valid</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>strongly disagree</td>
<td>1</td>
<td>.4</td>
<td>.4</td>
<td>.4</td>
</tr>
<tr>
<td>disagree</td>
<td>11</td>
<td>4.1</td>
<td>4.1</td>
<td>4.4</td>
</tr>
<tr>
<td>no opinion</td>
<td>41</td>
<td>15.2</td>
<td>15.2</td>
<td>19.6</td>
</tr>
<tr>
<td>agree</td>
<td>144</td>
<td>53.3</td>
<td>53.3</td>
<td>73.0</td>
</tr>
<tr>
<td>strongly agree</td>
<td>73</td>
<td>27.0</td>
<td>27.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>270</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
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</tbody>
</table>

Any customer may have expectation of service determined by factors like past experiences, personal needs or somebody’s recommendations. Firms believe that offering quick and efficient service is not only important to attract new customers, but also to retain existing customers.

During the survey, customers were enquired to witness their experience (feelings) whether they are generally contented (satisfied) by the bank’s services. As the response presented in figure 5 below
reveals, that a great majority of the respondents, (92.22%) are highly satisfied by the bank’s services. That is 103 (38.15%) respondents highly acknowledged (strongly agreed) that the bank offers quality services to the customers and also the behavior of the employees is magnificent. Therefore, they are highly satisfied by the bank services. Further, 146 (54.07%) respondents also agreed that the smooth (consistent) flow of the bank services, the smiling, friendly and courteous behavior of employees impressed and pleased (satisfied) them well. The other 13 (4.81%) of the respondents are impartial (neutral) to the request. They answered ‘have no opinion’ to the query. The remaining 8 (2.96%) disapprove (disagreed) of being satisfied by the bank services.

Customer satisfaction has a direct relation to customer loyalty and repeat purchase (Selvakumar 2015). Thus, the bank is efficient in offering its varied and quality services to the customers. Also, employees of the bank are courteous and friendly. They welcome customers with a smiling face. Further, the expansion of the branches makes the bank more accessible to customers. These all and other factors have resulted that in general, customers of the bank are highly satisfied by the service offered by the bank (92.22%). Customer satisfaction is important because it results in customer loyalty and repeat purchase and as a result increases in revenue. The findings of Curtis et al (2012) disclosed that satisfied customers display loyalty and a higher repurchase rate, while loyal customers display satisfaction and come back to repurchase the product.

Figure 5 – customer satisfaction by the services of the bank

Customers prefer a bank that offers them the best services that they expect and solves their problems. They also prefer a bank that delivers
efficient service. Of course, customers evaluate the service of the bank taking into consideration different elements and evaluating the services offered. According to Selvakumar (2015) customers’ evaluation of the bank service offer is affected by the service process, physical evidence and quality of the service personnel. Similarly, Kasahun Gebremeskel (2014) also found that customers choose a bank due to factors like high ranking of convenience, service provision, additional services and bank’s image as most selective criteria for banking services.

In figure 6 below, customers were enquired to respond if they always choose this bank than other competing banks. The response shows that majority of the respondents, (78.89%) wittingly choose this bank for their banking services. To make it detailed, 71 (26.30%) of the respondents strongly agreed that because of its best customer services and polite and friendly behavior of employees, they always select this bank than others. A further 142 (52.59%) also agreed with the earlier ones. They also added that because of competence of the employees, availability of branches in different parts of the country and its extended working hours, they always choose this bank than other competing banks. Conversely, 14 (5.19%) and 2 (0.74%) of the respondents answered disagree and strongly disagree respectively. They stated the reasons for their disagreement that because of its difficult procedures of loan processes, they also use other banks’ services. The remaining 41 (15.19%) of the respondents did not disclose their true feelings. They replied ‘have no opinion’ for the request.

Accordingly, because of its best customer service, branch availability at different districts, friendly and polite behavior of its employees, competence of its employees and extended business hours, customers always choose this bank than other competing banks (78.89%). The findings of Dawit T/Tsadik (2013) also match with this finding. The finding also revealed that the chief factors determining customers’ bank selection are: convenience, reliability and service provision.
Customer satisfaction is a cornerstone when the business intends to build customer relationships. According to Revaldo and Gronroos as cited in Bena (2010), customer satisfaction is a better predictor of intention to purchase than service quality. Satisfied customers expected to maintain contact with the firm, purchase more of the firm’s products/services more often.

During the survey, customers were enquired to reaffirm whether they do not have intention to leave the bank in the near future. As it is presented in table 2 below 84 (31.1%) of the respondents strongly agreed that they have no intention to leave because they are highly comfortable by the current service delivery at the bank. A further 108 (40.0%) of the respondents also concurred (agreed) that because of the quality service offered by the bank, extended working hours, polite and friendly employees who are eager to quickly solve customer’s problems, accessibility of the branches around their locality (vicinity) and other merits, they do not have any intent to leave the bank in the near future. On the other hand, the other 60 (22.2%) of the respondents remained neutral. They replied ‘have no opinion’ for the request. The remaining 18 (6.7%) are not comfortable by the service of the bank because 13 (4.8%) of the respondents disagree and 5 (1.9%) respondents strongly disagree when asked if they would not leave the bank on the near future.

Customer loyalty helps to build closer relationship between customers and the bank. Customers who feel loyal to a bank are more likely to purchase a banking product in the future. Also, most of the loyal customers recommend the bank to their friends and family (Khan and Rizwan,
2014). Accordingly, customers of the bank are comfortable with the services provided by the bank, polite and friendly behavior of employees, extended business hours, and accessibility of branches around their locality. Thus, they do not have intent to leave the bank in the near future (71.1%). Since the bank has already won the trust of loyal customers, it is easier to cross-sell or up-sell products to these customers than a new customer.

On the other hand, employees were also requested to assert if they observe whether most customers would stay (are loyal) with the bank once started dealing with the bank. The reply shows that most customers would be attracted by service delivery and stay loyal once started using the service (85.87%).

Table 2 - Intention to leave the bank in the near future

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>strongly disagree</td>
<td>5</td>
<td>1.9</td>
<td>1.9</td>
<td>1.9</td>
</tr>
<tr>
<td>disagree</td>
<td>13</td>
<td>4.8</td>
<td>4.8</td>
<td>6.7</td>
</tr>
<tr>
<td>no opinion</td>
<td>60</td>
<td>22.2</td>
<td>22.2</td>
<td>28.9</td>
</tr>
<tr>
<td>agree</td>
<td>108</td>
<td>40.0</td>
<td>40.0</td>
<td>68.9</td>
</tr>
<tr>
<td>strongly agree</td>
<td>84</td>
<td>31.1</td>
<td>31.1</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>270</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

6. Conclusions and Recommendations

6.1. Conclusions

Relationship marketing is a marketing approach that recognizes the significance of both the buyer and the seller in the marketing process. The core concept is to build long-term relationships with customers, make them loyal and retain as many customers as possible. The study was aimed to explore the key factors that affect customer loyalty and retention in Dessie region of Abay bank in Ethiopia. Therefore, to address the objective of the research, primary data has been collected.
from 270 customers of the bank found in sampled branches. Totally, 280 questionnaires were distributed to branches' customers and 10 questionnaires were not returned from them. Then, the data has been analyzed using descriptive method of data analysis. The result of the descriptive survey result indicates that the bank provides effective, efficient and prompt service to customers. Employees of the bank are efficient and provide a speedy service to their customers (93.70%). Employees of the bank are willing to solve customers' problems. Also, when the problem was caused by someone inside of the bank, they offer their apology and exert themselves to resolve the problem (71.48%). Customers with issues that are resolved quickly can often turn into loyal customers and even advocates of the bank services. On the other hand, a considerable number of respondents (23.33%) have no opinion for the request. This might be caused by the fact that they may not experience a problem themselves or might not witness such experience.

The result of the survey indicates that the bank’s employees and customers have established warm and enviable relationship with each other. During service delivery, they even chat for few minutes about family and personal issues (94.07%). Further, the bank provides reliable services and employees are polite and friendly. So this lot of qualities made them develop trust while in turn builds the feeling of safety in their relationship with the bank (92.23%). Also, the finding of the survey points out that customers of the bank are so satisfied that they pass messages of their evaluation of the services and the conduct of the employees, the friendliness and courteousness of the bank’s staff, and even the extension of the working hours and efficiency in introducing different banking services from time to time to their colleagues and friends so that they can prefer and use the bank services (80.3%). This serves to get unpaid promotion to the bank. Also, the word of mouth is most believed and it is a plus to the bank.

Thus, the bank is efficient in offering its varied and quality services to the customers. Also, employees of the bank are courteous and friendly. They welcome customers with a smiling face.

Further, the expansion of the branches makes the bank more accessible to customers. These all and other factors have resulted that in general, customers of the bank are highly satisfied by the service offered by the bank (92.22%). Customer satisfaction is important because it results in customer loyalty and repeat purchase and as a result increases in
revenue. The findings of Curtis et al (2012) disclosed that satisfied customers display loyalty and a higher repurchase rate, while loyal customers display satisfaction and come back to repurchase the product.

The finding of the study reveals that because of its best customer service, branch availability at different districts, friendly and polite behavior of its employees, the competence of its employees and extended business hours, customers always choose this bank than other competing banks (78.89%). The findings of Dawit T/Tsadik (2013) also match with this finding. The finding also revealed that the chief factors determining customers’ bank selection are: convenience, reliability and service provision. Accordingly, customers of the bank are comfortable with the services provided by the bank, polite and friendly behavior of employees, extended business hours, and accessibility of branches around their locality. Thus, they do not have intent to leave the bank in the near future (71.1%). Since the bank has already won the trust of loyal customers, it is easier to cross-sell or up-sell products to these customers than a new customer.

6.2. Recommendations

- It is believed that service quality is indispensable for the service providing firms like a bank. Therefore, the bank should continuously work hard to maintain, further improve and diversify the quality of the services it offers so that customers would be highly satisfied, become loyal and retained.

- A bit more than a quarter of the respondents either withheld their reaction or do not agree on employees skill in solving customers’ problems quickly. This shows that there are a considerable group of customers who do not agree or are not satisfied by problem solving skills of employees. So, the bank should train employees on complaint handling and problem solving skills in banks and so that customers’ problems can be easily solved.

- The bank is currently engaged on opening new branches at different sub-cities of provincial capitals and at different district towns where banking services were not available. This branch expansion activity results to reach a large number of new customers. Therefore, the bank should continue to conduct
studies on those profitable areas and continue to open branches so that it can maximize its customer base and market share.

- Nearly one-fifth of customers did not always choose Abay bank for their banking service needs and use other competing banks. This is a warning signal for the bank. So, the bank should study why employees select other competing banks and are not fully satisfied by the bank’s service and design and execute all-inclusive services that can satisfy all customers of the bank.

References:


CHALLENGES OF 21ST CENTURY LEARNERS: STUDENT’S ENGAGEMENT IN LEARNING- EMPLOYING STRATEGIES TO MAXIMISE STUDENTS’ ENGAGEMENT

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Abstract

The key of effective learning environment is meaningful learning experiences that the students gain each day. 21st century students are technologically and digitally driven active learners. Educators need to design innovative methodologies to keep our students actively involved and engaged by maximum participation from them. So the onus lies on all the stakeholders of education system to keep a pace with this dynamic group of students. Otherwise the objective of empowering students will be an utter failure.

The focus of the study is to find out the existing students engagement and based on it suggests strategies to enhance it. A survey was conducted to find out the Behavioral, Affective and Cognitive engagement of secondary school students. The researcher also finds out whether there is a significant difference between these three engagement domains. The researcher further suggests methodologies and strategies to maximise students’ engagement.

Keywords: Behavioural engagement, Affective engagement and Cognitive Engagement.

Introduction

The key of effective learning environment is meaningful learning experiences that the students gain each day. 21st century students are technologically and digitally driven active learners. Educators need to design innovative methodologies to keep our students actively involved and engaged by maximum participation from them. Engagement
describes energy in action; the connection between person and activity. So the onus lies on all the stakeholders of education system to keep a pace with this dynamic group of students. Otherwise the objective of empowering students will be an utter failure.

The most challenging job an educator faces is student engagement. If they fail so, it has an adverse affect on the psychology of the student. Students tend to divert themselves first from academics and eventually may result in grave situations like diverting from life. Disengagement or Engagement Gap as it is termed may result in drop outs and stagnation resulting in unproductive citizens. Even worse they become a burden to themselves as well as the society. So it is the need of the hour to nurture our young generations’ learner with utmost care and interest to fulfil the objective of creating end empowering better citizens of our country.

**Literature Review**

Tuomo Erkin Virtanum (2013) has identified Student engagement as an influential mediator between classroom interactional quality and adolescent learning outcomes. This study examined the relationship between classroom quality and student behavioural engagement in secondary school classrooms. The results showed, first, that there was variation in both classroom quality and student behavioural engagement between the classrooms. Second, classroom organisational support was associated with observed and with teacher- and student-rated engagement and instructional support was associated with student-rated and observed engagement. Third, emotional support did not have a direct effect on student engagement but contributed to student engagement indirectly via organisational and instructional support. There were no gender differences with respect to self-reported engagement. Class size had a positive effect on teacher-rated engagement. The results demonstrated specific associations
between the domains of classroom quality and student behavioural engagement in secondary school classrooms.

Parsons, Seth A & others (2014) found out that Student engagement is an important consideration for teachers and administrators because it is explicitly associated with achievement. What the authors call the ABC's of engagement they outline as: Affective engagement, Behavioral engagement, and Cognitive engagement. They also present "Three Things Every Teacher Needs to Know about Student Engagement:"

1. Engagement is closely associated with achievement;
2. teachers have significant influence over student engagement, and;
3. there are manageable ways to evaluate and document student engagement.

**Conceptual Definition:**

**Student engagement** occurs when "students make a psychological investment in learning. They try hard to learn what school offers. They take pride not simply in earning the formal indicators of success (grades), but in understanding the material and incorporating or internalizing it in their lives.

**Behavioral Engagement:** Behavioral engagement draws on the idea of participation; it includes involvement in academic and social or extracurricular activities and is considered crucial for achieving positive academic outcomes and preventing dropping out.

**Emotional or Affective Engagement:** Emotional engagement encompasses positive and negative reactions to teachers, classmates, academics, and school and is presumed to create ties to an institution and influence willingness to do the work.

**Cognitive Engagement:** Cognitive engagement draws on the idea of investment: it incorporates thoughtfulness and willingness to exert the effort necessary to comprehend complex ideas and master difficult skills.
Operational Definition:

Behavioral Engagement: It is quantified by measuring participation in the following variables; Academic engagement Co-curricular and extracurricular engagement Emotional or Affective Engagement: It is quantified by measuring positive and negative reactions to the following variables; Engagement with teachers Peer engagement Engagement with school environment Cognitive Engagement: It is quantified by effort necessary to comprehend complex ideas and master difficult skills.

Objectives:

1) To find out the significant difference between the different engagement components of higher secondary students

2) To suggest strategies to encourage engagement among higher secondary students.

Hypothesis:

Ho There is no significant difference between the mean scores of different engagement components of higher secondary students

Tool Used:

The statistical technique used to test this hypothesis is ANOVA

<table>
<thead>
<tr>
<th></th>
<th>Sum of Squares</th>
<th>Df</th>
<th>Mean Squares</th>
<th>F</th>
<th>P-value</th>
<th>LOS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>792.26</td>
<td>2</td>
<td>396.13</td>
<td>297.65</td>
<td>1.12</td>
<td>NS</td>
</tr>
<tr>
<td>Within Groups</td>
<td>395.26</td>
<td>297</td>
<td>1.33</td>
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<tr>
<td>Total</td>
<td>1187.52</td>
<td>299</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

P Value is 1.12 which is more than 0.05 so the null hypothesis is accepted.
There is no significant difference between the mean scores of different engagement components of higher secondary students.

**Interpretation and Discussion:**

The results reveal that there is no statistic difference between the three engagement components. This is a healthy sign the students are able to balance between all the components. The result will lead to answer such as ‘do students need to be actively engaged in all the domains to be called as engaged learners? Or if an academically excellent learner does not participate in other activities, do we still call the learner as engaged learner?'

**Strategies to enhance Students’ Engagement**

- **Flipped Classroom:** It a learning technique wherein the teacher gives the students topic beforehand so that students can do lot of browsing and research work on the topic planned. The students are well prepared and they can engage them in higher order learning in the class with lot of discussion and deliberation. This helps the students to be actively involved during the class hours.

- **Practice Journal or Blog Writing to Communicate with Students:** Journal writing helps better student attention, a good habit of summarizing and writing which further leads to cognitive restructuring.

- **Think Time:** The attention span of today’s generation is very less. To retain their interest and attention teachers should give time to the students for summarizing, sharing, and reflecting after each new concepts taught. This is one of the most crucial times when the students internalise the concepts and have higher order thinking. The following are two approaches which has a significant impact on students teaching learning process.
**Use the 10:2 method:** For every 10 minutes of instruction allow the students 2 minutes to process and respond to the instruction. This can be done in various ways by having them write what they have learned, questions they may have, or by discussing the content with a fellow student.

**Use the 3-2-1 method:** At the end of a lesson have students use the 3-2-1 method of summarizing by having students record three things they learned, two interesting things, and one question they have about what was taught. Allow time to share their findings with a peer. Better understanding of student engagement, and at what point students become disengaged, teachers may be able to implement specific strategies and instructional practices to enhance student engagement. Therefore, by keeping students engaged in the learning process, student achievement may increase while the “engagement gap” closes and may provide a possible intervention against the high school dropout rate [2].

Disengagement is a potential risk to all students, not just those of a minority or low socioeconomic status. To gain a deeper understanding of student engagement, the framework of this study is guided by the following research questions:

1. Do differences exist between high school students, middle school students, and upper elementary students in the three components of student engagement—cognitive, behavioral, and emotional?

2. Do differences exist between high school teachers, middle school teachers, and upper elementary teachers in the three components of student engagement—cognitive, behavioral, and emotional?
2. Literature Review

Student engagement is described from various definitions found within the research. For example, conceptualized engagement as “a magnet that attracts learner’s meandering attention and holds it . . . It means the learner has ‘wrapped around’ an important idea, has incorporated it accurately into his or her inventory of how things work. The learner owns the idea” [8].

In addition, the term engagement has been used synonymously with words such as active, attentive, interest, motivation, and effort [9]. However, Ainley, Frydenberg, and Russell [10] point out a difference between motivation and engagement. “Motivation is about energy and direction, the reasons for behavior, why we do what we do. Engagement describes energy in action; the connection between person and activity”.

In the National Survey of Student Engagement [11], engagement is defined as “the intersection of the time and energy students devote to educationally sound activities”. Engagement in behavioral terms is considered the willingness to complete required assignments, attending class, and participation in school activities [12].

Furthermore, a description for engagement is offered by Skinner, Kindermann and Furrer [13], “At its most general, engagement refers to the quality of a student’s connection or involvement with the endeavor of schooling and hence with the people, activities, goals, values, and place that compose”. Finn [14] stressed the connection of engagement with his “participation-identification model” highlighting the importance of students “bonding” with school; “if bonding does not occur, the likelihood of behavior problems, including leaving school before graduation is increased”. Students’ active participation in school and classroom activities and a concomitant feeling of identification with school” are positive engagement indicators [14]. Likewise, Skalsky [6]
added unlike socioeconomic status and IQ, educators can provide a positive influence toward increasing student engagement.

2.1 Components of Engagement

The inventory of definitions for the term engagement are plentiful and found throughout the literature; however, for the purpose of this research project, the comprehensive definition offered [7] provided an explanation incorporating the three components of engagement: behavioral, cognitive, and emotional: [7]

Even though the definition clearly divides the components of engagement, there is no implication to suggest a definitive separation and continue to clarify, “These factors are dynamically interrelated . . . they are not isolated processes” [7]. Even though each component of engagement has its own specific definition; they are interdependent and cannot be entirely separate. For instance, when students are excited about learning they are considered emotionally engaged, and they are more likely to implement effective learning strategies, thus becoming cognitively engaged. Each component shares overlapping concepts [10]. Engagement is a multicomponent concept that can be separated, but also remains intersected in a profound way [7].

2.1.1. Behavioral Engagement: Behavioral engagement is defined as a complex construct divided into three categories of school participation: (a) positive conduct, (b) involvement in learning and academic tasks, and (c) participation in school-related activities. For example, positive conduct includes obeying school rules, attending class regularly, adhering to norms and avoiding disruptive behaviors [7, 10, 12, 15-16]. Furthermore, involvement in learning and academic tasks includes effort, persistence, attention, class participation, asking questions, and conversing with the teacher and other students [7, 10, 12, 15-17]. In addition, participation in school-related or
extracurricular activities may include clubs, sports, or school governance [10, 12, 15-16].

Behavioral engagement captures the ways in which students interact within the school setting through academic and nonacademic activities to be thought of as “engagement in the life of the school” [2]. Students actively responding to learning tasks by asking relevant questions, working to solve task-related problems, and participating in relevant discussions with peers and teachers are prime examples of students behaviorally engaged [12]. Student attendance rates at school are a key factor in behavioral engagement and “highly predictive of non-school completion” [18]. Students must identify with school and take a personal interest in learning. Students who are behaviorally engaged identify themselves with school, will attend school regularly, and arrive to school on [14, 16, 30].

Data from a longitudinal sample of 526 high school students across the United States and examined how these students spent their time in high school and the various conditions in which students described being engaged. “Participants experienced increased engagement when the perceived challenge of the task and their own skills were high and in balance, the instruction was relevant, and the learning environment was under their control”. However, the results also indicated students spent one-third of their class time in an inactive state of learning such as listening to a lecture or watching a video and half of class time was spent on somewhat challenging independent work; furthermore, only 14% of class time was spent in class discussions and group activities [19]. High behavioral engagement is based on the quality of classroom experiences. Students reported whole group instruction “as relatively teacher-controlled, whereas small group and individual instruction are perceived as relatively student-controlled” [20]. Active learning encourages critical thinking, self-directed learning, and provide
students multiple opportunities to self-assess and revise their own thinking processes to better problem solve [21].

Active learning techniques encourage engagement by holding students accountable for involvement through specific question and response techniques, cooperative learning groups, and partner discussion, which empowers students to move from passive learning into active learning [22]. Cooperative learning groups provide a more comfortable atmosphere for student discussion and allow students an opportunity to ask questions in a more controlled setting, empowering students to remain engaged within the learning process. Student engagement necessitates active learning. If students are not engaged in the learning process, every minute spent on instruction, data collection and analysis, and professional development will not motivate students to learn [23]. Dewey [24] proposed the value of personal experience in learning forms a reciprocal relationship between thinking and doing. His work laid the foundation for future researchers. For example, students partake in conscious learning based on the activity theory. The foundation of the activity theory is defined by “the phenomenon that unifies attention, intention, memory, reasoning, and speech”. In other words the “activity theory focuses on the purposeful actions that are realized through conscious intentions. [The] activity theory claims that learning and doing are inseparable and that they are initiated by intention” [25].

Furthermore, the correlation results of teacher behavior and student engagement from a study conducted to investigate the reciprocal relationship between student and teacher. The measures include teacher involvement, structure, and autonomy support. “These relations were positive, indicating that children who were more behaviorally engaged subsequently received more contextual support . . .
. [and] strong empirical support was found for a reciprocal relationship between teachers’ behavior and student’s engagement in the classroom” [17].

2.1.2. Emotional Engagement: Additionally, the reciprocal relationship encourages emotional engagement through the student’s perceptions of teachers’ behavior and is directly supported through teachers’ actual behavior among students. “When children experience teachers as warm and affectionate [and] providing clear expectations, children feel happier and more enthusiastic in class” leading to building an emotional rapport between students and teachers. Emotions are a key component of student engagement and refer to students’ affective reactions in the classroom such as happiness, interest, boredom, anxiety, frustration, and sadness [7, 10, 17, 26]. Students exhibit emotional engagement when they employ positive or negative emotional responses to learning activities [17]. Furthermore, Herreid, Terry, Lemons, Armstrong, Brickman, and Ribbens [27] indicated their study revealed significant correlations among emotion, engagement, and learning gains. Teachers prefer students “to experience positive and pleasant emotions with the hope that these emotions will foster motivation, engagement, and learning” [28]. “Teachers know that engaged students are usually happier than disconnected ones who have isolated tasks to do, and research confirms that engagement activates more of the pleasure structures in the brain than do tasks of simple memorization” [29].

In addition to emotional responses, some conceptualize emotional engagement as a feeling of investment and identification. Identification is a sense of belonging, feeling an important part of the school body, and finding value in the school experience. “According to this perspective, the person comes to identify with a place or activity structure that may represent certain expectations, values, beliefs, and practices [14, 30]. However, Fredricks et al., [7] argued identification is
usually “general and not differentiated by domain or activity. For instance, it may not be clear whether students’ positive emotions are directed toward academic content, their friends, or the teacher”.

Identification is likely to occur over time when students are active participants during classroom and school-wide activities and when students receive praise, rewards, and acknowledgement. “An internalized sense of identification can, in turn, serve to perpetuate the student’s active participation in class and school” [31]. Teachers can influence emotional engagement by appreciating the strengths, culture, and life experiences of their students. Yazzie-Mintz [2] (2006) included,

The idea is reflected when a researcher observed a group of students taking an indirect route back to class to pass by a particular teacher standing at the doorway greeting students. The students took a longer route just for the purpose of receiving a moment of personal attention. Students look for a connection with an adult or peer, express a desire for engagement through relationship, and want to be acknowledged as an important part of their school community [29]. Emotional engagement can fluctuate based on the flow theory. He explains the flow experience occurs when challenges are balanced, neither too difficult nor too easy [19]. According to Fredricks et al., [7], “Flow is a subjective state of complete involvement, whereby individuals are so involved in an activity that they lose awareness of time and space. The definition of flow provides a conceptualization that represents high emotional involvement or investment”. “Emotion and attention, [is] the gateway to cognition” [32].

**2.1.3. Cognitive Engagement:** Cognitive engagement is a primary factor in how students go about completing instructional related activities [2]. “Lessons that are not engaging let students’ minds wander. They fail to make the case for relevance because they don’t connect them to what is important in their lives” [33]. Based on cognitive and constructivist ideas, making learning relevant and
scaffolding learners to a higher intensity of thinking, students are more likely to adapt their learning to predictable and unpredictable situations keeping students consciously thinking and engaged throughout the learning experience therefore improving their behavioral engagement[34-35]. Using strategies based on the theories of Piaget [36] and Vygotsky [37], students who are held to a higher accountability of rigorous learning require support through engagement activities. It is important to identify the levels of interest and attitudes described as affective criteria. As cognitive growth occurs, students are capable of engagement for longer periods [12]. Cognitive engagement can range from simple memorization to the use of self-regulating or strategic learning strategies that promote deep understanding and expertise [7]. Cognitive engagement can also be described as “engagement of the mind” [12]. “Cognitive control, the ability to coordinate thoughts and actions in relations with internal goals, is often required in our everyday life and sub serves higher processes such as planning and reasoning”. In addition, engagement includes cognitive criteria “to which students are attending to and expending mental effort in the learning” [38]. Cleeremans and Jimenez [39] defined learning as “a set of philogenetically advanced adaptation processes that critically depend on an evolved sensitivity to subjective experience so as to enable agents to afford flexible control over their actions in complex, unpredictable environments”. Shanks and St. John (as cited in [38] stated, “Human learning is almost invariably accompanied by conscious awareness”. We concluded that a significant difference between adaptation and learning is whether or not consciousness is involved” [38].

3. Methodology

This research project took place within one city school district consisting of 11 elementary schools, 4 middle schools, 2 high schools and a technology center. At the beginning of the project, the total
student enrollment within the district was 9,296 students and 523 certified teachers. The research participants were obtained through schools with similar demographics of low socioeconomics within the city school district. Neither students nor teachers were linked to any particular school within the district. However, the participants’ school level—high, middle, or upper elementary—was considered a targeted characteristic for this study. Enrollment is considerably lower at individual elementary International Journal of Education and Learning Vol.5, No.1 (2016)

18 Copyright © 2016 SERSC schools since there are so many more elementary schools than middle and high schools located within the district. A total of 585 consent forms were sent home to parents and guardians inviting and requesting student participation. A total of 181 consent forms, approximately 31%, were returned. Of that 31%, 42 parents or guardians of the upper elementary students refused participation of their child. All of the 109 students who were granted parental permission were provided assent forms. After the assent forms were explained to the students, 11 students declined to participate and 5 were absent on the date of the survey. A total of 93 respondents or approximately 16% of the 585 students invited participated in the research study—31 students in each school level. A total of 104 surveys were sent out electronically to certified teachers requesting participation. A total of 28 responses or approximately 27% were returned completed.

3.1 Quantitative Instrumentation

The National Survey for School Engagement was developed by the National Center for School Engagement [11] to gain a better understanding of how students relate to school experiences, their attitude toward school, and how to keep students interested in school and the learning process. The survey contained 15 items related to the
three components of engagement: cognitive, behavioral, and emotional. This design is cross-sectional allowing for quantitative data collection at one point in time for the comparison of students’ engagement levels and was administered only once. Permission to use the survey for this study was granted. All items were measured on a 1 to 5 Likert-type scale using two separate scales. The first scale was ranked (1) Strongly Agree; (2) Agree; (3) Neutral; (4) Disagree; and (5) Strongly Disagree. The second scale was ranked (1) Never/Almost Never; (2) Rarely; (3) Sometimes; (4) Often; and (5) Always/Almost Always. A behavioral example from this survey is “I come to class prepared.” A cognitive example from this survey is “I am interested in the work I get to do in my classes.” An emotional example from this survey is “I enjoy the work I do in class.” Cronbach’s alpha reliability tests were run on behavioral, cognitive, and emotional engagement. All showed a relatively high level of reliability based on the Cronbach’s alpha test with an exception of the behavioral engagement at .617. The reliability for the overall survey was .856, .759 for cognitive engagement, and the Cronbach’s reliability for emotional engagement was .793.

The Teachers’ Perception of Student Engagement survey was adapted by the researcher from the National Survey for School Engagement geared toward a teacher’s perspective. All items were measured on a 1 to 5 Likert-type scale using two separate scales. The first scale was ranked (1) Strongly Agree; (2) Agree; (3) Neutral; (4) Disagree; and (5) Strongly Disagree. The second scale was ranked (1) Never/Almost Never; (2) Rarely; (3) Sometimes; (4) Often; and (5) Always/Almost Always. The questions were of the same nature as the student survey, but slightly modified for the teacher respondent. The overall Cronbach’s alpha showed a high level of reliability at .910. In addition, respondents were asked to rank the three components of engagement with 1 as the most important and 3 as the least important.
4. Research Results

The first question of this study was to determine if any differences exist among high school students, middle school students, and upper elementary students in the three components of student engagement—cognitive, behavioral, and emotional. A one-way ANOVA was used to analyze students’ scores among the three components of engagement. The cohorts differed significantly among cognitive engagement, \( F(2, 90) = 2.521, p = .002 \) and emotional engagement, \( F(2, 90) = 6.346, p = .003 \). However, there was no significant difference in behavioral engagement, \( F(2, 90) = 2.576, p = .082 \). International Journal of Education and Learning Vol.5, No.1 (2016) To determine how the means differed, a Tukey honestly significant difference (HSD) post-hoc test was run for evaluation of significant differences. Tukey HSD post-hoc comparisons of the three levels among the emotional engagement group indicated a significant difference between the high school level (\( M = 14.94, [13.51, 16.36] \), \( p = .717 \) and the elementary level (\( M = 18.74, [17.24, 20.24] \)), \( p = .003 \). In addition, the middle school level (\( M = 15.81, [13.92, 17.69] \), \( p = .027 \)) indicated a significant difference between the elementary level (\( M = 18.74, [17.24, 20.24] \)), \( p = .003 \). The Tukey HSD post-hoc comparisons among the cognitive engagement group indicated a significant difference between the high school level (\( M = 14.68, [13.30, 16.05] \), \( p = .052 \)) and the elementary level (\( M = 18.00, [16.67, 19.33] \), \( p = .002 \)).

Mean significant differences existed between high school, middle, and upper elementary students among two of the three primary components of student engagement—cognitive and emotional. The high school participants and middle school participants rated emotional engagement significantly lower than elementary participants. There was no significant difference between the ratings of high school students and middle school students in the emotional engagement group. However, only high school participants rated cognitive
engagement significantly lower than elementary participants. Furthermore, there was no significant difference between the ratings of high school participants and middle school participants and no significant difference between middle school participants and elementary participants within the cognitive category.

The second question of this study was to determine if differences exist between high school teachers, middle school teachers, and upper elementary teachers in the three primary components of student engagement—behavioral, cognitive, and emotional. A MANOVA was used to analyze students’ scores among the three components of engagement. The cohorts differed significantly among behavior engagement, $F(2, 26) = 2.37, p = .025$ and emotional engagement, $F(2, 26) = 3.44, p = .004$. However, there was no significant difference in cognitive engagement, $F(2, 26) = 0.037, p = .936$.

To determine how the means differed, a Least Significant Difference (LSD) post-hoc test was run for evaluation of significant differences. The LSD post-hoc comparisons of the three levels among emotional engagement group indicated a significant difference between the middle school level ($M = 3.20, p = .027$) and the elementary level ($M = 3.44, p = .027$). In addition, a significant difference was found between the middle school level ($M = 3.20, p = .027$) and the high school level ($M = 2.92, p = .001$). Furthermore, the LSD post-hoc comparisons among the behavior engagement group indicated a significant difference between the high school level ($M = 2.92, p = .018$), the elementary level ($M = 3.44, p = .018$) and the middle school level ($M = 3.20, p = .018$).

5. Conclusions and Limitations

One of the top six reasons students drop out of school is not getting along with their teachers [40]. This disconnect may be the result of negative emotional engagement or a lack of positive emotional engagement. The results of this study revealed high school participants
and middle school participants rated their own emotional engagement within school significantly lower than the elementary participants. Engagement is about the relationships students develop within a school community such as teachers, other adults within the educational setting, and with peers. The degree of emotional engagement depends on the quality, affiliation, and depth of the relationships. The difference may be due to a positive personal connection the upper level elementary students have developed with their teachers over a longer period of time. Upper elementary participants are many times in a self-contained classroom. Self-contained means the students keep the same teacher for all core subjects. The students have other teachers for physical education, computer lab, and library classes, but the majority of each school day is spent with the same teacher and peers, allowing for more time to build personal and emotional International Journal of Education and Learning Vol.5, No.1 (2016)

References

GREEN GROWTH AND SUSTAINABLE DEVELOPMENT IN DAIRY INDUSTRY: A STUDY ON AMUL DAIRY

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Abstract:
Dairy is a universal agricultural production. People milk dairy animals in almost every country across the world, and up to one billion people live on dairy farms. It is an important part of the global food system and it plays a key factor in the sustainability of rural areas in particular. It is a widely-known fact that the dairy sector directly contributes to the economies of a number of communities, regions and countries. A Green Economy could be thought of as an alternative vision for growth and development; one that can generate growth and improvements in people’s lives in ways consistent with sustainable development. A Green Economy promotes a three-way bottom line, sustaining and advancing economic, environmental and social well-being. The prevailing economic growth model is focused on increasing GDP above all other goals. It consists of essential and potentially irreversible social, environmental and economic costs. The main objective of this paper is to study the practices of Amul Dairy in Strategies for green economic development.

Key words: Green Economy development, sustainable development, dairy industry,

Preface:
Dairy is a universal agricultural production. People milk dairy animals in almost every country across the world, and up to one billion people live on dairy farms. It is an important part of the global food system and it plays a key factor in the sustainability of rural areas in particular. It is a widely-known fact that the dairy sector directly contributes to the economies of a number of communities, regions and countries. An increasing demand worldwide is noticeably emerging at present, and the industry is globalizing, thus increasing the scope and intensity of the global dairy trade. Green economics is the economics of the real
world, human needs, the Earth’s materials, and how they mesh together most harmoniously. It is primarily about “use-value”, not “exchange-value” or money. It is about quality, not quantity for the sake of it. It is about regeneration of individuals, communities and ecosystems—not about accumulation, of either money or material. A postindustrial world requires an economics of quality, where both money and matter are returned to a status of means to an end. Green economics means a direct focus on meeting human and environmental need. Green economics is not just about the environment. Certainly we must move to harmonize with natural systems, to make our economies flow benignly like sailboats in the wind of ecosystem processes. But doing this requires great human creativity, tremendous knowledge, and the widespread participation of everyone. Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts: Human beings and human workers can no longer serve as cogs in the machine of accumulation, be it capitalistic or socialistic. Ecological development requires an unleashing of human development and an extension of democracy. Social and ecological transformation go hand-in-hand. Green economics and green politics both emphasize the creation of positive alternatives in all areas of life and every sector of the economy. Green economics does not prioritize support for either the "public" or the "private" sector. It argues that BOTH sectors must be transformed so that markets express social and ecological values, and the state becomes merged with grassroots networks of community innovation. For this to happen, new economic processes must be designed, and new rules of the game written, so that incentives for ecological conduct are built into everyday economic life. The state can then function less as a policeman, and more as a coordinator. This is a very different kind of "self-regulation" than current profit- and power- driven market forces. The basis for self-regulation in a green economy would be community, and intelligent design which provides incentives for the right things. Amul, the popular Indian dairy brand, has been rated as the top Indian Green Brand by Green Brands Global Survey for its mass tree plantation drive and contribution to environment by the milk producers of amul.
Review of Literature:

Descriptions and explanations of the potential for Green Growth to address both economic development and environmental sustainability challenges argue that Green Growth is necessary to achieve sustainable development (Lee, 2011; World Bank, 2012; ADB/ESCAP/UNEP, 2012; OECD, 2013). Green Growth is necessary and economically efficient (World Bank, 2012), vital to the future of developing countries, and it can lead to significant economic and social gains (OECD, 2013). Broadly, Green Growth policies entail bringing environmental factors into economic decision making by introducing considerations of resource efficiency, transforming energy systems, valuing natural capital in the economic calculus, and pricing environmental externalities (Jouvet et al., 2013). The importance of the equitability of Green Growth is emphasised by some authors, highlighting the link between social development and environmental sustainability (Smith et al., 2012; World Bank, 2012). Most countries have development objectives compatible with Green Growth approaches (UNEP, 2013), though the specific strategy for Green Growth will vary between countries (World Bank, 2012). For many the case for Green Growth remains unproven (Jacobs, 2013). Growth will increase the demand for energy, but fossil fuels are often the least cost source of energy (Sterner, 2011). Schmalensee (2012) suggests that there is little evidence of a threat to economic growth in the short- or medium-term from a depletion of natural capital or unchecked environmental degradation. It is not clear that a transition to a green economy can of itself generate the growth countries are seeking (Huberty et al., 2011), and for developing countries conventional growth may provide a more rapid route out of poverty (Dercon, 2012). Nor is it clear that giving up on economic growth is a necessary condition to tackle the environmental crisis (Janicke, 2012). Promises that green growth will offer a rapid route out of poverty are not very plausible; there may well be less rapid an exit than with more conventional growth strategies. The critical area of debate concerns the acceptance, or otherwise, of short-term adjustment costs in the expectation of long-term gains (Resnick et al., 2012). Most green policies have an economic cost over the short term, despite the economic benefit from a better environment and natural capital in the long term (Strand and Toman, 2010; Hallegatte et al., 2011). Green Growth policies should reconcile the short and long term, by maximising synergies and mitigating trade-offs across space and time (Hallegatte et
al., 2011). Accordingly, the World Bank (2012) suggests Green Growth should focus on what needs to be done in the next five to ten years to generate immediate benefits and avoid getting locked into unsustainable paths. The theory of green growth cannot determine the question of whether any particular green growth strategy or path will achieve the claims made for it (Jacobs, 2013), and some argue that the conventional tools of neo-classical economics have severe limitations for incorporating environmental considerations into economic policy (Kosoy et al., 2012). The limited literature specifically on developing countries is largely concerned with the potential of Green Growth policies, emerging economies, and the formulation of Green Growth strategies. Green Growth has been proposed as way for rapidly growing emerging economies, such as Brazil, China, India and Indonesia, to address greenhouse gas emissions and environmental degradation that their growth has brought (Jupesta et al., 2011; ADB/ADBI, 2013). Ellis et al. (2012) suggest there will be lessons to be learnt from their experience. Green Growth strategies have been developed for low-income countries may require strengthening to fully address environmental and social issues, as Bass et al. (2013) found in Ethiopia. For Malawi, Mozambique and South Africa, Resnick et al. (2012) suggest that Green Growth policies may be inconsistent with their comparative advantages and past investments, economically costly and face popular resistance. Achieving poverty reduction, economic growth and environmental sustainability will require innovation and the adoption of new green technologies. The suppliers of technology, however, are mostly located in industrialised countries and in emerging economies the development of new technologies is limited (Glachant, 2013). A case can therefore be made for supporting innovation in green activities (e.g. redirecting R&D subsidies, carbon taxes) (Ploeg et al., 2012). Reviewing over 160 international initiatives to support developing country innovation, Hultman et al. (2013) find that most have neither achieved scale, nor materially influenced development trajectories. The literature on international trade and Green Growth is generally framed in terms of the ‘green economy’. Global trends towards greening economies are likely to alter current patterns of competitiveness (Fankhauser et al., 2013). Increasing trade can be consistent with a green economy, and international trade could facilitate a green economy transition. Developing countries with abundant renewable resources are well-positioned to capitalise on the
opportunities presented by the greening of economies (UNEP, 2013). Resnick et al. (2012), however, suggest that Green Growth policies may be inconsistent with the comparative advantages of Malawi, Mozambique and South Africa. There is evidence and research both supporting and arguing against the notion that Green Growth provides jobs and increases incomes (Schmalensee, 2012). Most of the literature focuses on direct employment created, with more cursory treatment of indirect and induced job creation (Bowen, 2012). In the energy sector, Green Growth policies are likely to be more labour intensive than growth sustained by traditional fossil fuels (Stietska-Illina, 2011; Bowen, 2012; Cai, 2012). Mitigation policies in China’s power sector resulted in 472,000 net job gains between 2006 and 2010 (Cai et al., 2011). Skills development is critical to unlocking the employment potential of green growth, but labour policies and environmental policies are often dealt with in isolation from one another (Stietska-Illina et al., 2011). Many of the impacts of development upon the environment can be reflected in economic accounts (e.g. the productivity of labour affected by environmental health problems, and reduced productivity of agro-ecosystems), but some do not enter the accounts at all. While the theoretical structure for expanding the accounts has been laid out in various reviews, the empirical challenge of doing so is substantial (Reilly, 2012). Adjusted Net Savings (ANS) measures the real difference between production and consumption, taking into account investments in human capital, depreciation of fixed capital, depletion of natural resources, and damages caused by pollution. South Asia has displayed consistently strong ANS rates, fluctuating between 10% and 20% since 1985, with India dominating the aggregate figure. In Sub-Saharan Africa, ANS has not only declined in recent years but dipped below zero, suggesting unsustainable development and declining wealth (Reilly, 2012) Given Africa’s demographics and projected urbanisation, Green Growth provides a policy approach to create sustainable and inclusive economic growth for its increasing urban population. According to Freire (2013) Clean / green urbanisation is cost effective in the short, medium and long term.

**Need for the Study:**

The Amul dairy had adopted sustainable Green Economy development policies to promote Social and ecological transformation which is must for environmental and social well-being So, this study has made an
attempt to provide effectiveness and activities of sustainable Green Economy development in Amul dairy.

Objective:
The main objective of this paper is to study the existing sustainable Green Economy development policies in Amul dairy.

Methodology:
This paper mainly based on secondary data. The articles which are published in the area of in Green Economy development in dairy industry have collected for the study and from website of Amul

GREEN GUJARAT TREE PLANTATION CAMPAIGN BY MILK PRODUCERS OF DAIRY COOPERATIVES

Milk Producer members of Gujarat Dairy Cooperatives- better known as AMUL have been celebrating the nation's Independence Day in a novel manner by planting lakhs of saplings across Gujarat and have taken up an ambitious plan to save the environment by planting trees, making India green and thereby reducing the effects of global warming. The milk producers of Gujarat Dairy Cooperatives are conducting mass tree plantation drive every year on Independence Day for last nine years. In last nine years (2007 to 2015) the milk producers have planted around 583.4 lakhs trees). The most striking feature of these entire programmes was that it has been initiated by milk producer members of the dairy cooperatives. The unique fact about the programme was that the milk producer members took up the oath to protect tree saplings till it survives and grows into tree.

Over the years, due to intensive agriculture and dairying various natural resources are getting consumed at faster pace in Gujarat state of India. The state level apex body of dairy farmers in Gujarat gave a serious thought in this direction and discovered a novel idea for giving back to nature. The idea was "one member one tree" plantation on our 60th Independence day - 15th August 2007. To put this idea in to the practice a design team constituting of representatives of member unions were formed. The team accepted the idea by heart and immediately decided to spread it among farmer members of village dairy cooperative societies. Then the idea was communicated to farmer members and they all welcomed it and enthusiastically agreed to implement the idea.
For smooth implementation of the idea, the design team chalked out the road map for various activities. Execution teams were formed at district union level to give final shape and put the plan in action. Village level coordinators were identified and they were trained to streamline activity of tree plantation. Various awareness materials were prepared. Through various communication media farmer members were made aware of benefits of tree plantation and tree plantation activity schedule.

The entire plantation activity was coordinated at all the three tiers of Anand pattern - at village, district and state level dairy cooperatives. On 15th August, 2007, after the flag hoisting ceremony, each member took an oath to plant saplings and ensure that they grew into trees. Then individually they planted sapling on their own at their identified locations like their farm, near their home, on Farm bunds, etc. They have taken necessary care to ensure that this sapling survives and they also reported regarding the survival to village level coordinator and district milk unions after five months. In this way, 18.9 lakh trees were planted on 15th August 2007. This was just the beginning. Henceforth, the Village Dairy Cooperative Societies of Gujarat as a mark of respect for our nation decided to conduct such event on every Independence Day and accepted 15th August (Independence Day) as a “Green Revolution Day by Afforestation to Protect Mother Earth from Pollution, Climate change and Global Warming”.

But all this required immaculate planning and execution. An action plan of tree plantation programme was drawn up months back in advance. After the identification of the chief coordinator for each district milk union, the organization of a task force for the programme was put in place. Roles and responsibilities were assigned to each member and area of operation allocated. After preparing the overall action plan, each union issued a circular to the Dairy Cooperative Societies regarding the programme and arranged meetings with the societies covered. At the village level, coordinators were identified in respect of the villages to be covered and the number of saplings required. Along with logistical arrangements direct contact was established with different agencies for receipt of saplings. Pointwise methodology for implementation of tree plantation programme on such a mass scale is as following.

Pointwise Methodology of execution of programme is as following:
1. Member Unions were informed about the programme and channels of procurement of saplings, almost six month before to scheduled date of programme.

2. Continuous follow up were taken from the member unions about the status of activities planned for the programme.

3. A meeting on tree plantation programme was held at GCMMF Ltd., Anand almost a month ago in which status of action plan was each Member Union was discussed at length.

4. Milk Unions identified the coordinator for the programme and organized a task force for the successful implementation of the programme. The coordinator at Milk Union level chalked out overall action plan for the programme and assigned roles and responsibilities and area of operation to each member of task force.

5. Milk Unions (MUs) issued circular to their respective VDCSs (Village Dairy Cooperative Societies) mentioning the entire activity and procedure planned for the celebration of the programme. In circular details for milk producer members to make necessary preparations like deciding the place, digging the pit, taking care of saplings etc. well in advance were also provided. The circular was placed on notice board of VDCSs.

6. MUs task force members contacted & communicated about the concept to VDCS and identified the village level coordinator and assigned them roles and responsibilities.

7. MUs Coordinator properly explored and communicated the saplings acquiring sources/nursery details to VDCSs. They also ensured that saplings reach the VDCSs before 3 days.

8. A press note was prepared by the coordinator of the programme at MU level and which were given in the newspapers on a day before tree plantation to boost morale of producer members and mentally prepare them for the execution of programme on next day.

9. At time of handing over the saplings to members from VDCS, the producer members took oath to protect the saplings and accepted the responsibility for successfully growing the sapling into tree.
10. On 15th August, after the milk collection process, at a predecided time sirens at VDCSs were sounded or other means like beating Thali/utensil, loudspeaker etc. were used to facilitate the gathering producer members in time at predecided place in the village for celebration of Independence Day in VDCS premises, common plot, school etc. After flag hoisting ceremony, the tree plantation activity was executed by the producer members.

11. In many villages the milk producer members planted the trees after performing the Puja (worship) of saplings before planting them.

12. To add fervour and enthusiasm in the programme at many places the Chairman, Managing Director and Board of Directors of Member Unions participated in the programme.

13. Next day after the programme on a post programme press note was prepared giving details of the programme celebrations along with photographs. Similar such notes were published in house magazines/newsletters.

14. After the completion of the programme the MU's were asked to submit the report on tree plantation activity.

15. MUs conducted survey after 5 months to find out the survival rate of sapling under the programme.

First tree plantation programme (15th August, 2007) was carried out on "one member, One tree" basis. Second tree plantation programme (15th August, 2008) in which around 52.74 lakhs tree were planted was conducted on "one member three tree" basis.

In year 2009 and in year 2010, in mass tree plantation programme around 84.24 and 83.5 lakhs tree saplings were planted respectively. The programme was conducted on "One member, Five tree" basis. Further, this year 2011 around 72.6 lakhs trees were planted, the programme was carried out as per the same process and procedures followed in previous year.

There from, in last nine years, milk producers of GCMMF planted around 583.4 lakhs tree saplings in 28 districts of Gujarat. By doing so, milk producers of Gujarat Dairy Cooperatives have shown their concern, awareness and
commitment for betterment of environment. Yearwise details of tree plantation and survival of tree saplings planted is as under.

<table>
<thead>
<tr>
<th>Year of plantation</th>
<th>No. of trees (in lakhs)</th>
<th>No. of trees Survived (in lakhs)</th>
<th>Survival percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>18.9</td>
<td>11</td>
<td>58</td>
</tr>
<tr>
<td>2008</td>
<td>52.7</td>
<td>26</td>
<td>49</td>
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<tr>
<td>2009</td>
<td>84.2</td>
<td>38</td>
<td>45</td>
</tr>
<tr>
<td>2010</td>
<td>83.5</td>
<td>39</td>
<td>47</td>
</tr>
<tr>
<td>2011</td>
<td>72.6</td>
<td>34</td>
<td>47</td>
</tr>
<tr>
<td>2012</td>
<td>57.4</td>
<td>26</td>
<td>45</td>
</tr>
<tr>
<td>2013</td>
<td>72.0</td>
<td>34</td>
<td>47</td>
</tr>
<tr>
<td>2014</td>
<td>77.7</td>
<td>36</td>
<td>46</td>
</tr>
<tr>
<td>2015</td>
<td>65.13</td>
<td>30</td>
<td>46</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>583.40</strong></td>
<td><strong>274</strong></td>
<td><strong>47</strong></td>
</tr>
</tbody>
</table>

ACHIVEMENTS:

"Amul Green" movement has also been awarded by International Dairy Federation for best environment initiative in the "sustainability category" during the 4th Global Dairy Conference held at Salzburg Congress Center, Austria on 28th April, 2010.

ENVIRONMENT AND SUSTAINABLE DEVELOPMENT IN AMUL DAIRY

During the pre-independence era, public and private agencies dominated the dairy industry, although government policy did not favour any one organizational form. Early efforts to organize dairying along cooperative lines were made immediately after the enactment of the Cooperative Societies Act, 1912. The present day Anand Pattern dairy cooperatives trace its origin to the establishment of a dairy
cooperative at Anand in 1946 under the direction and guidance of Sardar Vallabhbhai Patel. The dairy farmers of the then Kheda District of Gujarat organized themselves to form a dairy cooperative in order to directly undertake sale and processing of milk collected from member dairy farmers of the district. The government of India took some steps to improve the quality of milch animals and their productivity through the Key Village Scheme, launched as part of the First Five-Year Plan (1951-56) and the Intensive Cattle Development Plan, launched under the Third Five-Year plan (1961-66). However, in the absence of a stable and remunerative market for milk, production remained more or less stagnant. During the two decades between 1951 and 1970, milk production grew by barely 1 per cent annually, while per capita milk availability declined by an equivalent amount.

During the 1960s, various state governments tried different strategies to develop dairying, including establishing dairies run by their own departments, setting up cattle colonies in urban areas, and organizing milk schemes. Almost invariably, dairy processing plants were built in cities rather than in the milk sheds where milk was produced. This urban orientation to milk production led to the establishment of cattle colonies in Mumbai, Calcutta, and Madras. The objective was to meet the demand for milk and milk products in big cities through improvements in milk collection, processing, and distribution.

The Operation Flood (OF) programme implemented by the National Dairy Development Board (NDDB) from 1970 to 1996 played the key role in bringing about the transformation in dairy development in the country. The OF programme established milk producers cooperatives in villages and made modern technology available to them. The broad objectives were to increase milk production ("a flood of milk"), augment rural incomes, and transfer to milk producers the profits of milk marketing that were hitherto enjoyed by well-to-do middlemen.

The importance of Operation Flood lies in its focus on small rural producers. Lucrative alternate employment opportunities are often not available in Indian villages, making dairying an attractive option for many villagers. Low capital intensity, a short operating cycle, and steady returns make dairying a preferred activity among marginal (less than one hectare of land holding) and small farmers (those having 1-2 hectares of land holding), who make up about 57 per cent of rural households in India. Dairying is feasible even for the landless, who
depend for fodder on common grazing and forest lands. Nearly 70 million Indian households hold a total of 98 million cows and buffaloes. A majority of milk producers have one or two milch animals, and these small producers account for some 70 per cent of the milk production. On average, 22.5 percent of the income of rural households is contributed by milk.

The Operation Flood programme is based on what are known as Anand Pattern dairy cooperatives, referring to their origin in Anand District in the state of Gujarat. Starting in 1970, NDDB replicated the Anand Pattern cooperatives through the OF programme all over India. Under the Anand Pattern structure, individual farmers are joined in village-level dairy cooperative societies (DCS), which are joined to form district-level unions, which in turn are joined in state-level marketing federations. In each state, the Anand Pattern features:

- Decentralized milk production by the small milk producers;
- Milk procurement by the village-level dairy cooperative societies;
- Centralized milk processing by the district-level unions; and
- Marketing of milk and milk products by the state-level federation.

The primary milk producers democratically govern this entire federal cooperative structure to ensure that the higher-tier organizations serve the purpose of the lower levels and that the gains at all levels flow back to the milk producers in significant measure. The core feature of the Anand Pattern model is farmer control of the three stages following production, that is, procurement, processing, and marketing of milk and milk products. The value added at the procurement and processing stages can be realized by the cooperatives only through control over marketing, which is therefore an essential requirement for success. In contrast, many dairy cooperatives worldwide end up as suppliers of raw material to private companies that own the brands and control marketing. By cutting out the need for middlemen in procuring and selling milk, the Anand Pattern cooperatives have helped to reduce seasonal price variations and have enabled the farmers to enjoy the fruits of their labour instead of surrendering most of the profit to corrupt and exploitative middlemen.
Consumers too have benefited. In 2003, dairy cooperatives accounted for the major share of processed liquid milk marketed in India. Milk reaches consumers in 750 towns and cities through the National Milk Grid network. Over the years, brands of dairy products created by the cooperatives have become known for quality and value.

**Growth in womens dairy cooperatives**

Milch cattle in India are mainly tended by women. Amul realized this and built womens empowerment activities as an important component of its dairy development programme. In the early phases of OF, the strategy was to train women in modern animal husbandry practices, and a large number of training programmes were specifically organized for them. Special incentives were given to all women dairy cooperative societies in order to encourage participation of women in governance of the cooperatives. According to NDDB annual report, 2001-02, the number of women who are members of dairy cooperatives has increased to 2.47 million in 2001-2002 from 0.62 million in 1986-87.

**Growth in milk production and availability**

Milk production in 1968-69, before the launching of Operation Flood, was only 21.2 million metric tones. It increased to 31.6 million metric tones by 1980-81, 53.9 million by 1990-91, and 84.6 million by 2001-2. The annual growth rate was 4.08 per cent during the first phase of Operation Flood. It was much higher (7.85 per cent) during the second phase, and production continued to grow at 5.05 per cent per year during the third phase.

As a result of substantial increase in milk production, milk consumption in India has risen from a low of 112 grams per day in 1968-69 to over 226 grams per day in 2002.

The increase in milk production and availability helped stabilizing milk prices over the years. Today most of our cities and towns receive adequate supply of hygienic milk, and the small farmers and landless labourers who make up the majority of dairy cooperative members now have a regular source of income.

**Market dominance of the dairy cooperatives**

Today milk is processed and marketed by 170 district-level unions, which are federated to 22 state-level marketing federations. Over the years, cooperative brands have earned the reputation of being known
for quality and value. Some of the brands that have earned consumer confidence are Amul (in Gujarat), Vijaya (Andhra Pradesh), Verka (Punjab), Saras (Rajasthan), Nandini (Karnataka), Milma (Kerala) etc. Each of these brands has become market leader in its own state or traditional area of operation and gradually expanding its presence in other states. Presently, the Gujarat Cooperative Milk Marketing Federation (of Amul brand) is the largest food company in India. The success of Amul proves that cooperatives can successfully compete with even multinational companies.

**Empowerment Elements**

Empowerment is a multidimensional construct. As suggested by the World Bank for assessing the Operation Flood programme on three dimensions: social empowerment, economic empowerment, and political empowerment.

**Social Empowerment**

Social empowerment deals with issues of exclusion and inclusion. They become important in a religiously diverse, multicultural, and highly stratified society like India where rural poor face many forms of exclusion. While Operation Flood is not an all-purpose development program and cannot hope to sweep away economic and social inequalities that existed in rural India for centuries, it has nonetheless had a profound impact on the social landscape of the countryside.

In its 1976 report on rural employment, the National Commission on Agriculture observed:

Next to crops, animal husbandry programmes have the largest employment potential. The most important features of these programmes are that they provide subsidiary occupation, offer gainful employment at the location itself, and make better utilization of female and child labour. . . Most of these programmes are particularly suitable for weaker sections of the rural community and have re-distributive effect on rural income in favour of them.

Renowned Sociologist BS Baviskar explains that Operation Flood was considered a means of overcoming the barriers of caste, class, and power, something earlier rural development programs had been unable to do.
Since milk production does not require much land, but family labour which the poor have amply, the landless poor can easily and profitably participate in the white revolution, deriving employment and additional income from it. Since milk is not a polluting substance in the Hindu religious ideology, people belonging to any caste, even the lowest, can and do participate in producing milk. . . . Also cooperatives which organize only milk producers can successfully bypass the constraint of village power structure.

Furthermore, although OF was not designed to eradicate the problems of poverty and unemployment, it is true that millions of landless, marginal, and small farmers who were engaged in milk production benefited greatly from the increased income and employment opportunities generated by OF. Of the farm families covered under OF, 21 per cent had no land and another 66 per cent were marginal and small farmers owning less than two hectares of land. Over 70 percent of the participating households had just one or two milch animals. Thus, OF turned out in practice to be a pro-poor programme that made the distribution of incremental income from milk among rural milk-producing households more equitable.

As far as empowerment of women is concerned, this took place mainly through the women dairy cooperative societies (WDC). In the WDCs women find themselves empowered, as they are authorised to make their own decisions in meetings held outside the home. Income from WDCs enables the women to make most household expenditures without being dependent on their husbands. OF has also played an important role in generating employment for women. With 3.5 million milk suppliers, "it is reasonable to assume that 5 percent represented women who were able to stay at home rather than go out for work. This withdrawal of women from the labour force will have created an additional 175,000 labouring jobs, predominantly for the very poor," reveals the assessment report of the World Bank in 1998.

Cooperative dairying also empowers people at another level. The village dairy cooperative is a clean, well-lit, and orderly place. The villages have gone through a similar transformation ever since the cooperatives began to operate. When the people of a village see cleanliness, sanitation, hard work, and discipline in the cooperative, and when they know that the cooperative serves them well, it probably inspires them to bring more of these qualities into their own lives.
The women members of dairy cooperatives visit dairy cooperative unions and are shown the mysteries of artificial insemination under a microscope. The knowledge of conception in animals helps them to better understand their own lives and to begin to control what was simply assumed as a matter of fate.

When our village people see a veterinarian cure an animal that would otherwise have died, they learn about the efficacy of modern medicine. They see that with feed and care better milk is produced and as their animals improve their income from milk increases and they become hopeful of better housing and future. And they learn that fate does not determine their future that they can take control of their own destinies.

**Economic Empowerment**

The economic empowerment aspects of OF deal with connecting people and their institutions with markets. In the pre-OF era, milk pricing was not used as an instrument of dairy development. No effort was made by any government to ensure a remunerative price to the producer, but the consumer price of milk supplied through government-run city milk schemes was invariably subsidized. This had two adverse effects on dairy development. First, in the absence of a year-round remunerative price for milk, the producer did not have any incentive to increase milk production through better breeding, feeding, and management of animals. Therefore, milk production increased at a miserably low rate of 1 per cent per year in the pre-OF era. Second, by selling milk for less than its cost and less than the open market price, city milk schemes incurred huge losses year after year, and as a result were not able to save and plough back any money into modernizing and expanding their activities. Thus, the milk pricing policy followed before 1970 was both anti-producer and anti-dairy development. For the first time, OF accorded the highest priority to ensuring a year-round and dependable market at remunerative prices for rurally produced milk. Indeed, OF was originally conceived as a marketing project. The producer price of milk in most OF areas is determined by the state government concerned and is set at a level that is considered remunerative to the milk producers. Although the cost of milk production is not explicitly considered in setting the producer price, there is evidence to show that the terms of trade over the last decade or so have been favourable to the milk producers. The time-series data on the producer price of milk...
and the wholesale price of oilcakes, which account for nearly three-fourths of the total cost of milk production, confirm this. Over the period 1987 to 1996, the compound annual rate of growth in the producer price of milk was 10.9 per cent as compared to 5.8 per cent in the wholesale price of oilcakes.

The strategy evolved by early dairy cooperatives in Gujarat proved decidedly superior to alternative ones being tested in the 1960s, such as the Key Village Scheme or the system under which government-owned milk plants collected and processed milk produced by contractors. The Anand Pattern emphasized keeping cattle in the hinterland and transporting milk to cities by farmer cooperatives, rather than transporting cattle as well as fodder to cities. Thus the system had strong comparative advantage. As a result, the early dairy unions in Gujarat such as Kaira, Mehsana, Sabarkantha, Banaskantha, and others rapidly emerged as large and successful farmer organizations, with hundreds of thousands of members dominating the economies of their domains.

Operation Flood was not conceived as an all-purpose poverty eradication program. It cannot be, because it focuses on a single productive activity, dairying, while the ranks of the rural poor include many different categories of the disenfranchised: the old, the infirm, tribals, the landless, small farmers, artisans, and so forth. Nonetheless, it is notable that the increased income from milk under OF encouraged a process of change in other activities of the milk-producing households and contributed to their overall socio-economic development.

**Political Empowerment**

The political empowerment aspect of the milk revolution deals with connecting poor people with the government. The OF programme was able to connect the grassroots-level dairy cooperatives not only with the state and central governments, but also with international agencies. On the first International Day of Cooperatives on 1 July 1995, United Nations Secretary-General Boutros Boutros-Ghali observed:

Cooperative enterprises provide the organizational means whereby a significant proportion of humanity is able to take into its own hands the tasks of creating productive employment, overcoming poverty and achieving social integration. They constitute a model for a people-
centred and sustainable form of societal organization, based on equity, justice and solidarity.

As "schools of democracy," cooperative enterprises also contribute to the promotion of social stability. It is clear that governments, although they may create an enabling environment, cannot achieve or maintain sustainable development without an interactive social partnership, actively involving all of civil society in an empowered, democratic manner. Thus, with its globe-spanning dimensions and diversity and its insistence on social partnership, participatory democracy, empowerment, and "people-centred sustainable development," the cooperative movement reflects a strong, deep current of humanism that forms the bedrock of social development.

Challenges being faced by the dairy cooperatives and interventions required to strengthen them

With the opening up of the economy preferential treatments of yesteryears are no more available to the dairy cooperatives. They are now required to compete in the open market. The terms of the World Trade dictates removal of all safeguards put in place earlier to protect the dairy industry from unfair outside competition. As a result, gradually internationalization of our dairy business is taking place. This transformation demands the dairy cooperatives to improve their performance; be it in marketing or quality of products or governance. A few dairy cooperatives like Amul have done well in the past in these areas. There are others who are catching up albeit in slow pace and there are many who need to substantially improve to come to the terms of open market competition.

While trying hard to improve their performance and professionalising their functions and governance, the biggest obstacle that the dairy cooperatives face today is political and bureaucratic interference. Business decisions are often guided by other than business considerations. The cooperative laws are unable to provide the protection the dairy cooperatives require to function as independent business entities. To end this dismal state of affairs, the most important intervention needed to professionalise the functioning of the dairy cooperatives is to liberate them from the clutches of the archaic cooperative laws enacted to establish State control over the affairs of the cooperatives. Additionally, in line with the developed countries,
there should be minimum laws to control the affairs of the cooperatives. Registrars of cooperatives should be responsible only for registration of cooperatives, their byelaws and arbitration as and when required. Routine management and governance should totally be left to the wisdom of the owners (i.e. members) of the cooperatives. It is heartening to note that some States have already taken some positive steps in this regard by enacting liberal cooperative laws; there are others who are also in the process of doing so.

Currently, the management in majority of the dairy cooperatives carries some or the other political leanings. As a result, it has become a common practice that the management of dairy cooperatives, irrespective of performance, gets superseded or suspended as and when opponent political parties come to power. In consequence, to ensure continuity of and protection to good management, depoliticalising cooperative institutions is a must. As business institutions, the dairy cooperatives from time to time are bound to take hard decisions. Irresponsible outside interference in the affairs of the dairy cooperatives is sure to deteriorate performance, eventually making them unfit for competition. To arrest the trend, the members need to be educated on governance matters. Adopting standard management practices to restrict arbitrary decision-making in a way could also be helpful. Also, a few restrictions in the cooperative laws could be introduced such as limiting term of members of governing bodies, setting up independent bodies to hold free, fair and timely election and audit in cooperatives.

Improving quality of products poses a big challenge to the dairy cooperatives. In today’s highly competitive market demand for superior quality products is on the rise. The dairy cooperatives are aware of this trend. They know that there is enormous scope to enhance their share in the world market too, given that India is the highest producer of milk and that too at the lowest cost. But to capture the world market the necessary prerequisite is product quality needs to match international standards. Improvements in product quality are required to enhance and retain their share in domestic market also. As quality upgradation is a long process, it calls for, besides commitment of the management, substantial investment in hygienic milk production, upgrading plants and machinery, upgrading manpower skills and setting up facilities for cold-chain storage and distribution of milk and
milk products starting from the farm level. Presently, the dairy cooperatives do not have the capacity to make such huge investments requiring the Government support to create institutional facilities for research and development, credit, training and education etc.

Poor productivity of milch animals constrains rapid development of the dairy industry. Systematic planning and integrated policies and programmes for animal breeding, genetic upgradation and feed and fodder management could only improve the situation. For all these to happen, the Government has to intervene and create funds (may be called Dairy Development Fund) for such programmes to be implemented on mission mode integrating various schemes.

Excess manpower and low skill level of employees are areas of great concern for the dairy cooperatives. The dairy cooperatives need to shed excess flab in manpower in order to match manpower productivity as per market demand. Skill sets of the employees need to improve to benchmark desired performance. Since the dairy cooperatives generally do not have capacity to hire high-calibre professionals, the only out is to invest in extensive training and education to upgrade the skills of the existing manpower. The employees need to be educated about the merits of scientific and modern management practices and processes.

Securing members participation in the affairs of the cooperatives is another area where the dairy cooperatives need to work hard. To earn allegiance of the members, cooperatives need to be responsive to their needs. The dairy cooperatives have to work out suitable strategies so that they can satisfactorily meet the requirement of the members. They can do so by providing required support services to their members for veterinary care, input supply and selling their milk and all these have to be done at reasonable cost. Members need to be encouraged to participate in the business affairs of their cooperatives and they could no longer be treated as mere suppliers of milk. Deputation of government officers to head the affairs of cooperatives has to stop to secure members participation. Legal provisions to hold free, fair and timely election are must and have to be ensured by the Government.

"Amul Green" movement has also been awarded by prestigious Green Globe Foundation Award-2012. Further, Amul Green movement has also been awarded by prestigious "Green Idol" Award under “Special Jury Award” category by Dainik Bhaskar Group.
**Conclusion:** A Green Economy promotes a three way bottom line sustaining and advancing economic, environmental and social well-being. Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs amul has adpated Green Gujarat tree plantation Campaign, Rural Sanitation Campaign. Economic Empowerment, Social Empowerment, Political Empowerment to promote Green growth and Sustainable development.

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PROBLEMS OF GIRL STUDENTS AT SECONDARY SCHOOLS IN UDALGURI DISTRICT UNDER BTAD OF ASSAM

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Abstract

The Government of India has been focussing on improvement of quality and enhancement of equity. But the present scenario of Secondary education is lop sided. Girls dropout rate at Secondary school stage is still high in rural areas. In rural areas girls are stopping their education at the most formative years of their life and this has made them lagged behind in every aspects of their lives. It is the need of the hour to study as to ‘why the girl students seeking Secondary education are low despite the various government initiatives’. Therefore the Investigator keeping in mind the condition of Secondary education of girl students in rural areas made an attempt to study the problems faced by the girl students at Secondary education in Udalguri District under BTAD of Assam and had tried to suggest some measures for improving enrolment of girl students in Secondary education of the district.

Key terms: Girl students, Secondary Schools

Introduction:

Secondary education is an important stage of the school education system. It is the stage at which children develop their basic knowledge acquired in primary school. Secondary education is the stage where the personality of the children takes shape and develops. Secondary education makes an important contribution to democratic citizenship and social cohesion, which are extremely important principles in India. There can be no improvement of higher education in India without first
improving and expanding the Secondary level. Therefore, it is extremely essential to strengthen the stage by providing greater access to and also by improving quality in a significant way. A country can be really tagged as developed country when the developments of both boys and girls are included. If we want to strengthen economies, reduce poverty and improve the quality of life of people then we should pay greater attention to girls education also. Various studies has also shown that girl’s education has a close relationship with the progress of the country. The education of girl child should be one of the most important concern of the central and state government. But there exists a huge gap in secondary education among the boys and girls even though the Indian Constitution has accorded equal rights for education for all its citizens irrespective of caste, class, or gender.

**Significance of the study:**

The various problems of girl’s education had been examined by various committees and commissions appointed from time to time. Many committees and commissions have recommended different suggestions to reduce and minimize the problems of girls education. A number of strategies are being carried out for restructuring Secondary education for girls, to spread secondary education among girls but access to Secondary education is still highly unequal in India. The centrally sponsored scheme Rashtriya Madhyamik Shiksha Abhiyan (RMSA) has also been introduced to make secondary education universal in India. But many challenges and constraints are in the way of achieving universalisation of secondary education. Our country must make Secondary education a priority, particularly for girls who are most often denied that right. When girls have more schooling, it is not only fruitful for themselves but also fruitful to the next generation. It is only education which would make them understand their rights and opportunities, and would help them to play an important role for the family and country. Greater attention should be paid to girls education
to strengthen economies, reduce poverty and improve the quality of life of people. But, despite of many initiatives of the government of India girl students are still lagging behind. Therefore, the investigator selected the area of Secondary education of girl students in Udalguri district.

Objectives of the study:

1) To find out the various problems faced by the girls in Secondary schools of the Udalguri District.

2) To suggest some measures for the problems faced by the girl students in Secondary schools of Udalguri district.

Methodology:

Method used: The Descriptive Survey method was adopted for the study.

Population and Sample:

The population of the present study comprises all the Provincialised and Recognised Secondary schools under the two sub-divisions of Udalguri District of Assam which are affiliated to Board of Secondary Education, Assam (SEBA). The Investigator collected the information regarding the total population of the school from the office of the Inspector of Schools, Udalguri. The total population of the school is 102. Moreover, the girl students are also included in the population.

Regarding the selection of sample size simple random sampling method is used. The researcher selected a sample of 40% i.e. 40(approx) schools from the district. From the total number of 1996 girl students 20% of them are selected by applying simple random sampling method.

Tool used:

In order to collect data, self constructed questionnaire was used for the girl students. The questionnaire consisted of both open and close ended
questions and the respondents had to fill in information with reference to the following areas:

A) Accessibility

B) Parents’ status

C) School facilities

i) Academics ii) Gender bias iii) Infrastructure

Analysis and Interpretation of the data:

A) Accessibility

Table-1.1 Approach road to school

<table>
<thead>
<tr>
<th>Sl. no</th>
<th>Approach road to school</th>
<th>Response (in %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Good</td>
<td>39%</td>
</tr>
<tr>
<td>2</td>
<td>Bad</td>
<td>61%</td>
</tr>
</tbody>
</table>

From the above table-1.1, it is seen that only 39% girl students responded that the approach road to school is good but 61% girl students responded that the approach road to school is bad. The approach road to school is pathetic and the students are unable to reach on time.

Table-1.2 Distance from school

<table>
<thead>
<tr>
<th>Sl. no</th>
<th>Distance from school</th>
<th>Response (in %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1km</td>
<td>30%</td>
</tr>
<tr>
<td>2</td>
<td>2km</td>
<td>25.5%</td>
</tr>
<tr>
<td>3</td>
<td>Above 2km</td>
<td>44.5%</td>
</tr>
</tbody>
</table>

From the above table-1.2, it is seen that distance between home to school for a section of girl students (30%) is 1km. A few number of girl students (25.5%) comes from the distance of 2km and 44.5% girl students comes from the distance above 2km. As a result a good
number of girl students are unable to attend the school timely and regularly.

**Table-1.3 Communication to cover the distance**

<table>
<thead>
<tr>
<th>Sl. no</th>
<th>Communication to cover the distance</th>
<th>Response (in %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Foot</td>
<td>30.25%</td>
</tr>
<tr>
<td>2</td>
<td>Bicycle</td>
<td>68%</td>
</tr>
<tr>
<td>3</td>
<td>Bus</td>
<td>1.75%</td>
</tr>
</tbody>
</table>

From the above table-1.3, it is revealed that 30.25% girl students comes to school on foot, majority of girl students (68%) comes to school by bicycle and only a section of girl students comes to school by bus.

**Table-1.4 Feel tired by the time you reach school**

<table>
<thead>
<tr>
<th>Sl. no</th>
<th>Feel tired by the time you reach school</th>
<th>Response (in %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td>78%</td>
</tr>
<tr>
<td>2</td>
<td>No</td>
<td>22%</td>
</tr>
</tbody>
</table>

From the above table-1.4, it is seen that majority of the girl students (78%) responded that they feel tired by the time they reach school but only 22% girl students responded that they do not.

**Table-1.5 Regular in attending school**

<table>
<thead>
<tr>
<th>Sl. no</th>
<th>Regular in attending school</th>
<th>Response (in %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td>66.25%</td>
</tr>
<tr>
<td>2</td>
<td>No</td>
<td>33.75%</td>
</tr>
</tbody>
</table>

Table 1.5 shows that 66.25% girl students regularly attends school but 33.75% responded that they do not and the reasons of their irregularities are the bad conditions of the road and they had to repair their bicycles again and again.
B) Parents Status

Table-1.6: Literacy Rate of Parents

<table>
<thead>
<tr>
<th>Sl. no</th>
<th>Literacy Rate of Parents</th>
<th>Response (in %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Graduate</td>
<td>10%</td>
</tr>
<tr>
<td>2</td>
<td>Intermediate</td>
<td>15%</td>
</tr>
<tr>
<td>3</td>
<td>Matriculate</td>
<td>24.3%</td>
</tr>
<tr>
<td>4</td>
<td>Non Matriculate</td>
<td>25.7%</td>
</tr>
<tr>
<td>5</td>
<td>Illiterate</td>
<td>25%</td>
</tr>
</tbody>
</table>

From the above table-1.6, it is seen that the Graduate parents rate of literacy is 10%. Intermediate parents are 15%, matriculate and non matriculate literacy rate of parents are 24.3% and 25.7% respectively and the illiterate parents are 25%. The literacy rate of parents varies from level of education to education in the district.

Table-1.7: Parents annual income

<table>
<thead>
<tr>
<th>Sl. no</th>
<th>Parents annual income</th>
<th>Response (in %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>More than 1 lakh</td>
<td>10%</td>
</tr>
<tr>
<td>2</td>
<td>1 lakh</td>
<td>36.3%</td>
</tr>
<tr>
<td>3</td>
<td>Less than 1 lakh</td>
<td>53.7%</td>
</tr>
</tbody>
</table>

It is seen from table-1.7 that only 10% girl students responded their parents annual income is more than 1 lakh, 36.3% parents annual income is 1 lakh and majority of girl students (53.7%) responded their parents annual income is less than 1 lakh. This reveals that majority of the parents annual income is less than 1 lakh and it is evident that from table-1.6 that most of the parents of the girl students are not qualified to possess a better job.

Table-1.8 Financial constraints at home

<table>
<thead>
<tr>
<th>Sl. no</th>
<th>Financial constraint at home</th>
<th>Response (in %)</th>
</tr>
</thead>
</table>

www.ijmer.in
It is seen from table-1.8 that 69.25% girl students responded there is financial constraint at home which hampers them in their studies. They also responded that their parents have no enough money to procure school uniforms (Dokhna/Mekhela chador) for them which is very costly. 30.75% girl students responded there is no financial constraint at home.

**Table-1.9: Parent’s consciousness regarding their girls education**

<table>
<thead>
<tr>
<th>Sl. no</th>
<th>Parent’s consciousness regarding their girls education</th>
<th>Response (in %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td>66.5%</td>
</tr>
<tr>
<td>2</td>
<td>No</td>
<td>33.5%</td>
</tr>
</tbody>
</table>

Table-1.9 reveals that majority of girl students (66.5%) responded that parents are conscious about their girl’s education and 33.5% girl students responded that parents are not conscious and they are forced to do the household chores instead.

**Table-1.10: Who helps you in your studies?**

<table>
<thead>
<tr>
<th>Sl. no</th>
<th>Who helps you in your studies?</th>
<th>Response (in %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Guardian</td>
<td>22.5%</td>
</tr>
<tr>
<td>2</td>
<td>Private tutor</td>
<td>34%</td>
</tr>
<tr>
<td>3</td>
<td>Self</td>
<td>43.5%</td>
</tr>
</tbody>
</table>

From table-1.10 it is found that 22.5% girl students responded that they are helped by their guardian in their studies, 34% girl students responded that they take private tuitions as there is no one to help them in their studies and 43.5% girl students responded that they study themselves as their parents cannot afford tuition fees for them.
C) School facilities:

a) Academics

Table-1.11 Teachers consciousness regarding education of girl students

<table>
<thead>
<tr>
<th>Sl. no</th>
<th>Teachers consciousness regarding education of girl students</th>
<th>Response (in %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td>98%</td>
</tr>
<tr>
<td>2</td>
<td>No</td>
<td>2%</td>
</tr>
</tbody>
</table>

From table-1.11, it is seen that 98% girl students responded their teachers are conscious regarding education of the girl students but only 2% girl students responded their teachers are not concerned. This shows that a good number of teachers are conscious regarding education of girl students.

Table-1.12 Teachers are helpful in academic matters

<table>
<thead>
<tr>
<th>Sl. no</th>
<th>Teachers are helpful in academic matters</th>
<th>Response (in %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td>96.75%</td>
</tr>
<tr>
<td>2</td>
<td>No</td>
<td>3.25%</td>
</tr>
</tbody>
</table>

From table-1.12 it is seen that 96.75% girl students responded their teachers are helpful in academic matters but 3.25% girl students responded that their teachers are not helpful. This shows that a good number of teachers are helpful to the girl students in their studies.
Table-1.13 Teachers are approachable

<table>
<thead>
<tr>
<th>Sl. no</th>
<th>Teachers are approachable</th>
<th>Response (in %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td>98.5%</td>
</tr>
<tr>
<td>2</td>
<td>No</td>
<td>1.5%</td>
</tr>
</tbody>
</table>

It is found from table-1.13 that 98.5% girl students responded teachers are approachable but 1.5% girl students responded their teachers are not approachable.

Table-1.14 Periodical tests are conducted properly

<table>
<thead>
<tr>
<th>Sl. no</th>
<th>Periodical tests are conducted properly</th>
<th>Response (in %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td>98.5%</td>
</tr>
<tr>
<td>2</td>
<td>No</td>
<td>1.5%</td>
</tr>
</tbody>
</table>

Table-1.14 shows that 98.5% girl students responded periodical test are conducted properly in the schools but 1.5% girl students responded periodical test are not conducted properly.

Table-1.15 Computer literacy programme in school

<table>
<thead>
<tr>
<th>Sl. no</th>
<th>Computer literacy programme in school</th>
<th>Response (in %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td>27.5%</td>
</tr>
<tr>
<td>2</td>
<td>No</td>
<td>72.5%</td>
</tr>
</tbody>
</table>

Table- 1.15 reveals 27.5% girl students responded that their school offer computer education but 72.5% girl students responded their school does not offer them computer education. This shows that only a few girl students of secondary schools are having computer literacy in the district.
Table-1.16 Home science subject should be introduced at secondary schools for girl students

<table>
<thead>
<tr>
<th>SL. no</th>
<th>Home science subject should be introduced at secondary schools for girl students</th>
<th>Response (in %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td>99.25%</td>
</tr>
<tr>
<td>2</td>
<td>No</td>
<td>0.75%</td>
</tr>
</tbody>
</table>

It is seen from table-1.16 that 99.25% girl students responded women oriented subjects like home science should be introduced at secondary level because the subject would provide the girl students with different vocations and would help them to get self employed. Only 0.75% girl students responded women oriented subjects like home science should not be introduced because they feel that it is not necessary and important. It can be pointed out that a good number of girl students are aware of the subjects like home science and its advantages.

Table-1.17 School organizes picnics, excursion and tournament separately for girls

<table>
<thead>
<tr>
<th>Sl. no</th>
<th>School organizes picnics, excursion and tournament separately for girls</th>
<th>Response (in %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td>20.5%</td>
</tr>
<tr>
<td>2</td>
<td>No</td>
<td>79.5%</td>
</tr>
</tbody>
</table>

Table-1.17 shows 20.5% girl students responded their school organize school picnics, excursion and tournament separately for girls but 79.5% girl students responded their school does not organize such. This shows that majority of students do not get chance and exposure to visit important and relevant places.
Table-1.18 Provision of co-curricular activities in the school

<table>
<thead>
<tr>
<th>Sl. no</th>
<th>Provision of co-curricular activities in the school</th>
<th>Response (in %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td>40%</td>
</tr>
<tr>
<td>2</td>
<td>No</td>
<td>60%</td>
</tr>
</tbody>
</table>

It is seen from table-1.18 40% girl students responded their institution offer co-curricular activities like Scout & Guide, NCC, Sports, and Music etc. but 60% girl students responded their institution do not offer such co-curricular activities.

Table-1.19 Provision of supervision monitoring and inspection in the school

<table>
<thead>
<tr>
<th>Sl. no</th>
<th>Provision of supervision monitoring and inspection in the school</th>
<th>Response (in %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td>64.75%</td>
</tr>
<tr>
<td>2</td>
<td>No</td>
<td>35.25%</td>
</tr>
</tbody>
</table>

From table-1.19 it is noticed that 64.75% girl students reported there is provision of supervision monitoring and inspection in the school but 35.25% responded there is no such provision in the school. This shows a good number of secondary schools in Udalguri district are supervised, monitored and inspected in the district.

Table-1.20 Awareness programmes on girls are conducted in school

<table>
<thead>
<tr>
<th>Sl. no</th>
<th>Awareness programmes on girls are conducted in school</th>
<th>Response (in %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td>19.5%</td>
</tr>
<tr>
<td>2</td>
<td>No</td>
<td>80.5%</td>
</tr>
</tbody>
</table>
Table-1.20 shows that 19.5% girl students responded that awareness programmes on girls are conducted in school but 80.5% girl students responded there school do not conduct such programme.

b) Gender bias

Table-1.21 School have female teachers

<table>
<thead>
<tr>
<th>Sl. no</th>
<th>School have female teachers</th>
<th>Response (in %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td>92.5%</td>
</tr>
<tr>
<td>2</td>
<td>No</td>
<td>7.5%</td>
</tr>
</tbody>
</table>

It is found from table-1.21 that 92.5% girl students responded that their schools have female teachers but 7.5% girl students responded that their schools do not have female teachers for which is why their parents are sometimes reluctant to send them to schools.

Table-1.22 Faced gender discrimination at the time of admission in the school

<table>
<thead>
<tr>
<th>Sl. no</th>
<th>Faced gender discrimination at the time of admission in the school</th>
<th>Response (in %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td>1.75%</td>
</tr>
<tr>
<td>2</td>
<td>No</td>
<td>98.25%</td>
</tr>
</tbody>
</table>

It is known from table-1.22 that a section of girl students (1.75%) responded that they had faced gender discrimination at the time of admission in the school but majority of girl students (98.25%) responded that they had not faced such discrimination in the school.

Table-1.23 Girls feel insecure in the school

<table>
<thead>
<tr>
<th>Sl. no</th>
<th>Girls feel insecure in the school</th>
<th>Response (in %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td>4.5%</td>
</tr>
</tbody>
</table>
From table 1.23, it is found that a few girl students (4.5%) responded that they feel insecure in the school as there is no boundaries and security guards in the school but 99.5% girl students responded that they do not feel insecure in the school.

**Table-1.24 Redressed mechanism available for providing help to girl students in the school**

<table>
<thead>
<tr>
<th>Sl. no</th>
<th>Redressed mechanism available for providing help to girl students in the school</th>
<th>Response (in %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td>5%</td>
</tr>
<tr>
<td>2</td>
<td>No</td>
<td>95%</td>
</tr>
</tbody>
</table>

From Table-1.24 it is clear that only 5% girl students responded there is redressed mechanism available for providing help to girl students in the school but 95% girl students responded there is no such mechanism available in the school.

c) Infrastructure

**Table-1.25 Provision of separate common room for girls in the school**

<table>
<thead>
<tr>
<th>Sl. no</th>
<th>Provision of separate common room for girls in the school</th>
<th>Response (in %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td>7.5%</td>
</tr>
<tr>
<td>2</td>
<td>No</td>
<td>92.5%</td>
</tr>
</tbody>
</table>

It is seen from table-1.25 that only 7.5% girl students responded there is separate common room for girls in the school but majority of girl students (92.5%) responded there is no separate common room for girls in the school. Due to lack of common room in the school they mainly face problem during rainy season because they get wet while coming to school but no proper place to change their dresses.
Table-1.26 Provision of separate toilet facilities for girls in the school

<table>
<thead>
<tr>
<th>Sl. no</th>
<th>Provision of separate toilet facilities for girls in the school</th>
<th>Response (in %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td>75%</td>
</tr>
<tr>
<td>2</td>
<td>No</td>
<td>25%</td>
</tr>
</tbody>
</table>

It is evident from table-1.26 that 75% girl students responded there are separate toilet facilities in the school but 25% girl students responded there are no separate toilet facilities.

Table-1.27 Provision of water in the toilet

<table>
<thead>
<tr>
<th>Sl. no</th>
<th>Provision of water in the toilet</th>
<th>Response (in %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td>25.5%</td>
</tr>
<tr>
<td>2</td>
<td>No</td>
<td>74.5%</td>
</tr>
</tbody>
</table>

It is clear from table-1.27 that only 25.5% girl students responded there is provision for water in the toilet but 74.5% girl students responded there is no provision for water and therefore they had to face problem in school during their menstruation. It is evident from table- 1.26 that even though the number of schools having separate toilet facilities is 75%, 74.5% toilets are without provision of water in the district.

Table-1.28 Hostel facilities in the schools

<table>
<thead>
<tr>
<th>Sl. no</th>
<th>Hostel facilities in the schools</th>
<th>Response (in %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td>0.00%</td>
</tr>
<tr>
<td>2</td>
<td>No</td>
<td>100%</td>
</tr>
</tbody>
</table>

It is clear from table-1.28 that all the sampled girl students responded there are no hostel facilities in the schools.
Findings and discussion:

In the present study it is seen that only 39% girl students responded that the approach road to school is good but 61% girl students responded that the approach road to school is bad. The approach road to school is pathetic and the students are unable to reach school on time.

It is seen that distance between home to school for a section of girl students (30%) is 1km. A few number of girl students (25.5%) comes from the distance of 2km and 44.5% girl students comes from the distance above 2km. As a result a good number of girl students are unable to attend the school timely and regularly. This is further supported by research study on girls' education in Indonesia that distance to school was identified as a critical factor that hinders girls' and women's education.

It is revealed that 30.25% girl students comes to school on foot, majority of girl students (68%) comes to school by bicycle and only a section of girl students (1.75%) comes to school by bus. Therefore majority of the girl students (78%) responded that they feel tired by the time they reach school.

66.25% girl students come regularly to school but 33.75% responded that they do not come regularly and the reasons of their irregularities are the bad conditions of the road and they had to repair their bicycles again and again.

It is seen that the Graduate parents rate of literacy is 10%. Intermediate parents are 15%, matriculate and non matriculate literacy rate of parents are 24.3% and 25.7% respectively and the illiterate parents are 25%. The literacy rate of parents varies from level of education to education in the district. This is further supported by the work done by Mishra & Yadav (2013) where the literacy rate of parents varies from level of education to education.
10% girl students responded their parents annual income is more than 1 lakh, 36.3% parents annual income is 1 lakh and majority of girl students (53.7%) responded their parents annual income is less than 1 lakh. This reveals that majority of the parents annual income is less than 1 lakh and it is evident from the present study that most of the parents of the girl students are not qualified to possess a better job.

69.25% girl students responded there is financial constraint at home which hampers them in their studies. They also responded that their parents have no enough money to procure school uniforms (Dokhna/Mekhela chador) for them which is very costly. 30.75% girl students responded there is no financial constraint at home.

The present study revealed that majority of girl students (66.5%) responded that parents are conscious about their girl’s education and 33.5% girl students responded that parents are not conscious and they are forced to do the household chores instead. The study of Mishra & Yadav (2013) also revealed that majority of parents are conscious about their girl’s education and most of the parents are not conscious due to their socio-economic problems.

In the present study 22.5% girl students responded that they are helped by their guardian in their studies, 34% girl students responded that they take private tuitions as there is no one to help them in their studies and 43.5% girl students responded that they study themselves as their parents cannot afford tuition fees for them.

Again 98% girl students responded their teachers are conscious regarding the girl’s education but only 2% girl students responded their teachers are not concerned. This shows that a good number of teachers are conscious regarding education of girl students.

In the present study it is seen that 96.75% girl students responded their teachers are helpful in academic matters but 3.25% girl students
responded that their teachers are not helpful. This shows that a good number of teachers are helpful to the girl students in their studies.

98.5% girl students responded teachers are approachable and periodical test are conducted properly but 1.5% girl students responded their teachers are not approachable and periodical test are not conducted properly.

27.5% girl students responded that their school offer computer education but 72.5% girl students responded their school does not offer them computer education. This shows that only a few girl students of secondary schools are having computer literacy in the district.

99.25% girl students responded women oriented subjects like home science should be introduced at secondary level because the subject would provide the girl students with different vocations and would help them to get self employed. Only 0.75% girl students responded women oriented subjects like home science should not be introduced because they feel that it is not necessary and important. It can be pointed out that a good number of girl students are aware of the subjects like home science and its advantages.

20.5% girl students responded their school organize school picnics, excursion and tournament separately for girls but 79.5% girl students responded their school does not organize such. This shows that majority of students do not get chance and exposure to visit important and relevant places.

40% girl students responded their institution offer co-curricular activities like Scout & Guide, NCC, Sports, and Music etc. but 60% girl students responded their institution do not offer such activities.

64.75% girl students reported there is provision of supervision monitoring and inspection in the school but 35.25% responded there is no such provision in the school. This shows a good number of secondary
schools in Udalguri district are supervised, monitored and inspected in the district.

19.5% girl students responded that awareness programmes on girls are conducted in school but 80.5% girl students responded that their school do not conduct such programme.

92.5% girl students responded that their schools have female teachers but 7.5% girl students responded that their schools do not have female teachers for which is why their parents are sometimes reluctant to send them to schools. Efforts should be made to recruit female teachers so that they can change the perceptions of society in terms of girls education.

In the present study a section of girl students (1.75%) responded that they had faced gender discrimination at the time of admission in the school. Schools should be made free from any gender biased violence because it would create an uncomfortable environment for learning. But majority of girl students (98.25%) responded that they had not faced such discrimination in the school.

99.5% girl students responded that they do not feel insecure in the school but a few girl students (4.5%) responded that they feel insecure in the school as there is no boundaries and security guards in the school. Mishra &Yadav (2013) also found that the school do not have security guard and the girls do not feel secure in school.

From the present study 5% girl students responded there is redressed mechanism available for providing help to girl students in the school but 95% girl students responded there is no such mechanism available in the school.

7.5% girl students responded there is separate common room for girls in the school but majority of girl students (92.5%) responded there is no separate common room for girls in the school. Due to lack of common
room in the school they mainly face problem during rainy season because they get wet while coming to school but they have no proper place to change their dresses.

75% girl students responded there are separate toilet facilities in the school but 25% girl students responded there are no separate toilet facilities.

25.5% girl students responded there is provision for water in the toilet but 74.5% girl students responded there is no provision for water and therefore they had to face problem in school during their period of menstruation. It is evident from the above analysis that even though the number of schools having separate toilet facilities is 75%, 74.5% toilets are without provision of water in the district. Improving and providing water and sanitation facilities at school are critical, especially for girls. Privacy issues relating to sanitation are a major factor forcing girls out of school. A study conducted by the Department of Public Health Engineering in Bangladesh in 1994 to 1998 showed that the provision of water and sanitation facilities in schools increased girls' attendance in schools by 15% (Patrinos, 2002). All the sampled girl students responded there are no hostel facilities in the schools.

Suggestions:

From the findings the following suggestions have been drawn to improve Secondary education of girl students in the district:

1. It is strongly suggested that the road conditions of the district should be repaired and the communication facilities should be provided so that the girl students can reach school on time.

2. Parents of the girl child should be made aware of the importance of girls education.

3. Efforts should be made to offer computer education programmes to more secondary schools of the district.
4. Awareness programmes on girls should be conducted in secondary schools because those programmes would help the girl students more matured and less likely to engage in any crime or become a victim of human trafficking.

5. Plans and policies regarding education of girl students should be implemented in the district properly.

6. Hostel facilities for girl students should be provided in each Secondary schools of the district.

7. Separate common room for girls should be provided in secondary schools of the district.

8. Proper and separate toilet for girls with running water facilities should be provided in the schools.

**Conclusion:**

It is seen that many girl students faced various problems in secondary schools of the district. Therefore, girls should also be given priority so that they could complete their secondary education and would take up bright careers along with boy students to strengthen economies, reduce poverty and improve the quality of life of people in the district and country as a whole. Though much has been done to increase female access to schooling, still there are major policy challenges to be made to improve the quality and better educational opportunities for girls at Secondary schools. A girl child should be helped to continue her education until the end of Secondary education so that they are more likely to be able to support themselves rather depending on their families at present and on husband in future. Acquiring a quality secondary education might help the girls to understand the concept of survival in their life.
• **References:**


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A PREEXPERIMENTAL STUDY TO ASSESS THE EFFECTIVENESS OF INFORMATION BOOKLET FOR CAREGIVERS REGARDING SIDE EFFECTS AND CARE OF PATIENTS RECEIVING ANTIPSYCHOTIC DRUGS FROM SELECTED HOSPITALS OF VADODARA

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Assistant Professor
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ABSTRACT

Background. Educating and training caregivers can increase compliance with discharge plans and prevent re-admissions. Informational booklet is an effective teaching strategy for giving information to caregivers. This study was conducted to find out the effectiveness of informational booklet for caregivers regarding side effects and care of a patient receiving antipsychotic drugs. Material and method An evaluative approach with one group pre-test – post-test design was used for the study. Sample 30 caregivers selected by convenience sampling method. Data were collected by administering a structured knowledge questionnaire prepared by the investigator. After collection of the baseline data informational booklet was given to the subjects and on the seventh day post-test was conducted using the same questionnaire used for collecting the baseline data. The collected data were analysed by using descriptive and inferential statistics (‘t’ test). Results The collected data was tabulated and analysed using descriptive and inferential statistics. Variables of age ($\chi^2= 7.09$), Gender ($\chi^2= 2.64$), educational status ($\chi^2=3.46$), relationship with
patient ($\chi^2=8.63$), Duration of caring ($\chi^2=7.71$) Occupation ($\chi^2=4.11$) was found not significant at 0.05 level of significance, and living area ($\chi^2=0.12$) was found significant at 0.005 level of significance. So we conclude that from the entire variable only one variable that is significantly associated with pre-test knowledge hence the hypothesis (H2) was accept with only living area. **CONCLUSION** educating the caregivers and making them involved in caring for mentally ill patients could help in compliance with medication. This may also be helpful in preventing relapse and handling side effects of antipsychotic drugs.

**INTRODUCTION**

Mental illness is defined as any disturbances of emotional equilibrium, as manifested in maladaptive behavior and impaired functioning, caused by genetic physical, biologic, psychologic chemical, or social and cultural factor. Antipsychotic drugs are chemicals that affects the brain and nervous system, alter feelings, emotions and consciousness in various ways and are frequently used therapeutically in the practice of psychiatry to treat a broad range of mental and emotional illness.

Psycho-educational intervention with caregivers of patients with schizophrenia have a well-established literature support. Behavioural family management is effective in reducing relapses and re-admission rates. Family intervention reduce burden of care, improve patient’s functioning is social Ares and are cost effective. Research has proved the effective of family intervention in managing treatments resistant patients in the community setting.

The nurse is in a pivotal position to educate the patient and the caregivers about medication. This includes teaching complex information to the patient, so that is understood, discussed and accepted. The caregivers and patient should be well informed about each drug, be well educated about the expected benefits and potential risks, and know what to do and whom to contact if there is a question.
or problems. Medication education is the key to effective and safe use of antipsychotic drugs, patients collaboration in the treatment plan and patient adherence with drug treatment regimens.

Relatives are usually involved in caring for the patients who are receiving antipsychotic drugs. Thus it is essential that all caregivers understand the medication, side effects, precautions and the caregivers roles.

**RESEARCH METHODOLOGY**

<table>
<thead>
<tr>
<th>Research Approach</th>
<th>Evaluative Research Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research Design</td>
<td>Pre-experimental Research Design</td>
</tr>
<tr>
<td>Variables</td>
<td></td>
</tr>
<tr>
<td>• <strong>Independent variable</strong> : Independent variable is the variable that stands alone and is not dependent on any other, in this study informational booklet is the independent variable</td>
<td></td>
</tr>
<tr>
<td>• <strong>Dependent variable</strong> : It is the outcome variable of interest, the variable that is hypothesised to depend on or be caused by another variable, the independent variable, dependent variable in the study is Knowledge of caregivers regarding side effects and care of patients receiving antipsychotic drugs.</td>
<td></td>
</tr>
</tbody>
</table>
| • **Demographic variables** : Any uncontrolled variable that greatly influences the results of the study is called as demographic variable, the demographical variable in this study is Age, Gender, living area, Education status, relationship with relative, Duration of
<table>
<thead>
<tr>
<th><strong>Setting</strong></th>
<th>Dhiraj general hospital Vadodara</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Population</strong></td>
<td>Care giver of mentally ill patient</td>
</tr>
<tr>
<td><strong>Samples</strong></td>
<td>30 care giver</td>
</tr>
<tr>
<td><strong>Sampling technique</strong></td>
<td>a convenience sampling technique</td>
</tr>
<tr>
<td><strong>Tool-development</strong></td>
<td></td>
</tr>
</tbody>
</table>
  **Section 1:** Socio-demographic variables  
  **Section 2:** Self administered knowledge questionnaire  
  **Section 3:** information booklet |
| **Content validity** | Suggestion from various experts i.e. Master in the field of mental Health Nursing the Asst. Prof. -7,1 M.A (English),gujarati |
| **Reliability**  | using Spearman Brown’s prophecy formula is 0.949. So the questionnaire is found to be reliable. |
| **Pilot study**  | Pilot study was conducted on 16th September 2016 to find out the feasibility of the study. The pilot study was conducted in Sampurna mind care. The data for pilot study was collected from 3 care giver |
| **Data collection procedure** | The investigator selected 30 sample for the inclusion criteria for the data collection. The investigator explain the purpose of the study, then the given some information about the knowledge questionnaire & information booklet |
Analysis of data

Consolidated and organized the collected data in a master sheet

Frequency and percentage for the analysis of demographic characteristics of the sample respondents.

Mean for the overall scores.

Association between knowledge & practice score and demographic variables by using fisher’s exact test & chi square.

RESULTS

SECTION I: Description of demographic variables of the staff nurses.

SECTION II: Assessment of knowledge before and after administration of information booklet.

SECTION III: Effectiveness of information booklet on caregivers regarding side effects and care of patients receiving antipsychotic drugs.

SECTION IV: Association of pre-test knowledge regarding side effects and care of patients receiving antipsychotic drugs with selected demographic variables.

ANALYSIS AND INTERPRETATION

ANALYSIS OF SOCIO DEMOGRAPHIC CHARACTERISTICS OF THE CARE GIVERS

<table>
<thead>
<tr>
<th>Sr No</th>
<th>Demographic Variables</th>
<th>Characteristics</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Age In Years</td>
<td>18-25 Years</td>
<td>4</td>
<td>13.33</td>
</tr>
<tr>
<td></td>
<td></td>
<td>26-35 Years</td>
<td>4</td>
<td>13.33</td>
</tr>
<tr>
<td></td>
<td></td>
<td>36-45 Years</td>
<td>10</td>
<td>33.33</td>
</tr>
</tbody>
</table>

www.ijmer.in
<table>
<thead>
<tr>
<th></th>
<th>Above 46 Years</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>27</td>
<td>90</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>Living Area</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Urban</td>
<td>28</td>
<td>93.33</td>
</tr>
<tr>
<td></td>
<td>Rural</td>
<td>2</td>
<td>6.66</td>
</tr>
<tr>
<td>4</td>
<td>Educational Status</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Illiterate</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Primary</td>
<td>12</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>Secondary</td>
<td>11</td>
<td>36.66</td>
</tr>
<tr>
<td></td>
<td>Graduation / P.G.</td>
<td>7</td>
<td>23.33</td>
</tr>
<tr>
<td>5</td>
<td>Relationship With Patient</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1st Degree Relation</td>
<td>11</td>
<td>36.66</td>
</tr>
<tr>
<td></td>
<td>2nd Degree Relation</td>
<td>8</td>
<td>26.66</td>
</tr>
<tr>
<td></td>
<td>3rd Degree Relation</td>
<td>6</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>4th Degree Relation</td>
<td>5</td>
<td>16.66</td>
</tr>
<tr>
<td>6</td>
<td>Duration Of Caring</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0-4 Years</td>
<td>10</td>
<td>33.33</td>
</tr>
<tr>
<td></td>
<td>4-8 Years</td>
<td>13</td>
<td>43.33</td>
</tr>
<tr>
<td></td>
<td>8-12 Years</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>More Than 12 Years</td>
<td>4</td>
<td>13.33</td>
</tr>
<tr>
<td>7</td>
<td>Occupation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Business</td>
<td>9</td>
<td>30.33</td>
</tr>
<tr>
<td></td>
<td>Job</td>
<td>8</td>
<td>26.33</td>
</tr>
<tr>
<td></td>
<td>Agriculture</td>
<td>13</td>
<td>43.33</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**SECTION II:**

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Table -1: frequency and percentage distribution in pre-test and post-test level of knowledge of caregivers score regarding side effects and care of patients receiving antipsychotic drugs.

<table>
<thead>
<tr>
<th>knowledge of caregivers</th>
<th>Pre-test</th>
<th>Post test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percent</td>
</tr>
<tr>
<td>Inadequate</td>
<td>9</td>
<td>30.0</td>
</tr>
<tr>
<td>Moderately adequate</td>
<td>20</td>
<td>66.7</td>
</tr>
<tr>
<td>Adequate</td>
<td>1</td>
<td>3.3</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Depicts the classification of level of care givers knowledge regarding side effects and care of patients receiving antipsychotic drugs, before and after information booklet.

Pre test depicts that prior to the information booklet majority 20 (66.7%) care givers had moderately adequate level of knowledge (score: 10-18) while 9 (30%) care givers had inadequate level of knowledge (score:0-9) and 1 (3.3%) care givers had adequate level of knowledge (score:19-28) in particular study.

Post test depicts that prior to the information booklet majority 16 (53.3%) care givers had adequate level of knowledge (score:19-28) while 14 (30%) care givers had moderately adequate level of knowledge (score:10-18) in particular study.

SECTION III:
EFFECTIVENESS OF INFORMATION BOOKLET ON CAREGIVERS REGARDING SIDE EFFECTS AND CARE OF PATIENTS RECEIVING ANTIPSYCHOTIC DRUGS.
To find the significant difference between the mean pre-test and post-test level of knowledge regarding side effects and care of patients receiving antipsychotic drugs, paired “t” test was used. In order to test the statistical significance between the mean pre-test and post-test knowledge score

**TABLE-2-MEAN, STANDARD DEVIATION, MEAN DIFFERENCE AND ‘T’ VALUE OF PRE-TEST AND POST TEST SCORES.**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>Mean difference</th>
<th>Std. Deviation</th>
<th>t-value</th>
</tr>
</thead>
</table>
| Knowledge of caregivers
| Pre-test          | 11.00| 8.1            | 2.75          | 11.51   |
| Post-test         | 19.10| 2.23           |               |         |

Df = 29
p = 2.045

- Represents that mean pre-test and mean post-test level of **Knowledge of caregivers score**, Standard Deviation, Mean difference and paired ‘t’ value. Level of **Knowledge of caregivers score** is with the maximum possible score of 28. Mean pre-test was 11.00, SD is 2.75 and, Mean post-test is 19.10, SD is 2.23 and comparison between pre and post-test level **Knowledge of caregivers score** of the sample was shows the paired ‘t’ value as 11.51 (**Significant at the p<0.05 level**).

**FIGURE 3: MEAN, STANDARD DEVIATION, MEAN DIFFERENCE AND PAIRED ‘T’ VALUE OF PRE-TEST AND POST TEST KNOWLEDGE OF CAREGIVERS SCORE**
H$_1$: The mean post-test knowledge score regarding side effects and care of patient receiving antipsychotic drugs is significant higher than there mean pre-test score.

To test the hypothesis, paired sample ‘t’ test has been used. Data have been analysed with the use of SPSS version 20.0 and the outputs are depicted in the above table. The table reveals that there is significant association between pre and post test score with 0.05 level of significant. ‘t’ calculated (11.51) is greater than the ‘t’ tabulated (2.045) hence the hypothesis was accepted. Positive mean difference indicates that the difference between pre-test and post-test level of knowledge regarding side effects and care of patient receiving antipsychotic drugs

**Section IV:**

Association of pre-test knowledge regarding side effects and care of patients receiving antipsychotic drugs with selected demographic variables.

<table>
<thead>
<tr>
<th>Sr No.</th>
<th>Variables</th>
<th>IA</th>
<th>MA</th>
<th>A</th>
<th>Total</th>
<th>$\chi^2$</th>
<th>Df</th>
<th>Level Of Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Age (In Years)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>30-40 years</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>4</td>
<td>7.09</td>
<td>6</td>
<td>(7.09&lt;12.59) NS</td>
</tr>
<tr>
<td></td>
<td>41-50 years</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>51-60 years</td>
<td>3</td>
<td>6</td>
<td>1</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>60 and above</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>6</td>
<td>1</td>
<td>8</td>
<td>25</td>
<td>2.64</td>
<td>2</td>
<td>(2.64&lt;5.99) NS</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td>5</td>
<td></td>
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</table>
### Living Area

<table>
<thead>
<tr>
<th></th>
<th>Rural</th>
<th>18</th>
<th>1</th>
<th>27</th>
<th>0.12</th>
<th>2</th>
<th>(6.05&gt;5.99) S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>3</td>
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<td></td>
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</tbody>
</table>

### Educational Status

<table>
<thead>
<tr>
<th></th>
<th>Primary</th>
<th>5</th>
<th>6</th>
<th>1</th>
<th>12</th>
<th>3.46</th>
<th>4</th>
<th>(3.46&gt;9.48) NS</th>
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<tbody>
<tr>
<td>Secondary</td>
<td>2</td>
<td>9</td>
<td>0</td>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Graduation / P.G.</td>
<td>2</td>
<td>5</td>
<td>0</td>
<td>7</td>
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</table>

### Relationship With Patient

<table>
<thead>
<tr>
<th></th>
<th>1st Relation</th>
<th>Degree</th>
<th>3</th>
<th>8</th>
<th>0</th>
<th>11</th>
<th>8.63</th>
<th>6</th>
<th>(8.63&lt;12.59) NS</th>
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</thead>
<tbody>
<tr>
<td>2nd Relation</td>
<td>2</td>
<td>6</td>
<td>0</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3rd Relation</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4th Relation</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>7</td>
<td></td>
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</tbody>
</table>

### Duration Of Caring

<table>
<thead>
<tr>
<th></th>
<th>0-4 Years</th>
<th>4</th>
<th>5</th>
<th>0</th>
<th>9</th>
<th>7.71</th>
<th>6</th>
<th>(7.71&gt;12.59) NS</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-8 Years</td>
<td>3</td>
<td>8</td>
<td>0</td>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8-12 Years</td>
<td>2</td>
<td>3</td>
<td>0</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>More Than 12 Years</td>
<td>0</td>
<td>4</td>
<td>1</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Occupation

<table>
<thead>
<tr>
<th></th>
<th>Business</th>
<th>1</th>
<th>5</th>
<th>1</th>
<th>7</th>
<th>4.11</th>
<th>6</th>
<th>(4.11&gt;12.59) NS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Job</td>
<td>3</td>
<td>5</td>
<td>0</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agriculture</td>
<td>4</td>
<td>8</td>
<td>0</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
KEY= S is significant, NS is not significant. DF= Degree of freedom, IA= Inadequate, MA= moderately adequate, A=Adequate

TABLE - reveals that the data in the above cited table shows that the $\chi^2$ value computed between the knowledge level of caregivers score regarding side effects and care of patients receiving antipsychotic drugs, with selected socio-demographic variables.

Variables of age ($\chi^2= 7.09$), Gender ($\chi^2= 2.64$), educational status ($\chi^2=3.46$), relationship with patient ($\chi^2=8.63$), Duration of caring ($\chi^2= 7.71$)Occupation ($\chi^2= 4.11$) was found non significant at 0.05 level of significance, and only one variable which is that is living area ($\chi^2=0.12$) was found significant at 0.05 level of significant , so it can be concluded that there is no significant between knowledge level and the selected demographic variable so hypotheses 2 ($H_2$) was rejected.

DISCUSSION

This chapter presents the major findings of the study and discusses them in relation to similar studies conducted by other researchers.

The main aim of this study was to evaluate the effectiveness of an informational booklet in increasing the knowledge of caregivers with regard to side effects and care of a patient receiving antipsychotic drugs

LIMITATIONS

1. Small number of subjects (30) and the sampling technique (convenient sampling technique) used to conduct the study restricts the generalization of the results.

2. Caregivers of mental patients receiving antipsychotic drugs who were able to read Kannada, English and Malayalam were only included in the study.
3. Sample subjects were selected from only one hospital in Karnataka state; hence generalization can be made only for the samples studied.

4. The study did not use a control group. The investigator had no control over the events that took place between pre-test and post-test.

**RECOMMENDATIONS**

On the basis of the findings of the study following recommendations have been made for further study:

1. The study can be replicated on a larger sample, thereby findings can be generalized for a larger population.

2. A comparative study may be conducted to find out the effectiveness between IB and planned teaching programme regarding the same topic.

3. A similar study can be replicated with a control group.

4. Similar study could be undertaken using other teaching strategies.

5. A similar study could be conducted for the caregivers on other aspects of caring for mentally ill patients.

6. A study may be undertaken to assess the effectiveness of informational booklet observing practices of the caregivers.

**ETHICAL STANDARDS**

The permission was taken from the authority concerned in the dhiraj general hospital, vadodara to conduct the study. No financial burden was given to the participants towards the materials used during the intervention. All information was kept as confidential and used only for the present study.
CONCLUSION

The main aim of this study was to evaluate the effectiveness of an informational booklet in increasing the knowledge of caregivers with regard to side effects and care of a patient receiving antipsychotic drugs.

Review of literature enabled the investigator to develop the conceptual framework, methodology, setting of the study and plan for data analysis. The conceptual framework adopted by this study was based on a general system model. The research approach adopted in the present study is quantitative and evaluative approach, pre-experimental one group pre-test post-test design was adopted for this study. Non probability purposive sampling technique was used to select the sample and the sample size was 30 caregivers in a mental hospital.

The present study was done to find out the effectiveness of an informational booklet in increasing the knowledge of caregivers with regard to side effects and care of a patient receiving antipsychotic drugs.

MAJOR FINDINGS OF THE STUDY

Age distribution of the sample showed that 33.33% were in the age group of above 40 years. Majority of the caregivers (90%) were male. Among the respondents 36.66% had studied up to secondary. The caregivers 93.33% were living in an urban area and rest 6.66% were living in a rural area. Among the caregivers (36.66%) have first degree relationship with patients and 43.33% caregivers had previous experience (4-8 years) of caring. Among the caregivers 43.33% belong to agriculture and 30.33% caregivers are belongs to business.

REFERENCES

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drug
2. www.indinajournal.com


OVERVIEW OF ‘MANAGEMENT INFORMATION SYSTEM’ (M.I.S)

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Abstract:

Every organisation big, medium or small needs help and facts for their crucial decision making. Management information system (M.I.S.) implemented in any organisation presents timely and relevant information to the management to make decisions more quickly and effectively. Since it plays a vital role, it can improve effectiveness of various functional areas of the organisation. Information of and from various departments of the organisation can be tracked and monitored easily. Long term planning becomes easier and more accurate. Management information system brings clarity in cohesive functioning and understanding between various departments of the organisation which streamlines the business process.\(^4\)

Keywords: Management Information System, MIS, Information, Data, Organization.

I. Introduction: In every organisation, any decision making process, even a simple decision needs variety of data and information. This information is required at various levels as well as various functional areas of the management. In reality thousands of decisions are taken in various areas of the organisation. Due to this, large number of data and information is needed to be processed, to ease the decision making process of management which is otherwise very difficult to carry out manually.\(^4\)

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II. Need of M.I.S.: Organisation needs some system to capture, gather, collect, store, process and retrieve the information, which is required by the management at the right time to make crucial business decisions. Management Information system was developed to get help for making decisions from the information which is right, accurate, timely and sufficient.\[^4\]

III. Objectives of MIS: MIS should provide accurate information, timely information, information in the right format, it should provide the information to right personnel and it should filter out unnecessary and unwanted information. MIS should provide not only accurate but right information also.\[^4\]

IV. Some conceptual designs of MIS:

1) The process model.\[^4\]

In process model the process is supported with procedures, process materials, knowledge and training and machines required for the process. Then after the process required output will be generated.\[^4\]

2) The logical model.\[^4\]
In this logical model MIS resides on science and technology as an uppermost layer; which further rests on management science, which again further rests on Data and knowledge and finally Information technology forms the core. \(^{[4]}\)

3) Physical Model: \(^{[4]}\)
MIS contains several subsystems or parts. These parts communicate with each other to finally produce information in the desired format.^[4]

**IV. Role of MIS in an organisation:**^[4]

A vital role is played by MIS in an organisation. The management of an organisation is involved in decision making which demands information.^[4]

![Diagram of organisational structure](image.png)

The base layer i.e. operational management is concerned with day to day operations of the organisation.^[4]

The middle layer is concerned with progress monitoring; short term goal setting etc.^[4] Top management is concerned with long term issues of market, opportunities, goals and objectives etc.^[4]

**V. Impact:**

With proper Management information system (M.I.S.), functional areas such as human resource, production/development, finance, sales, marketing, quality
control/testing can be properly managed and their effectiveness can be improved. [4]

VI. Literature survey:

1) THE SIGNIFICANCE OF MANAGEMENT INFORMATION SYSTEMS FOR ENHANCING STRATEGIC AND TACTICAL PLANNING[1]

This research states the extent to which management information system implemented to take successful decisions. To study the fact researcher selected two financial organizations. The result of study shows both the organisations used MIS preliminary to boost strategic planning. Researcher did regression analysis result is Tactical planning have no effect on Decision Making, while Strategic planning has a clear effect on the Decision Making in both organizations.

This paper aims at how information management is necessary to generate proper planning and then decision making at both strategic and tactical levels in both the organizations. MIS helps in decision making at all levels from low level management to top level management. MIS is useful for achieving objectives of management. [1]

2) Management information systems and business decision making:

Review, analysis and recommendations. [2]

In this research, the role of Management Information Systems is described and analyzed focusing on decision making. Impact of decision making process on top level management in business
organisation is explained. Six recommendations are suggested to increase the effectiveness of MIS in the decision making process.

Decision Support System (DSS) is a subset of MIS. A DSS is a computer based system capable of analyzing a data and then represents it in a way that helps the organisation to make business decisions more efficiently and effectively. It is used by all levels of people in an organization. Top level management uses DSS for strategic decisions, middle management uses for tactical decision and low level management uses it for day-to-day operational decisions.

According to definitions MIS refers to a system that uses information in order to ensure appropriate management of businesses.\(^2\)

MIS used today can perform various tasks at the same time. This increases efficiency in a company since several business operations can be conducted simultaneously. The capacity to multitask ensures that decisions are made speedily as compared to other systems which can only handle one task at a time.\(^2\)

3) Review on Management Information Systems (MIS) and its Role in Decision Making.\(^3\)

This paper focuses on detail study of the concept of MIS, the need and advantages of MIS in an organization, the MIS model, need and usefulness of MIS in decision making. It states the role of MIS in decision making of an organization. How decisions are made in an organization using MIS, it also states different challenges faced by the organization in this process and some suggestions to overcome these challenges. It gives details of why MIS improves decision making.\(^3\)
MIS provides storage of all the business information across all levels in an organization. MIS not only collects the information, but also represents it in required formats which is useful for the management to make important organizational decisions.\[3\]

This paper focuses on understanding the need, benefits, types of MIS, the MIS model, decision making system and majorly the role of MIS in decision making of the organization.\[3\]

Information system ensures that information is available on time, in required format for decision making. It supports major functions like planning, control, operations functions of an organisation by supplying accurate information in time. Though MIS provides accurate, timely, relevant information which is very useful for decision making and also useful for various functions of an organization, it also has a few challenges while implementing it. Like involvement of top management, business owners must acquire knowledge of the ever changing trends in MIS. The MIS strategies should be adopted as per the requirement and should aim to achieve the business goals.\[3\]

VII. Conclusion:

M.I.S. combines or processes computer based database decision models, hardware and software, human resource i.e. manual procedures as well as information which is needed by managers either top level or middle level to make timely, right, accurate and effective decisions for progress of the organisation.\[4\]

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Book title- Management Information Systems
Paperback, 300 pages Published (first published 1976)
APPLICATIONS OF BSC ON PUBLIC SERVICE DELIVERY: BENEFITS AND CONSTRAINTS (THE CASE OF DEBRE ELIAS TOWN)

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Policy Study and Research Center
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Abstract

This research is conducted with the objective of assessing the benefits and constraints of the BSC application on public service delivery at government organizations. The study employs case study research strategy and has employed both qualitative and quantitative approaches. Data was gathered through Questionnaire, Interview, and Focused group discussion. The findings of the study, among other things, revealed that BSC has been considered as the causative factor for effectiveness and efficiency as well as better customers' service; lack of proactive training and communication system, less committed to top leadership and management, high turnover of civil servants, the evaluation process is not conducted at regular intervals (inconsistency of individual performance measurement & reward system) were the vital constraint factors in the successful implementation. To alleviate the challenges it is recommended that an appropriate training and awareness development should precede the implementation of the new laws, rules, regulations, manuals etc. In addition to this, the decision-making process needs to be participative and transparent, Allocating appropriate budgeting, IT, interactive communication and reward systems, viewing the BSC as a continuous process, reassessment and updating for effective BSC formulation and implementation.

Keywords: Balanced scorecard, performance management, public servants, service delivery.

1. Introduction

The Balanced Scorecard (BSC) has emerged as a method for strategy implementation. Some have argued that the BSC has its theoretical origins from Management by Objective (MBO). Both are techniques for orienting the activities of organizations towards their
objectives. Both also put an emphasis on integrating this orientation towards objectives into the performance appraisal process. The difference is in the tools used. The BSC includes the use of the strategy map to illustrate the strategy of the organization.

At the core of the BSC is an idea that the strategy of an organization should develop a strategy that is balanced. This balance is achieved by balancing between financial and non-financial issues, and short-term and long-term goals (Hepworth, 1998). To balance between the financial and non-financial issues, the BSC propose that organizations develop four perspectives i.e. the financial, customer, internal process and learning and growth perspectives (McAdam and O’Neill, 1999).

To balance between short-term and long-term goals, the BSC requires that organizations develop leads and lag measures that provide short-term and long-term objectives that are interrelated with one another. In essence, the BSC helps organizations develop a comprehensive framework that translates vision and strategy into a coherent set of performance measure and objectives (Kaplan and Norton, 1996).

A key idea in the BSC is that the understanding that a method has to be compelled to gift the causal model of a business (Kaplan and Norton, 1996). To do this, the causal relationship between the four perspectives of the BSC is graphically presented in a strategy map (Kaplan and Norton, 2001). The relationship is depicted in the strategy map, then becomes the premise for the developing the scorecard. The scorecard spells out the short-term and long-term objectives. A number of researchers have expressed concerns about the limitation of the BSC and will also face problems.

2. Statement of the Problem

The Balanced scorecard is a change initiative for visualizing and communicating an organization’s long-term strategic intent to any or all employees that are directly linked to the service delivery and overall customer service and satisfaction. The implementation process of the balanced scorecard is a top-down process, meaning that the initiative is taken by the management. The management then creates a general scorecard which is broken down for each subunit (in this case work process). BSC cannot apply easily on long process work. The setting and
monitoring of performance targets would only be doable once the information system and the accounting system are able to capture and allocate the necessary financial measures.

The BSC program has been implemented since 2011 in the region. According to Debre Elias Woreda Civil Service Office annual performance report of 2013/14, most of the government institutions in the case study area are not implemented as the program cascades to the lower level. High turnover of the public servants and sector officials are one of the factors that hinder the implementation of BSC program. As soon as public servants are trained to higher skill levels, they depart to the private sectors or other government sectors.

The BSC is more and more gaining favor worldwide as a good performance management and measurement tool. In the case study area, most organizations are lack of a benchmark for clear strategic planning due to lack of relevant data. Leadership has less committed to implementing the performance management system as if the implementation of the performance management system has to be supported and driven by top leadership and management.

Generally, incorrectly perceived among the public servants BSC has been taken as a political tool, the organization's top leadership is not driving the change process, training and development interventions are not implemented proactively, a reward system that rewards high performance and discourages low and average performance does not place in right place, lack of an interactive communication strategy and process followed all the way through the implementation of the performance management system and the evaluation process is not conducted at regular intervals. A performance measurement system would be put in place to reward public servants and managers for excellent work. Therefore, in this paper, attempts have exerted to examine the benefits and constraints of the BSC application for public service delivery in almost all government institutions in Debre Elias town.

3. Objectives

3.1 General Objectives

The objective of the study is to assess the benefits and constraints of the BSC application for public service delivery in the case study
organizations at Debre Elias town and propose possible solutions to overcome the challenges

3.2 Specific Objectives

- To examine the benefits of the BSC application in public service delivery.
- To assess balanced scorecard that serves as a strategic framework for measuring institutional performance so as to create public service delivery easy.
- To identify the existing challenges and capacity gaps in the design and implementation of BSC in the case study organizations.
- To suggest appropriate mechanisms of implementing BSC in government organizations.

4. Review of literature

4.1 Basic Concepts of the Balanced Scorecard

The concepts of Balanced Scorecard was first conceived by Kaplan and Norton in 1992, it has been implemented in thousands of corporations, organizations, and government agencies worldwide and its functions have evolved as the number of organizations applying this methodology has increased.

The Balanced Scorecard was developed out of a belief that traditional ways of thinking that relied primarily on financial accounting measures were becoming obsolete. As the developers explained, so as to appreciate sustainable growth and organizational success in the future, an organization should:

a) Pursue its strategy in a balanced and coherent manner, with the vision placed above, and strategic objectives broken down into four perspectives;

b) Promote communication within an organization vertically and horizontally while balancing various management and operational elements;

c) Think logically about strategic hypotheses for achievement in terms of cause-effect relationships; and

d) Build business processes by forecasting, then verifying them by
quantification;

4.2 The Four-Perspective Model

The notion of the Balanced Scorecard was described as "a framework for multi-dimensional performance evaluation and performance management." This framework urges an organization to break down its strategy and vision into quantitative objectives in terms of cause-effect relationships that can be represented by the four-perspective model: financial, customer, internal business process, and learning and growth.

The connection between vision, strategy, and the four perspectives, which characterize the Balanced Scorecard, Kaplan and Norton (2001) initially defined these as:

- **Financial**: a strategy for growth, profitability, and risk viewed from the perspective of the shareholder.
- **Customer**: a strategy for creating value and differentiation from the perspective of the customer.
- **Internal business processes**: the strategic priorities for various business processes that create customer and shareholder satisfaction.
- **Learning and growth**: the priorities that create a climate that supports organizational change, innovation, and growth.

The four perspectives imply two meanings. To understand these were important for utilizing the Balanced Scorecard more effectively. First, they include timeframes, like short-term, mid-term, and long-term, therefore the framework could extend from short-term initiatives to long-term initiatives. It is a fundamental notion of the four perspectives that not solely pursuing financial performance within the short term, however additionally undertaking and investing such initiatives can generate future growth. Appropriate investment in internal processes and support infrastructure will have varying effects on financial performance depending on the timeframe. Second, the four perspectives represent discrete stakeholders, such as shareholders, customers, suppliers, partners, employees, and so on, depending on the organization's business. An organization can clarify its strategic objectives and initiatives for each stakeholder using the four perspectives.
4.3 BSC as A Tool for Performance Measurement in Public Sector

Kaplan and Norton (2001) believe that the BSC has several purposes in public organizations by being a tool for performance measurement of non-financial items, additionally a helpful tool to increase accountability and responsibility. Public organizations are characterized by customer focus and quality of services, which implies that non-financial factors are equally important (Aidemark, 2001). According to Dolnicar, Irvine, and Lazarevski (2008), during the implementation of the BSC, public organizations take into consideration the dimensional management, wherever not only the financial aspects and also the financial work are put focused. Public Sector does not exist to make a profit. It is a mission-driven institution. Kelly and Lewis (2009) mean that the Public Sector organizations are providing public services to citizens, which implies that public organizations are considered as non-financial performance.

Wisniewski and Olafsson (2004) suggest that the process of public sector balanced scorecard implementation is not a straightforward one and is arguably harder than in a private sector company. The researcher also supports this idea, the reasons that in public sector organizations performance measures focus not only on cost but also on the efficiency and effectiveness of the service provision, the customer (satisfaction) perspective becomes one amongst the ultimate objectives of the performance measures, within a public service environment, customer definition can be more complex, resulting in a public sector of customers or service users, as well as stakeholders.

It is necessary to conclude that the BSC is a doubtless powerful management tool that will help organizations to boost their competitive position and reach organizational objectives however management must carefully plan and manage its implementation and use.

4.4 Advantages and Disadvantages of the BSC in Public Sector

The following section explains the potential benefits and the drawbacks of the BSC and also the development of the BSC within Public Sector organizations. There are four main advantages of the BSC in Public Sector.

- The first advantage is that the BSC works as a tool that organizations use to determine strategies and targets based on non-financial performance. Financial performance measures such things
as marginal utility, and return on assets that are complemented by non-financial dimensions, which are more relevant in the Public Sector. The non-financial dimensions that are common in public organizations consist of customer satisfaction, advanced services, and employee skills (Khaki, Najafi and Rashidi, 2012).

- The second advantage of the use of the BSC within the Public Sector is that democratic accountability and responsibility are increased (Kaplan and Norton 1992).

- The third advantage is that the BSC can help organizations to implement strategies, achieve goals and increase knowledge through a combination of financial and non-financial performance measurements. Another study in health care shows that the scorecard is applicable to all or any forms of organizations, with some modifications by adjusting the various perspectives (Urrutia and Eriksen, 2005).

- The fourth advantage is that the definition of customers, which should be extended. Wizenski and Ólafsson (2004) studies, the scorecard is useful for improving performance measurement. This is often because; performance measurement in public organizations focuses not only on costs but also considers efficiency and effective (quality) within the provision of public services. Finally, the authors note that the customer's satisfaction is that the final goal of performance measurement.

There are some disadvantages that complicate the use of the BSC in publicly funded organizations. In public service, the definition of customer and stakeholder is sort of difficult, owing to the range of customers and stakeholders. Wizenski and Ólafsson (2004) also note that the implementation of the BSC is a complicated process compared to private companies.

The author also argues that there is a lack of financial goals that make the scorecard difficult to implement in practice. Some researchers are cautious in pursuing the benefits of the BSC in the public sector organizations. Another disadvantage is that the BSC can be particularly difficult to achieve because it is focusing too much on performance measurements (GreatBanks and Tapp, 2007; Kaplan, 2001).
5. Research methodology

5.1 Research Method

The study employs the descriptive type of research method. The main purpose to use this is often described the existing condition of the state. The study was used to explain the benefits and constraints of the BSC application in the study area. The study was additionally made clear that what challenges have organizations encountered in the process of design and implementation of the BSC. It also employs a case study strategy on five public institutions.

5.2 Research Approach

The study has employed both quantitative and qualitative approaches for the reason that descriptive research is appropriate to use both approaches. By using qualitative approaches the interest, opinion and attitude to respondent towards the benefits and constraints of the BSC application in service delivery would be captured. On the other hand, quantitative descriptions are applied to compare, summarize and calculate data. The relevant data and complete information were collected with care to enhance the reliability of the information.

5.2.1 Research Techniques

To get qualitative and quantitative data the research used questionnaires for public servants of the selected government organizations that are: Woreda Trade and Transport Office, Woreda Finance and Development Office, Woreda Health Office (including one branch of Health Center in the Town), Municipality, and Woreda Civil Service Office and government officials. Mainly, the interview and observation /focus discussion/ were accompanied by checklists and supported by photo camera and sound recorders. Moreover, to minimize ambiguity the questionnaires were tested in a pilot testing program, in ten civil servants (outside of the selected sample size). Then the questions were refined and finalize based on the input from the pilot survey.

5.3 Sample Design

The research was employed purposive and has to follow a case study research strategy. Random sampling was found to be less appropriate; the researcher purposely selected two relatively successful, two
relatively less successful and one public organization that mobilizes and supervises other sectors how BSC is applied and implemented. The underlying principle to choose purposive sampling is to take in hand the sample element directly those have the vital information relevant to the study. The major selection criteria are sectors which should have implemented BSC that provides direct services to customers and Woreda Civil Service Office annual performance report of 2013/14.

5.3.1 Sampling Technique

The sampling technique employed for selecting representatives were both the combination of purposive and probability sampling. Purposive sampling was used for selecting the public offices that are; Woreda Trade and Transport Office, Woreda Finance and Development Office, Woreda Health Office (including one branch of Health Center in the Town), Municipality and Woreda Civil Service Office. Probability sampling is used to give an equal chance for public servants being included in the sample. Random sampling is used to select respondents from the total public servants of the selected case study, organizations.

The number of employees (public servants) in the sample is determined following a proportionate distribution of the employee size of each processor unit by using a random sampling technique.

5.3.2 Sample Size

The appropriate sample size was calculated based on the formula of precision rate and confidence level (Kothri C.R., 2004).

\[
\begin{align*}
\text{If } N \text{ is greater than } 10,000 & : n = \frac{z^2pq}{d^2} \\
\text{If } N \text{ is less than } 10,000 & : fn = n/ (1+ n/N)
\end{align*}
\]

Where
- \( N \) = target population size
- \( n \) = desired sample size
- \( z \) = standard normal variable at the required confidence level (\( z \) statistics)
- \( p \) = estimated characteristic of the target population
- \( q \) = 1-\( p \)
- \( d \) = level of statistical significance (margin of error)

Due to the limitation of financial resource and the homogeneous nature of the public servants of Debre Elias town the research settled on a sample size of 118 public servants based on the formula stated
below. The formula uses the proportion of target population with an incident rate of 0.5 and 95% of confidence level with z statistics is 1.96, and the desired accuracy at 0.05 levels and then the sample size is determined as follows:

\[
n = \frac{z^2pq}{d^2} = \frac{(1.96 * 1.96) * (0.5 * 0.5)}{(0.05)^2} = 384
\]

Substitute the result to the next formula since \( N < 10,000 \)

\[
fn = \frac{n}{1 + \frac{n}{N}} = \frac{384}{1 + 384/172} = 118
\]

5.4 Sources of Data

The study was conducted on public sectors (five government organizations) in Debre Elias town. The type of research that was conducted is basic research (since it enables to achieve the formulated objectives). The data sources for the study were both primary and secondary data.

5.5 Data Collection Instruments/Tools

The method was used to conduct this study was descriptive technique, since it is more relevant to reveal the problem accurately. In the process of data collection, both primary and secondary data collection method is used. Both qualitative and quantitative data collected through questionnaire and interview will be prepared in the form of close-ended and open-ended questions; while the secondary data are required from different literature reviews such as books, the internet, senior thesis, journals, reports and written documents. The methodology involved in data collection includes questionnaires, interview, and discussions held with selected public servants and officials in the case study area.

5.6 Data Analysis and Interpretation

Data analysis is the process of linking data based on their relationships. Kitchen and Tate (2000) explained that data generation and analysis are not separated and both need to be considered carefully before starting the research. The explanation of how data of particular research problem is interpreted and analyzed accounts a major
constituent of research work that demands the researcher’s knowledge and understanding of the subject.

The data were summarized and interpreted in quantitative and qualitative methods of analysis in the numeric and narrative method. The quantitative data were presented in the form of tables, ratios, figures, charts, graphs and percentages. The qualitative data were also organized and summarized based on the relevancy of the study and the result is presented in the final report by using qualitative description.

6. Results & Discussion

In order to indicate the findings of the study, this involved in identifying the major benefits and challenges of the implementation of the BSC, the following categories of analysis have been used.

Awareness and understanding of public servants about BSC, Reasons to Introduce BSC, The Commitment of Management & public servants towards BSC, The benefits of the BSC application in public service delivery, and the major problems/challenges faced organizations during BSC implementation undertakings in five government organizations are discussed hereafter as follows.

6.1 Awareness of Public Servants about BSC

For the question, do you have a clear understanding of the BSC? From the above table, on the average 72.9% of respondents have a clear understanding of the BSC whereas 27.1% said “No”. In this regard, data obtained from the focus group discussion also emphasize checklist question “What is the level of awareness and knowledge of the public servants in the implementation of BSC?” There was a lack of understanding and deep knowledge about BSC. Nevertheless, Trade and Transport, and Civil Service Offices were better understanding, implementation of a balanced scorecard. To show more clearly the percentage, below the figure illustrates the understanding of balanced scorecard in each case study institutions.
We can understand from the above figure 1 that there is a visible knowledge gap between employees and management indicated by weak understanding about BSC. Some portion of the public servants, especially Health office including the Health Center; lack clarity on the concepts, objectives and importance of BSC and hence, views the program as a political tool that is aimed at downsizing rather than a management tool. However, staff should be helped through training, discussion sessions through change army and work group, publications etc., to change their attitudes from perceiving the understanding about balanced scorecard.

### 6.2 Reasons to Introduce BSC

<table>
<thead>
<tr>
<th>(a) Internal Factors</th>
<th>Number of Respondent</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>The need to reduce cost</td>
<td>14</td>
<td>11.9</td>
</tr>
<tr>
<td>The need to increase efficiency</td>
<td>47</td>
<td>39.8</td>
</tr>
<tr>
<td>The need to define strategic focus</td>
<td>38</td>
<td>32.2</td>
</tr>
<tr>
<td>The need to improve technology /automate</td>
<td>19</td>
<td>16.1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(b) External Factors</th>
<th>Number of Respondent</th>
<th>Percent</th>
</tr>
</thead>
</table>

As can be seen from the Table 1 above 39.8 percent of the respondents under item (a) agree that the highest pressure to introduce BSC in government organizations was exerted by the need to increase efficiency ranked first, followed by 32.2 percent of the respondents who believe that the need to define strategic focus has exerted its influence on the government organizations internally. Similarly the need to improve technology and the need to reduce cost ranked third and fourth, which have 16.1% and 11.9% respectively. At the same time 38.1 percent of the respondents under item (b) believe that external factors related to shifting government policy put pressure on government organizations ranks first to introduce BSC followed by customer needs the changing industry and market conditions which are believed to be another factor to put pressure on government organizations to introduce BSC by about 32.2 percent of the respondents. The competitive advantage of new opportunity constitutes 28 percent of the respondents’ ranks third and others mentioned like being one part of BPR which constitutes 1.7 percent ranks last. This shows whatever the differences in percentage these elements are the core factors that influence public institutions to introduce balanced scorecard.

The above information shows that the majority of respondents are aware of the idea of change is not something escapable in the world of ever changing. The responses of the interview also lead to a similar conclusion. From the interview made in the case study respective officials, the reason to introduce were to monitor and evaluate the employee performance with their assigned job position, to play the public servants their own role, to produce a competitive essence for better work effectively and efficiently. Interview results also support this notion of change by explaining that both external and internal
factors exert the influence of their own to introduce change to one’s organization and also the interviewees believe that change is an everlasting solution to cope up with the environment changing rapidly.

6.3 The Commitment of Management & Public Servants towards BSC

Table 2 Responsibility of role of change agent

<table>
<thead>
<tr>
<th>Response</th>
<th>Civil Service</th>
<th>Trade &amp; Transport</th>
<th>Finance &amp; Economic Development</th>
<th>Municipality</th>
<th>Health (including town health center)</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top executive</td>
<td>18</td>
<td>12</td>
<td>21</td>
<td>8</td>
<td>19</td>
<td>78</td>
</tr>
<tr>
<td></td>
<td>85.7%</td>
<td>70.6%</td>
<td>70%</td>
<td>57.1%</td>
<td>52.8%</td>
<td>66.1%</td>
</tr>
<tr>
<td>Process Coordinator</td>
<td>4.8%</td>
<td>-</td>
<td>6.7%</td>
<td>28.6%</td>
<td>8.3%</td>
<td>8.5%</td>
</tr>
<tr>
<td>Employees</td>
<td>2</td>
<td>5</td>
<td>7</td>
<td>2</td>
<td>14</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>9.5%</td>
<td>29.4%</td>
<td>23.3%</td>
<td>14.3%</td>
<td>38.9%</td>
<td>25.4%</td>
</tr>
<tr>
<td>Total</td>
<td>21</td>
<td>17</td>
<td>30</td>
<td>14</td>
<td>36</td>
<td>118</td>
</tr>
<tr>
<td></td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

As the table 2 above reveals, 66.1 percent of the respondents think that the top executive of government organizations should be primarily responsible for assuming the role of a change agent. But in separate organization responses; 85.7% in Civil Service, 70.6% in Trade & Transport, 70% in Finance & Economic Development, 57.1% in Municipality, and 52.8% in Health office. From this, one can understand that the top executives of the Municipality and Health office (including health center) were not taking the leading role relative to other sectors. While 25.4 percent of the respondents assumed the process coordinator to play the role of change agent. 8.5 percent of the respondents think that this responsibility should be expected of the employees of government organizations. In general, one can infer from this that top executives of government organizations took the leading responsibility of role of change agent.

Table 3 the attitude of employees towards BSC

<table>
<thead>
<tr>
<th>Response</th>
<th>Civil Service</th>
<th>Trade &amp; Transport</th>
<th>Finance &amp; Economic Development</th>
<th>Municipality</th>
<th>Health (including town health center)</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pro-change</td>
<td>16</td>
<td>10</td>
<td>23</td>
<td>11</td>
<td>16</td>
<td>76</td>
</tr>
<tr>
<td></td>
<td>76.2%</td>
<td>58.8%</td>
<td>76.7%</td>
<td>78.6%</td>
<td>44.4%</td>
<td>64.4%</td>
</tr>
<tr>
<td>Anti-change</td>
<td>2</td>
<td>-</td>
<td>3</td>
<td>1</td>
<td>9</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>9.5%</td>
<td>-</td>
<td>10%</td>
<td>7.1%</td>
<td>25%</td>
<td>12.7%</td>
</tr>
<tr>
<td>Indifferent</td>
<td>3</td>
<td>7</td>
<td>4</td>
<td>2</td>
<td>11</td>
<td>27</td>
</tr>
</tbody>
</table>

www.ijmer.in
The table 3 above shows that 64.4 percent of the respondents see the attitude of employees of the case study, organizations towards BSC is pro-change. 22.9 percent of the respondents are indifferent to explain whether the employees of case study organizations are pro-change or anti-change while 12.7 percent of the respondents said that the employees of case study organizations are anti-change. This manifests that though it is not absolute, the majority of the public servants do not have a negative attitude towards the system or they are not at least resisting its implementation.

Though it might be hard to obtain 100 percent commitment from all staff if the sense of ownership and commitment level is less, the level of implementing the system may not be as anticipated and may fail to serve its purpose. Therefore, resistance is one of the challenges expected in the new performance management endeavors. This can be alleviated through time and needs persistent follow-up to minimize to an average level. Therefore, management should focus on identifying and investigating the reasons and take proper actions if they mean to implement the system.

Table 4 Response about the principle of BSC

<table>
<thead>
<tr>
<th>Response</th>
<th>Civil Service</th>
<th>Trade &amp; Transport</th>
<th>Finance &amp; Economic Development</th>
<th>Municipality</th>
<th>Health (including town health center)</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>9</td>
<td>10</td>
<td>22</td>
<td>12</td>
<td>19</td>
<td>72</td>
</tr>
<tr>
<td></td>
<td>42.9%</td>
<td>58.8%</td>
<td>73.3%</td>
<td>85.7%</td>
<td>52.8%</td>
<td>61%</td>
</tr>
<tr>
<td>No</td>
<td>12</td>
<td>7</td>
<td>8</td>
<td>2</td>
<td>17</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td>57.1%</td>
<td>41.2%</td>
<td>26.7%</td>
<td>14.3%</td>
<td>47.2%</td>
<td>39%</td>
</tr>
<tr>
<td>Total</td>
<td>21</td>
<td>17</td>
<td>30</td>
<td>14</td>
<td>36</td>
<td>118</td>
</tr>
<tr>
<td></td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

For the question, "Does performance measurement is taken according to the principle of BSC?" Table 4 above reveals that 61 percent of the respondent's performance measurement is taken according to the principle of BSC. From the remaining portion of respondents, 39 percent have performance measurement is not taken according to the principle of BSC. Therefore, this leads that the civil servants cannot perform their job committed and leads high turnover of staff unless the measurement is not taken according to their individual performance. According to Niven, 2002, when considering how long
time it takes to implement Balanced Scorecard there are organizations that have every measurement ready before launching the scorecard. Usually, there are about 30% of the measurements missing when the scorecard is developed.

Based on the responses to open-ended questions in the above questionnaire who response “No” performance measurement was not taken regarding the principle of BSC but belief that: The performance result was restricted by top executives, evaluate and filling of the performance result were not based on their work but based on personal relationship of public servants with their boss, the leaders filled the result without enough knowledge about BSC, public servants not political supporter of leading party have impact on their performance evaluation results, due to lack of understanding balanced scorecard from leaders and public servants it was not governed by the principles, and the officials put signatures while the public servants filled out their result by themselves without evaluating against the pre-set plan. From this, we can conclude that there were a knowledge and skill gap. Nevertheless, the researcher’s opinion and the idea arose from the focus group discussion there is not any impact on their performance result evaluation being a supporter of the leading political party.

6.4 Benefits of Balanced Scorecard

For the benefits of balanced scorecard, 74.6 percent of the respondents agree that the BSC implementation has brought a quality service delivery and effective evaluation performance of case study organizations. While 9.3% and 16.1% of respondents tells the level of agreement BSC implementation has brought a quality service delivery and effective evaluation performances neither agree or disagree (neutral) and disagree respectively. Whatever the differences in the majority percentage of responses show that balanced scorecard implementation has brought a quality service delivery and effective evaluation performance in public institutions.

According to the question "Does BSC serves as a good tool for improvement of processes and workflows?" 86.4 percent of the respondents agree that BSC can serve as a good tool for improvement of processes and workflows. A small portion (13.6 percent) of the respondents responded in BSC cannot serve as a good tool for improvement of processes and workflows.
The information under the question "Does BSC essentially helps to provide better customer service?" 84.7 percent of the respondents feel that BSC helps government organizations essentially to provide better service for its customers. The response of interview and focus group discussion also leads to a similar conclusion.

The information held in question "Do you think that BSC leads to efficiency and effectiveness?" 86.4 percent of the respondents believe that BSC leads government organizations to better efficiency and effectiveness while 13.6 percent of the respondents were not lead to efficiency and effectiveness.

Again the information in question "Does BSC help your organization to improve its working environment?" 83.1 percent of the respondents responded that BSC has helped selected government organizations improved its work environment. While 16.9 percent of the respondents visualize their work environment has not shown improvement.

The majority of the respondents were in conformity with Wizenski and Ólafsson (2004) who state that the balanced scorecard is useful for improving performance measurement. This is because performance measurement in public organizations focuses not only on costs but also considers efficiency and effectiveness (quality) in the provision of public services.

To sum up, the significance of improvements in performances, customer services, working flow and working environment is considered, by the large majority of the respondents to be based on efficiency and effectiveness of an organization under study. The researcher understands this can be good evidence about the changing orientation of government organizations if the respondents tend to be persons of their words or give a reliable response not hypothetically, what in the real situation was happening.
Table 5 Satisfaction level of public servants in applying BSC

<table>
<thead>
<tr>
<th>Response</th>
<th>Civil Service</th>
<th>Trade &amp; Transport</th>
<th>Finance &amp; Economic Development</th>
<th>Municipality</th>
<th>Health (including town health center)</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very High</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.8%</td>
</tr>
<tr>
<td>High</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>-</td>
<td>2</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>14.3%</td>
<td>17.6%</td>
<td>10%</td>
<td></td>
<td>5.6%</td>
<td>9.3%</td>
</tr>
<tr>
<td>Medium</td>
<td>14</td>
<td>11</td>
<td>22</td>
<td>13</td>
<td>15</td>
<td>63.6%</td>
</tr>
<tr>
<td></td>
<td>66.7%</td>
<td>64.7%</td>
<td>73.3%</td>
<td>92.9%</td>
<td>41.7%</td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>4</td>
<td>2</td>
<td>5</td>
<td>1</td>
<td>19</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>19%</td>
<td>11.8%</td>
<td>16.7%</td>
<td>7.1%</td>
<td>52.7%</td>
<td>26.3%</td>
</tr>
<tr>
<td>Total</td>
<td>21</td>
<td>17</td>
<td>30</td>
<td>14</td>
<td>36</td>
<td>118</td>
</tr>
<tr>
<td></td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Similarly the information held in Table 5 above 63.6 percent of the respondents evaluate their level of satisfaction about the implementation of BSC as medium and 26.3 percent of the respondents evaluate their level of satisfaction about implementing balanced scorecard as low while 9.3 percent of respondents rated it as high. 0.8 percent of the respondents revealed that their level of satisfaction about implementing balanced scorecard is very high in the case studies institutions. But in separate organization responses 52.7% in Health office (including town Health center) response low level of satisfaction about implementing balanced scorecard.

The focus group discussion made with selected public servants from the case study, organizations reported that recognition of performance does not practice especially in health centers. Nevertheless, in contrary in Trade and Transport office and Civil Service office front line employees name have been posted weekly on the notice board. In the researcher’s observation, recognition of performance will increase the level of satisfaction and leads to competition among public servants. This shows that sector officials will need to raise the level of satisfaction of public servants through different motivation systems.

The data collected shows that 57.6 percent of the respondents rated the team spirit in their work environment as medium 19.5 percent of the respondents rate the team spirit in their work environment as low while 17.8 percent rate it as high and 5.1 percent rate it as very high.
However, interviewees from five case study organizations made known those new team charts, change army and work manuals are in place to foster teamwork.

On the basis of communication, 44.1 percent of the respondent's BSC served as communication management tools at the team level of the case study, organizations. While 32.2% and 23.7% of respondents tell BSC serves as institutional and employee level respectively. These shows whatever the differences in percentage responses are balanced scorecard serves as communication management tools at all levels of the organization.

An institution, which is open, transparent and communicate well with staff benefits more from ownership and commitment of staff to the fulfillment of its objectives more than those which are not doing so. Understanding the vision and mission of the organization and striving for better performance are results of good communication practiced in the organization. Good communication is also a manifestation of leadership quality. Further, the more staff knows what is going on in the institution the more they develop a sense of belongings to it.

The majority of employees in the case study organizations believe that there is team level cooperation in applying the BSC as a communication tool. However, the practice of teamwork in Trade & Transport and Civil Service offices are significantly better than the practice of teamwork in the other sectors.

A balanced scorecard is only effective if it is clearly understood throughout an organization. Frequently, the balanced scorecard is developed at the executive level, but not communicated or cascaded down through an organization. Without effective communication throughout the organization, the balanced scorecards will not long-lasting change and performance improvement.

6.5 Challenges/Constraints of BSC

According to the findings from among the major factors that hinders the implementation of BSC program the data gathered: Lack of proactive training and communication system ranked first by 42.4% of the total respondents (that is 47.6% in Civil Service, 47.1% in Trade & Transport, 56.7% in Finance & Economic Development, 35.7% in Municipality, and 27.8% in Health office). Less committed to top leadership and management, high turnover of civil servants, and
inconsistency of individual performance measurement & reward system (30.5%, 14.4%, and 12.7% rank second, third and fourth respectively) are also identified as constraining factors. This shows whatever the differences in percentage these elements are core challenges to implementing BSC.

In this regard, data obtained from the open-ended questions, interview, and FGD also appreciated the aforementioned challenges. In addition, some of the challenges encountered while implementing BSC in public sectors are:

- Mainly seeing BSC as a monitoring and measurement tool for individual activities, implementation of Business Process Reengineering (BPR) and serve to strictly control the civil servants;
- Less awareness assume BSC is tedious & negative attitude of some employees towards change;
- Less skilled human resource and shortage of budget;
- Human resource capacity gaps, operational knowledge and skill gaps;
- Lack of commitment and lack of understanding of BSC;
- Weaker coaching and monitoring capacity of managers and team leaders;
- Absence of strategic performance management system, appropriate monitoring and evaluation system, measurement and reward system;
- Poor performance records management.

From the above analysis, it is important to note that; lack of proactive training and communication system, less committed to top leadership and management, high turnover of public servants, and inconsistency of individual performance measurement & reward system were the vital constraint factors in the successful of BSC implementation. However, it should not be ignored that the additional factors mentioned by interview and focus group discussion have also a significant impact on the success of BSC in government institutions.

The possible solutions taken by case study organizations to overcome the challenges encountered were that: prepare a reward
system for employees, give short term and on the job training, reading guides, directives and manuals, one to five change army and work group discussion, ask for workers that have a better understanding about BSC, Prepare discussion forum and monitoring and evaluation was guided with checklist and gave feedback for strengths and weakness periodically.

Therefore, the public organizations need to give the necessary attention to build proactive training and communication system, fulfill continuous individual performance measurement & reward system, assess the reason for the turnover of civil servants, obtain the commitment of the top management, and implement the system successfully.

Table 6 Factors affecting public organizations in applying BSC

<table>
<thead>
<tr>
<th>Determinant Factors Item</th>
<th>Very high</th>
<th>High</th>
<th>Moderate</th>
<th>Low</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NR</td>
<td>%</td>
<td>NR</td>
<td>%</td>
<td>NR</td>
</tr>
<tr>
<td>a) Financial capacity</td>
<td>28</td>
<td>23.7</td>
<td>21</td>
<td>17.8</td>
<td>45</td>
</tr>
<tr>
<td>b) Technical capacity</td>
<td>17</td>
<td>14.4</td>
<td>16</td>
<td>13.6</td>
<td>55</td>
</tr>
<tr>
<td>c) Institutional capacity</td>
<td>21</td>
<td>17.8</td>
<td>18</td>
<td>15.3</td>
<td>54</td>
</tr>
<tr>
<td>d) Technological capacity</td>
<td>28</td>
<td>23.7</td>
<td>10</td>
<td>8.5</td>
<td>33</td>
</tr>
</tbody>
</table>

According to the findings from among the major determinant factors that affect organizations in applying to BSC program the information under item (a) in Table 6 above shows 38.1 percent of the respondent rated that the financial and technological capacity to apply BSC was 23.7 percent of the respondents rated it as very high while 17.8 and 14.4 percent of the respondents rated it as very high the institutional and technical capacity respectively. The majority of respondents accept that the financial & technological capacity to apply BSC is dependable.

One can infer that technical skill on any intervention affects performance more than anything. Technical skill can be acquired through training and practice on an intervention. To implement balanced scorecard without proper and adequate training is unthinkable. However, the majority of respondents reveal that the financial, technical and institutional capacity is moderate and above it needs to enhance the technical and technological capacity of civil servants to mitigate the challenges of implementing balanced scorecard in the government organizations.
The interview held with selected officials, does your organization apply all BSC stages? If not, what is the reason behind it? The majority of interviewed officials’ answers that they perform all nine stages of the balanced scorecard, but stage seven; automation is not properly implemented because it needs more software, performance reporting, and knowledge sharing.

Does your organization have encountered any challenges when using the BSC as a tool for performance measurement? Would you mention some of these challenges, please? The interviewee said that "Yes", some of the challenges encountered while implementing BSC in public sectors are: less awareness assume the BSC is tedious & serve to strictly control the civil servants, negative attitude of some employees towards change, less skilled human resource, shortage of budget, lack of understanding of BSC by employees, human resource capacity gaps, operational knowledge and skill gaps, lack of commitment, weaker coaching and monitoring capacity of managers and team leaders, absence of strategic performance management system and appropriate monitoring and evaluation system, poor measurement and reward system and poor performance records management.

Constraints of BSC

- There was a gap in the performance directive those public servants who record very high and high result in the evaluation period of BSC will be motivated while the reward directive will enact followed this directive (says article 11:5 of Amhara National Regional State(ANRS) civil servants performance evaluation directive, October 2012). Nevertheless, the reward directive has not been enacted yet.

- Cumbersome work process of BSC in semi-annual, 15 days and weekly to plan, record daily work and to evaluate performance and to give feedback and also having many forms to evaluate performance.

From the focus group discussion the discussion question, how them anagementofpublic sectors manages the implementation the BSC?

 ✓ **Intermsofproactive communication:** There is no proactive communication while implementing balanced scorecard. The management of selected case study, organizations is not managing
strategically. The BSC plan was prepared by officials, cascade to public servants without a clear understanding, and does not keep its regular time.

**Interms of monitoring and evaluation process:** There is no clear monitoring and evaluation mechanism, objective performance measurement, and support giving mechanisms. The monitoring and evaluation of BSC were not periodically performed.

**Interms of reward system:** The reward system is not uniformly implemented in all sectors, except Trade and Transport office; the rest has not practiced the reward system even though the directive is not enacted yet.

### 7. Findings

Analyses of the data gathered to confirm the following findings:

- There is a visible knowledge gap between employees and management signaled by a weak understanding about BSC. Some portion of the public servants, especially Health office, including health centers, lack clarity of the concepts, objectives and the importance of BSC and hence, views the program as a political tool, which is aimed at downsizing, rather than a management tool.

- Among the major factors that hinder the implementation of the BSC program: Lack of proactive training and communication system ranked first by 61% of the total respondents. And followed by less committed to top leadership and management, High turnover of public servants, and inconsistency of individual performance measurement & reward system (45.8%, 22.9%, and 21.2% respectively) are also identified as constraining factors. This shows whatever the differences in percentage these elements are core challenges to implementing BSC. Therefore, the public organizations need to give the necessary attention to build proactive training and communication system, fulfill continuous individual performance measurement & reward system, assess the reason for the turnover of public servants, obtain the commitment of the top management, and implement the system successfully.

- Data obtained from the open-ended questions, interview, and FGD also appreciated the aforementioned challenges. In addition,
some of the challenges encountered while implementing BSC in public sectors are:

- Less awareness assume BSC is tedious & serve to strictly control the civil servants.
- Negative attitude of some employees towards change.
- Less skilled human resource and shortage of budget.
- Human resource capacity gaps, operational knowledge, and skill gaps.
- Lack of commitment and lack of understanding of BSC.
- Weaker coaching and monitoring capacity of managers and team leaders.
- Absence of strategic performance management system appropriate monitoring and evaluation system, measurement and reward system.
- Poor performance records management.

The majority of the respondents reported that the attitude of employees of case study organizations towards BSC is pro-change. This manifests that, though it is not absolute, the majority of the public servants do not have a negative attitude towards the system or they are not at least resisting its implementation.

Public servants and management at different levels of the hierarchy have been receiving training as a result of BSC implementation, but still, the need for training and development remains a high priority.

The concept of BSC is not managed through training in the Health office including health center than others. Data obtained from the focus group discussion also support the idea that there is lack training for health center workers.

Cumbersome work process of BSC in semi-annual, 15 days and weekly to plan, record daily work and to evaluate performance and to give feedback and also having many forms to evaluate performance are constraints to implementing BSC.
8. Conclusions

The balanced scorecard is thus a very important strategic management tool that helps an organization not only to measure performance but also decide/manage the strategies needed to be adopted /modified so that the long-term goals are achieved. Thus, in other words, the application of this tool ensures the consistency of vision and action, which is the first step towards the development of a successful organization. Also, proper implementation can ensure the development of competencies within an organization which will help it in developing a competitive advantage, without which it cannot be expected to outperform its rivals.

Factors that necessitated BSC on the other hand, is found to be sustaining the achievements of the BPR, improving the effectiveness of resource utilization and institutionalizing performance measurement complete. However, BSC is not free from challenges and constraints. To pinpoint the critical ones: low level of understanding about BSC, limitation on the leadership commitment, failure to fulfill the required facilities (information technology), low level of staff commitment, and a high degree of staff turnover are the major bottlenecks of the balanced scorecard implementation identified by the majority of the respondents. In this regard, data obtained from the FGD also appreciated the aforementioned challenges. In addition, lack of a proper reward system, inconsistency in capacity building endeavors, failure to link budgets with the strategic initiatives, and failure to keep records of accomplishment of individual performance and evaluate against the pre-set service delivery standards are identified as critical challenges of balanced scorecard implementation. Regarding achievements of BSC, improved performance level of organizations' strategy, improved the effectiveness of resource utilization, attitudinal change to focus on the organizations' strategy, substituting the promising achievements of BPR and improved employees' commitment and teamwork takes the lead. Lastly, data obtained from (leaders and employees) of the selected sectors and secondary sources, especially from annual performance evaluation reports of the five sectors concluded that the level of BSC performance as 'moderate'.
9. Recommendations/Suggestions

Based on the assessment of the case study to overcome the challenges encountered in the process of implementation BSC in public sectors the following recommendations are suggested.

- Public organizations should institutionalize the change and coordinate all human, material, and financial resources in a way that can enable to alleviate the problem of continuity of implementation of BSC as well as facilitate and deliver an appropriate training and knowledge products to improve the capacity and commitment level of leaders and civil servants.

- Health office (including health center) and Municipality should develop and maintain an awareness creation to achieve a good ground for all its members to internalize the concept of BSC. Rapidly increasing change agents and consistently addressing the benefits of BSC can do this. Although the study revealed a significant number of members of the Health Sector and Municipality have witnessed a good awareness level, still the proportion of members who fall on the other side of the spectrum cannot be overlooked.

- An appropriate training and awareness development should precede implementation of the new laws, rules, regulations, manuals etc.

- Continuous training and coaching will assist to enhance public servants skills, bring cultural change, and improve relations, communications, and team building. Thus, the Civil Service office should give training and coach proactively for other sectors and give feedback periodically after supervision.

- Continuous monitoring and evaluation should be regularly conducted and communicated to all concerned units and individuals for further improvement and growth. This requires a responsible body that closely follows up and gives technical assistance when needed.

- Public organizations should think about the decision-making process need to be participative and transparent, allocating appropriate budgeting, IT, interactive communication and reward systems, viewing the BSC as a continuous process,
reassessment and updating for effective BSC formulation and implementation.

References


SOCIAL WORK PRACTICE WITHIN THE INDIAN CRIMINAL JUSTICE SYSTEM: WITH SPECIFIC REFERENCE TO THE CORRECTIONAL SETTING

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Abstract

The current article, which is based on the work of two major research projects, gives the reader an insight into the role of a Social Work Practitioner within the Criminal Justice System (CJS) in India, particularly the Correctional Setting. The article begins by very briefly shedding light on the condition of the CJS in India. It then goes on to describe social work practice within the Indian CJS, with specific reference to Correctional Setting, under the following heads: a) Interventions undertaken by social workers within the CJS and Correctional settings; b) Value orientations, skills and knowledge base necessary for social work practice with prisoners and; c) Best practices and Evidence based practices in Correctional Social Work.; and d) Intervention and Research Gaps in the Setting. This article hopes to be a guide to any person who desires to work with prisoners in India.


1. INTRODUCTION

The nature of crime, criminal justice and correctional systems show variations across cultures and across time; nevertheless, there seems to be no other social problem which attracts common interest more than Crime. Social Workers, across the world, are an integral part of the mission to assist and reform the Criminal Justice Systems (CJS) of their countries. The current article is an empirical discussion on the role of Social Workers within the CJS in India, especially the Correctional Setting.
This Article is based on a Study being conducted by the Social Work Department of Loyola College of Social Sciences on Social Work Practice in 20 Social Work Settings in India, one of the settings being the Correctional Setting. During the first stage of the study sponsored by University Grants Commission (Joseph & Alexander, 2012), case studies were documented under each setting to list out the practices of Social Workers through interviews with practitioners. During the ongoing second stage of the study, sponsored by Indian Council of Social Sciences Research (2012-2014), material is being collected from a number of primary and secondary sources to triangulate and validate the findings of the first stage. The Study falls in the category of a Mixed Methods Research and adopts the Mixed Research Design called the Exploratory Sequential Design (Creswell & Clark, 2011, p. 71).

The current article is a compilation and analysis of the data collected on the Criminal Justice and Correctional Setting by: a) conducting Case Studies of 5 non-governmental organizations (NGOs)/Projects: Prayas Project of TISS, Cross Roads Prisons Ministry (CPM), Mumbai, Prison Ministry of India (PMI), Bangalore, Aswasa Bhavan, Kerala and Commonwealth Human Rights Initiative (CHRI), Delhi; b) reviewing websites of other Criminal Justice and Correctional organizations in India; and 3) reviewing literature on international best practices and evidence-based practices.

2. THE CRIMINAL JUSTICE SYSTEM IN INDIA

The Criminal Justice System (CJS) is “the system of law enforcement that is directly involved in apprehending, prosecuting, defending, sentencing, and punishing those who are suspected or convicted of criminal offenses” (Oxford Dictionaries, n.d.). The correctional system is “one component of the larger criminal justice system and is dedicated to improving public safety by helping offenders to become law-abiding citizens, while exercising secure and humane control.” (Champagne & Felizardo, n.d., para 2).

India has one of the largest CJSs in the world; however, the appalling state of its functioning can be understood by monitoring the increasing crime rates (National Crime Records Bureau [NCRB], 2012a), the non-democratic attitudes of the police (Patil, 2008), the lethargy of the Judiciary (Sharma, 2012; Tembhekar, 2013;'Vyawahare, 2013), the pathetic condition in prisons (NCRB, 2012b, Prison Reforms,
n.d.) and the rigid, slippery and unjust nature of certain legislations (Daruwala & Boyd-Caine, 2007; Patil, 2008). The decay of the Indian CJS is verbalized in the ‘Committee on Reforms of the CJS Report’ (Ministry of Home Affairs, 2003) thus “...crime has become a profitable business. Life has become unsafe and people live in constant fear... the citizens have lost confidence in the CJS” (p. 4, 5).

3. SOCIAL WORK INTERVENTION IN THE CRIMINAL JUSTICE AND CORRECTIONAL SETTING

As portrayed in the previous section, the state of affairs in our country puts great responsibility onto the shoulders of Social Workers. There is urgent need for the Social Worker to play dual roles- one, of an Activist or Advocate who raises voices for reformation of the CJS, and secondly, that of a Service Provider, who supplements the services within the present system, so that the accused, victims, prisoners and their families are assisted to lead lives of dignity and are reintegrated back into the community. This section minutely describes the tasks of social workers within the Criminal Justice and Correctional Setting. Focus is given to discussion on two points: a) Social Work Education and Jobs related to the Criminal Justice and Correctional Setting; and b) Social Work Interventions in Criminal Justice and Correctional Setting.

3.1 Social Work Education and Jobs related to Criminal Justice & Correctional Setting

The prominent role played by Social Workers within this Setting has led a few Social Work Schools in India to provide specialized courses in Social Work related to the setting- TISS offers M. A. Social Work in Criminology & Justice (Admissions 2013-2015, n.d.), Lucknow University offers ‘Correctional Social Work’ (Ordinance Master of Social Work, n.d.), LISSAH College offers ‘Criminology and Correctional Administration’ (Courses of LISSAH College, n..d) etc. A Social Work Specialization in Criminology and/or Correctional Administration/Social Work “provides the students with immense opportunity to examine and work with actors and institutions dealing with crime, law and justice from a rights-based perspective” (Admissions 2013-2015, n.d., para 1).

In the west, the corresponding specialization is Forensic Social Work, which includes both civil and criminal justice. National
Organization of Forensic Social Work defines Forensic Social Work as: “the application of social work to questions and issues relating to law and legal systems...Child custody issues,...the implications of child and spouse abuse, juvenile and adult justice services, corrections, and mandated treatment all fall under this definition.” (Forensic Social Work, n.d., para 1).

Thus, we can see that Correctional Social Work, Police Social Work, Child Protection Services, Family Court Counselling and Human Rights Protection, primarily associated with police arrest and custodial treatment, could be classified under Forensic Social Work. In India, Social Workers actively practice in all the above areas, except, Police Social Work, which is yet to develop.

The Encyclopaedia of Social Work defines Police Social Work as:

....a new area of social work practice in which social workers provide assessment and crisis intervention in a timely manner to individuals experiencing delinquency, mental health issues, alcohol and substance use and abuse, family and neighbour conflicts, and crime victimization. Social workers also provide counselling to police officers and their families as well as training and consultation. (Treger, 1987).

Parihar, which is a Bangalore city-based Family Counselling Centre, with the Bangalore City Commissioner of Police as its President, offers a developing model of Police Social Work in India; the Bangalore City Police actively refers individuals with problems to Parihar, and there is a rich exchange between the Police and Social Workers (Joseph & Alexander, 2012).

In Canada, a Social Worker is also qualified to practice as a ‘Community Coroner and Special Investigator’. A coroner is a medico-legal investigator who is authorized by law to inquire into deaths, where homicide is not suspected (Yeager, 2007).

3.2 Social Work Interventions within the Criminal Justice and Correctional System

As explained above, social work intervention within CJS in India can be categorized into two broad areas: protection of human rights and provision of services. The target population involved are persons in prisons, their families, victims and their families, legislators,
police, judiciary and other persons involved in Criminal Justice Administration and the general public.

(a) Protection of Human Rights

There are numerous Human Rights Organizations in India, whose mission is to look out for human rights violations committed by governments, corporates, groups and individuals; bring them to the notice of the public, and pressurise authorities to restore and protect human rights of the victims involved. Social Work interventions primarily aimed at protection of human rights in the area of Criminal Justice can be witnessed in the work of TISS Prayas Project and CHRI.

TISS Prays Project is a social work demonstration project of the Centre for Criminology and Justice, Tata Institute of Social Sciences. Its major objective is ‘to contribute knowledge and insight to the current understanding of aspects of CJS policy and process in India’. Commonwealth Human Rights Initiative (CHRI) an international NGO, has its mandate to ensure the practical realisation of human rights in the countries of the Commonwealth. Both these organizations give very high emphasis on protection of human rights and human rights advocacy with the criminal justice system. The activities adopted towards human rights protection within the CJS are:

- Creating knowledge on social work interventions within the Criminal Justice System
- Organizing fact-finding missions
- Identifying issues and bringing them before Government and other forums
- Seeking out the specific information needs of the people and communicates them to policy makers in various ways.
- Formation of human rights networks,
- Building capacities of civil society organizations (CSO)
- Catalysing the development of networks of CSOs working in the same field
- Concientization of people through public education, training, research, publications and media.
- Critically reviewing policies, legislations and other key documents,
Providing technical expertise to form strong legislation
Assisting partners with implementing of good practice,
Campaigning for National Human Rights Law and Access Legislations
Collaborating with community based groups,
Facilitating the process of Police Reforms, Prison Reforms, and Judicial Education.
Examining Police Accountability issues and Political Interference,
Mobilizing public support for reforms within the CJS

(b) Provision of Services

In 2006, CHRI conducted a survey of 129 organizations, involved in prison work, across 14 states. The aim of the study was to understand the level of community involvement and participation in prison, the functions and duties of these organizations in a correctional setting. According to CHRI 2008, Community Participation in prisons involves two processes: the community coming into prisons and prisoners going into communities as in after care homes. Civil Society presence is felt in prisons through the following activities:

bail projects, legal clinics, status study of under-trail, voluntary probation services, adult education, medical assistance, drug de-addiction, moral and spiritual discourses and practices, vocational training and employable skills, use of prison labour by private entrepreneurs, community groups visiting prisoners, family support, religious groups visiting prisoners, training of prison staff (Bharadwaj, 2008, p.237, 238).

Cross Roads Prison Ministries, Mumbai, Prison Ministry of India, Bangalore, TISS Prayas Project, Mumbai and Aswasa Bhawan, Kerala are such Civil Society Organizations working for the relief, rehabilitation and reformation of prisoners in several prisons within and outside their state. The aim of these organizations is to foster a life of dignity for prisoners, victims and their families; and their mission is to empower prisoners and their families by providing them with economic, psychological, social, spiritual, legal and medical support. The snapshot combining the activities conducted these organizations are the follows:
1. Programmes promoting Spirituality and Psychological wellbeing: Conduction of weekly prisoners meetings (Prarthana Sabhas), provision of counselling services, personal support programmes in the form of helplines and mail services, provision of television sets, carom boards and other recreational and sports items, teaching Songs and encouraging prisoners who sing to form choirs, facilitating celebration of occasions/holidays and talent search among prisoners.

2. Programmes promoting Physical and Mental Health: Establishment of Pathological Units in a prison, provision of dental chair to one prison, conduction of Medical Camps and Eye Camps, distribution of medicines, spectacles and other medical aids to needy prisoners and referral services. Some organizations provide Deaddiction support as well.

3. Educational Support: Community Colleges for prisoners, Person-to-person tuition and group lectures, mobilization of scholarships and financial assistance for continuing education.


5. Social Rehabilitation: Reference of persons to shelters, Running a Community Care centre for released prisoners, an institution where prisoners can live, earn and contribute regularly to the society; and conducting follow-up of released prisoners.

6. Legal Assistance: Arrangements for payment of fines for prisoners and acquiring bails for them, providing Legal Aid to prisoners, both foreign and local, and conduction of legal awareness classes.

7. Victim Support Programmes: Support for victims based on their physical and psychological needs; bringing the victims of crimes and perpetrators together to bring about a sense of healing and forgiveness.

8. Services to families of prisoners and victims: Assisting the women and children of the families of prisoners by facilitating education of children, providing psychological and economic support, providing
vocational training and opportunities for starting income generation programmes.

3.3. Intervention Gaps in the CJ &CS in India

The researcher made an analysis of the intervention gaps of organizations working in the CJ &CS in India. Correctional Social Work in India has down-played a few vital areas of intervention:

- The focus is more on provision of services, and less on social action and systematic advocacy for reforming the CJ S.

- Social Workers should study best practices of other countries in the field of Correctional Administration and bring it to the notice of the Government. The system of private prisons in the west could be implemented here, with necessary modifications.

- There is very little coordinated effort by Social Workers in this field. Also there is very little effort by authorities to coordinate the efforts of civil society even though this is often a felt need.

- Less weightage is given to ‘Rehabilitation of prisoners’. Most Correctional organizations concentrate primarily on the material needs of prisoners and their families. Preventing recidivism gets very little attention, especially because the present Prison System does not consider this as a priority- neither is there adequate number of probation officers, nor opportunity for civil society social workers to indulge in one-to-one in-depth interaction with prisoners. Social Workers themselves may not be equipped with relevant skills to assist people to bring about behavioural change.

- More after-care homes should be started for released prisoners.

- Families of prisoners, particularly children, should be systematically helped, to overcome stigma, depression etc. so that they can live full lives.

- Aspects relating to prevention of Crime are given very little thought by social workers.

- Victim Support programmes also get very little focus.

Synthesising information, from the 5 case studies, the secondary data collected on organizations working in the CJ &CS, and an analysis of the researcher on the gaps in Social Work Interventions
in Criminal Justice and Corrections, Table 1 has been presented as a summary of the range of activities being conducted and that could be conducted by Social Workers in the field of Criminal Justice and Corrections in India.

Table 1: Range of Social Work Interventions possible within the Criminal Justice and Correctional System:

<table>
<thead>
<tr>
<th>GOAL: “A society where Crime is reduced and Criminal Systems are just, fair and precise”</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objective 1:</strong> To prevent the occurrence and maturation of crime through community-based interventions</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Interventions</th>
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</thead>
<tbody>
<tr>
<td>1. IEC (Information Education and Communication) with Community on Human Rights, Community responsibility in case of prisoners, and generally, on crime and prevention.</td>
</tr>
<tr>
<td>2. Education and Training for Risk Groups</td>
</tr>
<tr>
<td>3. Early Intervention: Identification, Counseling and Therapy with delinquents</td>
</tr>
<tr>
<td>4. Community Vigilance/Neighbourhood Policing Systems: Training them on community responsibility, team work; how to avoid crime, detect signs of criminal activity and report effectively.</td>
</tr>
<tr>
<td>5. Value Based Education in Schools: Training teachers to detect and deal with delinquent behaviour. Personality Development Programmes; Value Based Education; Counselling</td>
</tr>
<tr>
<td>6. Campaigns to Prevent Corruption, Organized Crime and White Collar Crimes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Objective 2: To mitigate the effects of crime on accused, criminals, prisoners, victims, their families and law enforcement personnel</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Special facilities for Under trials- like private prisons</td>
</tr>
<tr>
<td>2. Coordination with Probation Officers to create and run more effective systems of Probation and Parole</td>
</tr>
<tr>
<td>3. Assisting the Government in Community Sentencing initiatives.</td>
</tr>
<tr>
<td>4. Programmes for Rehabilitation of Criminals: Assessment, Screening,</td>
</tr>
</tbody>
</table>
Classification, Corrections Programming and Community Re-entry

5. Provision of various services to Prisoners in the form of economic, psychological, social, spiritual, legal and medical support (See CPM Activities). Literacy and Education is also provided.

6. Running after care centres for prisoners.

7. Support to Families of Criminals, especially children

8. Victim Support: Securing adequate relief for the victim and/or their families and upholding their rights, Programmes for prevention of PTSD among Victims and prisoners families; bringing victims of crime and perpetrators together in a therapeutic relationship.

9. Serving as expert witness in certain cases

10. Screening, evaluating, and treating law enforcement and criminal justice personnel

3. To advocate for reformation of the Criminal Justice System: Police, Prisons and Judiciary

1. Advocacy and Lobbying for creation and implementation of just and effective legislations.


3. Documentation, Publication and Media Advocacy.

4. Training Criminal Justice Functionaries

5. Facilitating mediation and arbitration

6. Partnership in Law-making, Policy and Programme development

7. Research on the condition of Criminal Justice and Corrections in India and on the various best practices, evidence-based practices etc; Evaluating Training needs Government and Civil Society staff etc.

4. SOCIAL WORK VALUES, SKILLS AND KNOWLEDGE BASE

The Correctional Social Worker should reaffirm her belief in the inherent worth of the individual; i.e. he/she should believe that no person is born amoral- a serial killer turned out to so because of the destructive environment that conditioned and enforced his behaviour. The Social Worker has to maintain a non-judgemental attitude and trust in the self-determination of the client, no matter how uncanny the
client history seems. He/she should believe in the ability of people to change and uphold Reformatory systems in Prisons. The Correctional Social Worker should communicate to the society that criminals are the products of a decaying society and that the society has the moral obligation and social responsibility to reform criminals and persons with criminal tendencies. Social Workers should hence commit themselves to making prisons an extension of the community and facilitate exchange between prison administration and the community.

Some of the lessons learned by the Social workers of respondent organizations were:

a) Dealing with prisoners who were habitual offenders could be emotionally taxing. The chances of relapse in such persons are very high; hence the Social Worker should work hopefully, persistently and patiently, without high expectations of immediate results;

b) Social Workers as a policy should not ask any prisoner what his/her offence was.

c) Questions of confidentiality can come into play, especially in dealing with habitual offenders, and the social worker should handle the prison authorities and the prisoners tactfully so as to not lose credibility with both parties; d) The social worker should take utmost care not to be carried away by manipulative tactics of criminals; e) it is crucial to permeate unconditional love and acceptance into the relationship.

**Fundamental Skills** required according to the National Institute of Corrections, USA include: a) fairness and firmness; b) empathy; c) good interpersonal skills; d) ability to set limits; e) ability to model appropriate problem-solving behaviour; f) ability to offer structured programmes with reinforced practice; g) skills to effectively engage inmates and defuse potentially violent situations through nonphysical intervention. (Crime and Justice Institute [CJI], 2009) The Staff of CPM suggested that the most important skill required Effective Case Management skills with special focus on behaviour modification models.

In addition to these, a Criminal Justice Social Worker should have the skill to critically analyze policies, legislation and social events and their implications, so as to know when and how to act in protection of human rights. It is vital to inculcate the skill to carry out advocacy,
networking, and lobbying systematically and professionally, so as to ensure sustainable results.

Knowledge Base required includes United Nations Conventions/handbooks/declarations on Prisoners, Accused and Victims of Crime; Relevant Constitutional provisions, Penal Law, Various Prison-related Acts; Model Police Act 2006, Prison Manuals, Relevant Case Laws (like the Prakash Singh Case), NCRB Statistics, History of Criminal Justice and Correctional reforms in India, Reports of various Committees/Commissions on these reforms, Government Administration in Prisons, National and International Best Practices in Rehabilitation of Prisoners etc. Knowledge of Criminal Psychology and Counselling will also benefit the social worker who wishes to practice counselling and therapy at a deeper level.

5. BEST PRACTICES (BP) AND EVIDENCE BASED PRACTICES (EBP)

Best Practices and Evidence based practices, if applied to our CJ S, along with political resolve and CSO partnership, will produce striking results in crime reduction, prison management and rehabilitation of prisoners. For this section, the Best Practices of the 5 cases studied will be discussed, followed by a sharing of few International models.

1. Advocacy and Lobbying: CHRI adopts a top-to bottom approach; it endeavours to bring about changes at the policy-making and executive level through monitoring (human rights situation), advocacy, lobbying, training and awareness building. Prayas adopts bottom-to-top approach, where it brings issues discovered through practice to the notice of authorities and public.

2. Community re-entry Centres: PMI and CPM provides social integration of released prisoners through a Community Based Residential Centre and Placement Services. PMI adopts a restorative justice practice which aims at bringing the victims of the crimes and perpetrators together and enabling them to achieve a sense of closure.

3. Community Corrections/Sentences are alternatives to custodial imprisonment imposed on accused by a court in lieu of imprisonment, or by a parole board or probation officer after release of the accused. According to Petersilia, 2007, they can include “general community supervision as well as day reporting centres,
halfway houses and other residential facilities, work release, and other community programs”.

4. **The Integrated Model (IM):** The effective implementation of correctional interventions requires equal focus on “Evidence based practices, organizational development, and collaboration to achieve successful and lasting reform”. (CJI, 2009). Serin’s Eight Evidence-based principles for effective practice in corrections are: 1) Inmate Assessment and Classification; 2) Enhance Intrinsic Motivation; 3) Targeted Correctional Programming; 4) Skill Train with Directed Practice; 5) Positive Reinforcement; 6) Community After Care; 7) Measure Processes/Practices; 8) Measurement of feedback (Serin, & CJI, 2005)

6. **GAPS IN SOCIAL WORK RESEARCH**

- There are almost no Evidence-based practices in India. Evaluative and Experimental Studies of the results of rehabilitative and other interventions should be conducted.

- An evaluative study of existing after care homes for released prisoners needs to be done.

- Applicability of International models in India should be tested.

- Collaborative research should be encouraged with Correctional Social Workers, in different States, about the condition of the prisons in which they are working; analysis of state laws, evaluation of interventions etc should also be conducted state wise.

- The skills and training needs of persons working in this area should be assessed.

7. **CONCLUSION**

“The degree of civilization in a society can be judged by entering its prisons” (Dostoevsky, 1862). A highly evolved society will devise every means possible to prevent crime from engendering and to reform offenders. The time is ripe to consider how civilized our institutions are, and to act, lest the fate of a rotten society befalls us.
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A STUDY ON EXISTING AND POTENTIAL LIVELIHOODS OPPORTUNITIES AMONG CHENCHU TRIBES IN SIX TRIBAL VILLAGES OF ATMAKUR MANDAL, KURNOOL DISTRICT, ANDHRA PRADESH

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1. Introduction:

Chenchus are one of the twelve Particularly Vulnerable Tribal Groups (PVTGs) who live in Andhra Pradesh. In addition to Andhra Pradesh, they also live in Tamil Nadu, Orissa and Telangana states. In Andhra Pradesh, they live in Nallamala hills of Guntur, Nellore and Kurnool districts. According to 2011 census, undivided Andhra Pradesh (including Telangana) has 47,315 Chenchus, out of which 50.4% are male. Chenchus occupy 1.8% of 1.32-lakh tribal populations in the state. Their staple food is meat of various animals found in the forest along with roots and tubers, Jowar and Maize. Chenchus who are mainly monogamous have a patrilineal form of society. However, widow remarriages are common through polygamy.

2. Current study:

Livelihood assessment study for six Chenchu villages in Kurnool district of Andhra Pradesh was taken up with the following objectives:

- To understand the social parameters of Chenchu households in order to understand the overall livelihood scenario in a broader social and cultural framework.
- To understand the existing livelihood activities on which Chenchu households are dependent.
- To understand the potential livelihood activities among the existing livelihood portfolio for further development.
- To identify additional livelihood activities in line with the resource base, human resources and marketing potential.
3. Study methodology:
Livelihood assessment was taken up by conducting Focus Group discussions with twenty to twenty five people in each village. In addition livelihood portfolio mapping exercise using a questionnaire was randomly conducted for eight households residing in four villages. Quantitative findings of the study were analyzed by taking in to consideration aspects that were discussed during the Focus Group Discussions.

4. Chenchu households - Current livelihood scenario:
Chenchus take up a variety of livelihood options such as wage labor, agricultural activities, goat rearing, poultry, bamboo-based handicrafts, collection of forest produce etc. Every household takes up around four to five subsistence activities.

a. Wage labor:
Around 36% of the income for Chenchu villages is generated from activities related to wage labor. 31% of income comes from wage labor activities under The Mahatma Gandhi National Rural Employment guarantee Act (MGNREGA) and the rest comes from agricultural labor activities taken up for other farmers, cutting of forest grass for forest department, setting up of fences around agricultural fields etc. All the Chenchus have been getting support through MGNREGA and they are getting employment up to 15 days every month. This is one of the most important livelihood options for the Chenchus.
b. Agriculture

Agriculture provides 18% of the revenue to the Chenchu villages. As chenchus lead a life of hunting and gathering earlier, instead of preserving food, they were more concerned about finding and gathering various foods that would keep them free of hunger for longer period of time. They were unaware of cultivation of crops. According to a study efforts were made by Madras presidency to rehabilitate Chenchus from deep forests to agricultural plain lands of Kurnool district as early as 1932. Post independence, (since 1951) the efforts by government to rehabilitate Chenchus was enhanced. Establishment of Integrated Tribal Development Agency (ITDA) in the year 1975 ensured movement of tribal from forests to the surrounding villages. ITDA has been implementing several activities for rehabilitation and development of Chenchus. Project Tiger\(^1\), which also funded relocation of villagers in order to protect tigers from activities of poachers, established a tiger reserve forcing Chenchus to leave the forest.

The forest department allowed felling of trees at the edge of the forests to convert the forestland in to arable land. This land was allocated to Chenchu families as a source of livelihoods. Several initiatives such as land leveling, distribution of seeds and fertilizers, digging of bore wells were taken up by ITDA in order to encourage Chenchus to cultivate their lands instead of depending on forests. The evacuation was also taken up to cut the alleged nexus between Chenchus and naxalites.

In every village, around 60% of the households have agricultural lands ranging from two acres to ten acres. Though some of them have pattas\(^2\) rest of the landowners are waiting for the legal document. Government and other agencies have been trying their level best to shift Chenchus from forest based livelihoods to agriculture, only 10% to 20% of Chenchus living in the six villages have taken up farming. Rest of them have been giving the land for lease and earning anything from Rs.500 to Rs.10,000 per acre per year based on the location, quality, slope and irrigation facility of the land. Around 2% to 5% of the landowners have

\(^1\) Project tiger was launched in 1973 by National Tiger Conservation Authority of Government of India, which aims at protecting Bengal tigers from extinction and to increase the population of tigers in their natural habitat

\(^2\) Land patta is a legal document that states that the person in whose name it is registered is the owner of the land.
sold their lands to enterprising tribal such as lambadas. Hence though agriculture provides 18% of household revenue to those who cultivate land, for the rest who lease out land, less than 2% of household income comes from the lease amount. Farmers take up red gram, green gram, Bengal gram, black gram, groundnut and sunflower. Farmers also take up Pearl millet, Kodo millet, Sorghum and pigeon pea. Also, chenchus who do not take up cultivation are fully dependent on the Public Distribution system, which mainly provides rice. According to a study conducted by National Institute of Nutrition, dietary intake of foods barring cereals, as compared to balanced diets of Chenchus was generally poor and less than the recommended levels. The prevalence of underweight, stunting in less than five year old children was 42% and 53% respectively.

Support institutions for agriculture

In order to encourage chenchus to take up cultivation, certain support institutions are putting forth efforts to ensure that chenchus shift to farming.

- Village Renewal Organization (VRO) supported in ploughing lands and also handed over seeds and pesticides during Kharif season of 2015. At least 60% of the farmers who have taken up farming have seen good harvests and are keen to take up cultivation rather than leasing it out.

- ITDA is supporting them support in digging bore wells. However, none of the 16 bore wells were successful and officials have fixed the machine, which provides water for 10-15 minutes per day.

- EFICOR is an NGO, which trains them on agricultural techniques and natural farming.

Problems in agriculture

In spite of efforts put forth by several organizations, there are several problems that chenchus face in cultivating their lands.

- In many cases, land allotted to the Chenchus has not been leveled making the cultivation difficult.

- Crops are attacked by wild boars and monkeys attack kitchen gardens.
• Farmers are dependent on external inputs, which increases the cost of cultivation.

• Water harvesting structures are not seen in the fields. Though government has been encouraging water harvesting structures, Chenchus are not keen to take them up as they feel that the structures are unsafe as they cannot be covered and there is always fear of drowning of their children.

• They have not been desilting the wells and hence the water is insufficient for entire year. Also, most of the wells do not have elevated walls surrounding them to ensure that the water does not get polluted and desilting is not required year after year.

• Farmers sell their produce to middlemen who come to their village. These middlemen cheat the Chenchus by buying the produce at far cheaper price than that which exists in the market.

Reasons for not shifting to agriculture
In addition to several problems in cultivating their farms there are several other reasons for not shifting to agriculture.

• Only few of the villagers had land since the time of their forefathers and rest of them have acquired land during land clearing exercise took up in 2006 under NREGA. Hence, farming is a new intervention for them and most of them are unaware of farming methodologies and hence prefer to give land on lease rather than cultivate on their own.

• Chenchus are unaware of scientific methods of cultivation. Hence they are afraid to take up farming owing to the risks involved.

• Farming hinders the movement of Chenchus who continue to depend on the forest for collection. Chenchus being hunters and gatherers are used to collection of produce rather than cultivation of the same and hence are skeptical to cultivate.

• Agriculture is capital intensive. In order to invest in agriculture, Chenchus are dependent on moneylenders from Atmakur who charge interest as high as 120%. Chenchus are liable to pay the first loan installment along with interest while taking loan.
c. Forest based livelihoods:

16% of the revenue comes from collection of commodities from forests which include bamboo, honey, gum, firewood, sarsaparilla (Hemidesmus indicus), soap nuts, herbs etc. Earlier, Chenchus were dependent on forests for food, clothing and shelter needs. Forest commodities were not traded for money. Gradually, chenchus started searching for economically important forest produce such as honey, soap nuts, gum, tubers etc. and sell the same to contractors. This was the first ever interaction of Chenchus with the civilized world. Though chenchus dressed sparsely earlier, this interaction gradually changed the dressing and living pattern of the Chenchus. For the very first time, they understood the importance of money. As the demand for forest produce increased, in addition to Chenchus, other tribes and people from plains began to extract the forest produce and sell the same to the contractors. Gradually, fruits, honey combs, trees etc. were getting destroyed owing to the greed for money. The birds and animals in Nallamala forests dwindled. Though Chenchus learnt to live harmoniously with nature, rest of the collectors destroyed the resources beyond the carrying capacity\(^3\) of the Nallamala forest. Thus began the restrictions of the forest department on accessing the forests and the produce.

As far as commodities collected from forests are concerned, bamboo that is collected from forests is further processed to make bamboo partitions and also bamboo sticks that provide support to pilgrims going to Srisailam\(^4\) on foot during festivals. Other than bamboo, no other forest commodity is processed and hence 13% of revenue comes from processed bamboo products, whereas only 3% of revenue comes from collection and sale of other commodities from the forests. Though Chenchus are legally not allowed in to the tiger reserve, they depend on

\(^3\)The number of people, animals, or crops, which a region can support without environmental degradation is called carrying capacity.

\(^4\)Srisailam, located around hundred kilometers from the Chenchu villages is reputed for the shrine of Lord Mallikarjuna. The temple is one among 12 Jyotirlinga temples dedicated to Lord Shiva and also one of the eighteen Shakti Peethas in India.
forests for honey, gum, Madhuka flowers and seeds, Musti kaayalu (Ayurvedic herb), Sugandhi root (Indian sarsaparilla), soap nuts etc.

**Gum:** Collection of gum from gum karaya trees is a regular feature among Chenchus. However, as they were not trained on the right method to collect the gum, gradually, the trees perished. Though Chenchus have identified saplings in the forests, they will take more than five years to mature. Chenchus complain that though they are aware of the precautions to be taken while collecting gum, banjaras living near their gudems are destroying the trees because of the incorrect methods used for extracting gum.

**Vippakaayalu/Mahua/Madhuka:** Villagers collect flowers and seeds of Mahua and prepare wine and oil respectively. Both wine and oil have excellent economic value. As felling of Mahua trees is rampant, Chenchus are unable to collect flowers and fruits of Mahua.

**Musti (Strychnos nux-vomica):** These are collected by the villagers and sold to GCC. There are other bulbs such as chenchu gadda, chada gadda, Noolgadda etc. which are boiled and consumed by Chenchus.

**Sugandhi gadda (Indian sarsaparilla):** Roots of Hemidesmus indicus/Indian sarsaparilla are extracted and sold for Rs.200 to Rs.300 per kilogram. VRO has trained them in boiling the roots and extracting a juice called Nannari, which is very popular drink in the surrounding areas during summer. The extract is considered to purify blood and act as a body coolant during summer. Preparing the juice concentrate and selling in the market fetches six to seven times the amount. However, in the absence of other support services, Chenchus prefer to sell the roots instead of juice concentrate.

**Bamboo:** The villagers were buying the bamboos during auction, would cut them and sell in the market for profit. However, the process has stopped now. Though villagers can grow bamboo, they are not doing so. Some of them are making partitions out of bamboo and selling in the local market. Some (very few) have been trained on making handicrafts out of bamboo. Though there are few villagers who are skilled in bamboo handicrafts, they are not able to sell the products in the market. In addition to the stem, Chenchus also collect bamboo rice from the forest. Though bamboo rice has good economic value, availability of such rice is unpredictable.
Though there are several such produce available in the forests, following are the reasons for which it is important to ensure alternate livelihood opportunities such as agriculture and animal husbandry:

- Chenchus stay in the forests for weeks together in search of various products and hence the whole family goes to the forest, stays there for about week to ten days and comes back. They cook in the forest and drink water that is available. They do not have any protection from various insects in the forests. Most of them are falling sick after coming back from the forest and some of those illnesses are life threatening.

- There are several incidences where in Chenchus wild animals such as bears attacked and some of them also lost their lives.

- As the entire family goes to the forests for weeks together, children are unable to attend to the school on a regular basis.

d. Brewing alcohol:

Considerable amount (10%) of income comes to the Chenchu households from brewing alcohol. Alcohol is brewed using jiggery and bark of Acacia tree (may be Acacia nilotica) and is consumed by all the household members including children in few cases.

e. Jobs:

Around 10% to 15% of Chenchu households have at least one member who holds a permanent job with the forest department as watchmen, washer men (to be verified if this is similar to protection washer) and security, which provides around 30% to 40% of the household income. Some of the Chenchus have been appointed as guards under project tiger in the reserve forest.

f. Petty shops:

Twice every year, pilgrims from Andhra Pradesh and neighboring states go to Srisailam temple on foot and pass through the Chenchu villages en route. Chenchus set up stalls selling cool drinks and related items. 5% of the income comes from such shops.
g. Transportation:
Few of the households have taken loans to buy auto to transport people from their villages to Atmakur and 4% of household income comes from this source.

h. Other sources:
A very small part of the household income (3%) comes from cultivation of small ruminants such as Goats. Some of the households also have taken up diary. Further, there are other livelihood options such as Poultry and diary activities

- **Poultry:** VRO- A local NGO provided them Giriraja poultry with the support from KVK. Required vaccinations have also been provided to the poultry. ITDA has also provided poultry to the Chenchus. However, required veterinary support was not provided and hence the mortality rate was near 100%

- **Diary:** Diary activity is going on in the village and milk is sold to milk diaries @Rs.35 per kilogram. In the outside market, milk fetches a price of Rs.50 to Rs.55. There are hostels and other establishments in Atmakur who require regular supply of milk. Though few of the village youth are trained as Para veterinarians (Gopala mitra), they are afraid to take up the job and hence the villagers are entirely dependent on the veterinarian. However, they do not get proper advise on vaccinations. People are unaware as to how to grow fodder and hence buy fodder.

5. **Employability and profitability of livelihood activities:**
As far as profitability of any livelihood activity is concerned,
Shops set up for pilgrims during festivals provide highest income per day (Rs.1429). Owing to the profitability of shops set up during festivals, 25% of households studied set up shops for around fourteen days during festivals (A week each during Mahashivratri and Ugadi, the new year day). However, in terms of scope the activity, the shops could be further expanded to provide a variety of products such as food items, nannari sharbat, bamboo handicrafts etc. to the commuters.

- Brewing alcohol, provides Rs. 729 as income per day and around 50% of Chenchu households brew alcohol for commercial purposes and it is to be noted that almost all the Chenchu households are skilled in the preparation of alcohol and only few of them have taken up the same as one of their livelihood activities.

- Making bamboo baskets is a profitable enterprise and bamboo-based livelihoods are generating good amount of revenue (Rs.384 per day) to the Chenchus. The partitions made out of bamboo have good demand in surrounding villages.

In addition to bamboo, honey, firewood, gum, soap nuts, medicinal herbs, sarsaparilla roots (locally called as sugandhi) etc. are also collected from forest. Other than bamboo, rest of the commodities collected from the forest is sold in its raw form to various traders and hence income per day is lesser (Rs.236) than bamboo based products. Though Rs.236 per day is an average amount across various households,
collection of commodities is similar to a gamble and at times people go on searching for the commodities for weeks together and earn very little. Following chart describes income per day as compared to number of days spent in searching for the produce. There are households who have spent 26 days in the forest and earned only Rs.192 per day, while there are other households who have only spent a week in the forest and earned Rs.1714 per day.

Chenchus go to forest for various other commodities including honey. However, availability of all the commodities depends on the luck of the people. Once they find any commodity extraction of the commodity such as honey purely depends on the skill of the individuals. Following chart provides details of income per day earned by various households. There are families who earn as high as Rs.1000 per day in a matter of five days and use rest of the days for other livelihood options, there are others who spend more than 75 days and earn only Rs.237 per day. Hence relying on forests as a source of livelihood is doubtful. However, as some chenchus have required skills to collect the forest produce, they could be trained further on sustainable collection practices. Also, advocacy with forest officials is required in order to encourage these livelihood opportunities.
6. Poverty and Chenchus:

When compared to the per capita income of Andhra Pradesh, which is Rs.90517 in the year 2015, except one household, rest of them is far below the per capita income for the state. As far as annual income of the household is concerned, 12.5% families live on less than one dollar a day, 37.5% on less than 1.35 dollars per day and 75% of the families live on less than 2 dollars per person per day. Depending on size of the family, number of members who consume alcohol and total income earned by family, they spend 15% to 75% of their income on liquor alone. Though in terms of absolute poverty, they might not be poor, but in terms of standard of living, health status, information, life expectancy etc., they are extremely poor.

7. Potential livelihood activities identified:

a. Developing existing livelihood options:

- As far as existing livelihood opportunities being taken up by Chenchus are concerned, MGNREGA has been providing key support to the households consistently for fifteen day per month. This is an assured employment scheme provided by the government. Further advocacy could be taken up for increasing number of days of employment under the scheme, particularly for landless Chenchus. However, one should note that the assured employment under the scheme could be threatened by change of government policies or by the change of government.
itself. Hence adequate care should be taken to sufficiently diversify livelihood opportunities of landless Chenchus in particular.

- **Alcohol brewing** is one of the major income source as well as the major expenditure source. However, according to a study, (K. Mallikharjuna Rao 2014), high prevalence of alcohol consumption in Chenchu households is leading to cirrhosis of liver. Pulmonary tuberculosis was also widely prevalent among them. During Focus Group Discussions, Chenchu households said that on a daily basis, a Chenchu couple consumes Alcohol worth Rs.200, which reflects an annual consumption of Rs.67000 for the couple alone. Hence, though this livelihood activity seems to be lucrative, this cannot be encouraged under any circumstances.

- **Bamboo based livelihoods** have great scope and have the potential to improve livelihood of tribals. This activity could be expanded as the chenchus have required skills, there is adequate demand in the market and required natural resources are available in the market. In addition to bamboo partitions, bamboo could be used as food and fodder. Bamboo bio textiles and bamboo briquettes could also be encouraged. Though some of the tribals have been trained in bamboo handicrafts, the finesse is missing and hence further training and marketing of the end products is required. However, further advocacy with the forest department for providing required licenses to Chenchus is to be taken up.

- Goatery and poultry are the livelihood opportunities that are providing much needed finance in case of emergencies. Hence such units could be encouraged after making provisions for essential veterinary services. Gopala mitras, who are already trained on para veterinary services could be considered for providing much needed support services.

- **Agriculture** is one activity, which offers good returns to farmers in addition to keeping them meaningfully occupied. Also, chenchus are new to agriculture and if Organic farming can be taken up, it would support them both in terms of providing nutritional security and good returns. Similarly, taking up
animal husbandry such as poultry, dairy and small ruminants would not only enhance the diversity of livelihoods and reduce risk, but would also support Chenchus in taking up organic cultivation. The symbiotic relationship between agriculture and animal husbandry could be tapped. Following model could be taken up in order to ensure development of all the Chenchu households irrespective of land ownership status. However, training and handholding support is essential to ensure that agriculture becomes a part of lives of Chenchus.

Integrated Organic agriculture and animal husbandry model:

Integrated Organic Agriculture and Animal Husbandry (IOAAH) model could be taken up in all the six villages inhabited by Chenchus is two mandals of Kurnool district of Andhra Pradesh.

- As more than half of the Chenchus in every village own 2-5 acres of agricultural land, they would be encouraged to take up organic cultivation of food crops such as cereals, pulses and vegetables. Fodder would also be grown in the land to be used both for animals owned by farmers and also by agricultural laborers as well.

- In addition, farm pond would be constructed to provide protective irrigation to crops and also for growing fishes.

- Necessary manure/compost for enriching the farmlands would be sourced from diary, goatery and Poultry units taken up by farmers and landless agricultural laborers.

- At least ten more poultry units, five more small ruminant units and three more diary units could be established per village. In addition to providing nutritional security and additional income, these units shall provide essential manure to the crops. Care should be taken to provide such units to landless Chenchus.

- Landless laborers who have taken up animal husbandry would be encouraged to take up composting units for supplying to the Chenchu and other farmers as well.

- Villagers with farms on roadside would be encouraged to set up shed net-based cultivation of farm nurseries to supply vegetable saplings to farmers. Farmers would handover seeds retained from previous crop to be developed into saplings.
Multiple shed net units and composting units would be encouraged to ensure competitive spirit among various producers.

A model farm would be taken up by taking an acre of land under lease and following practices would be taken up:

- Millets would be taken up in half an acre, pulses would be taken up in one quarter of an acre and in rest of the land, and vegetables would be taken up.
- Along with vegetables, farm pond would be constructed and fishes would be cultivated in the same.
- In addition, Papaya, Lemon and drumstick would be taken up on farm bunds along with Glyricedia, which provides necessary green manure for the crops.
- Green manures, Farm Yard manure, Vermicomposting and other animal droppings would use for enriching the soil fertility.
- Using neem solutions, neem cake, dashpharniark and other solutions would control pests.
- Savings healthy seeds from the standing crop would produce own seeds.
- Drip irrigation system would be used for the land in order to use water economically
- The model would try to demonstrate in situ water conservation methods by using broad based furrow method and mulching with locally available material and take up two crops instead of one crop in a year.
- As wild animals are damaging the crops, live fence using Karonda" (Carissa carandas), commonly called as “vaakkaya” can be used as live fence. The plants are bushy and thorny and shall provide additional income to the farmers. Also, bamboo or thorny bamboos could be taken up as live fence to provide additional income to farmers.
b. New livelihood opportunities identified:

**Bee keeping:** Collecting honey from the forest is a time-consuming affair and not all villagers are able to get good income per day in this search. Also, education of children is being affected as the entire family goes in search of honey. As all the villages are located near Nallamala forests, flowers are available throughout the year and hence apiculture could be promoted. However, thorough handholding support is required for promotion of the enterprise. With the support of organizations such as under the mango tree, organic honey could be promoted. Nearness to forests is an added advantage for apiculture. Apiculture can be taken up near organic farms during cropping season and in the rest of the seasons, the hives could be shifted near the forests. Few of the village youth are also trained in bee keeping and they have started the activity. However, they feel that it is not possible to domesticate the bee. They also feel that ants that come to feed on the sugar tablets fed to the bees also lead to migration of the queen bee. In addition to training, youngsters are to be provided on the job support for taking up the activity. Model units could be set up in order to improve the confidence of Chenchus. Apiculture not only provides additional income to Chenchus, but also increases the agricultural production by increasing pollination. Also, marketing support could be provided through KVIC. Three to four apiculture units could be established in each village to start with.

**Sericulture:**

As Chenchus are new to agriculture, few of them could be encouraged to take up mulberry plantations along silk rearing units. One to two Chenchu households could take up mulberry plantation on a pilot basis. Silk has great demand in the nearby Hindupur market and Bangalore markets and technical support from Central Silk Board, who has already extended support to few units in the nearby villages could be solicited. Gradually, silk cluster could be developed in this region with all the required support services.

**Juice centers selling Nannari:**

During festivals such as Sivarathri and Ugadi, pilgrims visit Srisailam on foot and Chenchus establish cool drink stalls on the route. Instead of selling Sugadhi gadda to outsiders, Chenchus could prepare juice on their own and set up stalls during the festival season. Two to three
experimental stalls could be established during the season in order to inculcate confidence among the Chenchus.

**Tailoring units:**

One tailoring unit could be established per village in order to provide additional income to the households. Several women are already trained in tailoring and hence other support such as loans for procuring tailoring units could be taken up in order to improve the livelihoods of Chenchus.

**Support providers:**

Government agencies have been providing training to village youth for providing support services in apiculture and animal husbandry. These support providers are essential towards promotion of specific livelihood options. Similarly, support providers in terms of organic agriculture and sericulture should be trained to provide appropriate support services for a fee. Two to three youth could be trained on each of the livelihood opportunities identified to ensure competition and service quality.

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AN OVERVIEW OF UPDATED PROVISIONS PERTAINING TO SALARY INCOME TAXABILITY AND TAX-SAVING INVESTMENT OPTIONS IN INDIA

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Abstract:
Salary includes both Monetary (Basic salary, Bonus, commissions, allowances, etc) facilities and Non Monetary (Housing Accommodation, Medical Facility, Perquisites, etc) facilities. To be taxable under salary there should be an employer employee relationship and the employment may be part time or full time employment. ELSS stands for Equity Linked Savings Scheme. These are tax-saving mutual funds that invest at least 65% of their assets in the stock markets. Investments of up to Rs 1.5 lakh in ELSS funds can earn a tax break under Section 80C. The advantage of ELSS funds is that they come with the lowest lock-in among all tax-saving investments--just 3 years. Apart from that, because of their equity exposure, ELSS funds are best placed to help you earn inflation-beating returns over the long-term.

Keywords: Salary, Tax saving, Employee, Employer

Introduction
The Income Tax Act prevailing in India is subject to amendments and updations with every Union Budget. Every assessee who earns income as salary is falling under the taxable ambit. Every payment made by an employer to his employee for services rendered, would be chargeable to tax as income from salaries. Salary includes both Monetary (Basic salary, Bonus, commissions, allowances, etc) facilities and Non Monetary (Housing Accommodation, Medical Facility, Perquisites, etc) facilities. To be taxable under salary there should be an employer employee relationship and the employment may be part time or full time employment.
Salary as per Section 17(1) includes wages, any annuity pension, any gratuity, any fee, commission, perquisites or profit in lieu of or addition to any salary, any advance salary, encashment of leave not availed, interest earned in excess of 9.5% on Recognised Provident Fund, amount contributed in excess of 12% on salary to RPF etc.

**Salary Components and Taxability**

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Taxability/Exemption</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Salary</td>
<td>Fully Taxable</td>
</tr>
<tr>
<td>Dearness Allowance (‘DA’)</td>
<td>Fully Taxable</td>
</tr>
<tr>
<td>Bonus/Incentive</td>
<td>Fully Taxable</td>
</tr>
<tr>
<td>Commission</td>
<td>Fully Taxable</td>
</tr>
<tr>
<td>Employer’s Contribution to Provident Fund</td>
<td>Exempt upto 12% of the salary</td>
</tr>
</tbody>
</table>

**Allowances**

House Rent Allowances (HRA)

Exemption is least of the following:

- a. Actual HRA Received
- b. Rent paid less 10% of salary
- c. 40% of salary (50%, if house situated in Chennai, Mumbai, Kolkata or Delhi) for the relevant period

Conditions for claiming HRA:
• The employee should be staying in a rented house
• The employee shall furnish
  ✓ Name,
  ✓ Address and
  ✓ PAN of the landlord if the total rent paid during the year exceeds INR 1,00,000.

Other Allowances

<table>
<thead>
<tr>
<th>Name of the allowance</th>
<th>Exemption</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children Education Allowance</td>
<td>INR 100 per month per child, restricted to 2 children</td>
</tr>
<tr>
<td>Children Hostel Expenditure Allowance</td>
<td>INR 300 per month per child, restricted to 2 children</td>
</tr>
<tr>
<td>Transport allowance</td>
<td>INR 1,600 per month (Rs. 3,200 for fully blind and handicapped employees)</td>
</tr>
</tbody>
</table>

Perquisites

Leave Travel Assistance (LTA)

• Going on a leave anywhere in India along with family
• Actual expenses incurred on the journey
• 2 journeys in a block of 4 calendar years
• Current block
  ✓ January 2014 to December 2017
  ✓ January 2018 to December 2021
Free meals/Food vouchers

- During office hours at office or business premises
- Paid vouchers – usable at eating joints
- 50 per meal per day for 2 meals

Medical reimbursement

- Medical reimbursement upto Rs. 15,000 in a year
- Actual expenditure incurred by employee for medical treatment of the employee or family

Gift

Gift in cash – fully taxable

Gift in kind – upto Rs. 5,000 is exempt

**Investments eligible as tax-saving deductions under Section 80C**

**Investments in ELSS funds**

ELSS stands for Equity Linked Savings Scheme. These are tax-saving mutual funds that invest at least 65% of their assets in the stock markets. Investments of up to Rs 1.5 lakh in ELSS funds can earn a tax break under Section 80C. The advantage of ELSS funds is that they come with the lowest lock-in among all tax-saving investments—just 3 years. Apart from that, because of their equity exposure, ELSS funds are best placed to help you earn inflation-beating returns over the long-term. Even though these tax-saving mutual funds don’t offer guaranteed returns, the best performing ones have generated 12-15% returns over the long-term through the power of compounding interest. Additionally, since ELSS funds are equity-oriented funds, all gains on investments held for over one year are tax-free for the investor.
Investments in Public Provident Fund (PPF)

Deposits made in a PPF account are eligible for tax deductions under Section 80C. A maximum of Rs 1.5 lakh can be claimed in one financial year. PPF gives guaranteed interest that is fixed by the Finance Ministry for every financial year. The current interest from the PPF for FY2016-17 is set at 8.1% that is compounded annually. The PPF has a tenure of 15 years, after which the withdrawals are tax-free. While the PPF doesn’t allow premature withdrawals, the account holder can take loans against the corpus in their PPF account.

Additionally, an employer’s contribution to the Employee Provident Fund (EPF) account also earns a tax break under Section 80C of up to Rs 1.5 lakh.

Investments in Employee Provident Fund (EPF)

An employee’s contribution to the Employee Provident Fund (EPF) account also earns a tax break under Section 80C of up to Rs 1.5 lakh. This amounts to 12% of salary that is deducted by an employer and deposited in the EPF or other recognised provident fund. The current interest rate on the EPF is 8.8%.

Investments in Tax-saving Fixed Deposits (FD)

Tax-saving FDs are like regular fixed deposits, but come with a lock-in period of 5 years and tax break under Section 80C on investments of up to Rs 1.5 lakh. Different banks offer different interest on the tax-saving FDs, which range from 7-9%. The returns are guaranteed and the FDs offer 100% capital protection. But upon maturity, the interest is added to the investor’s taxable income.

Investments in National Pension System (NPS)

The NPS is a pension scheme that has been started by the Indian Government to allow the unorganised sector and working professionals to have a pension after retirement. Investments of up to Rs 1.5 lakh can
be used to avail tax deductions under Section 80C. An additional Rs 50,000 can also be invested in the NPS for tax deductions under Section 80CCD(1B). The NPS offers different plans that the subscriber can choose as per their risk profile. But the highest exposure to equity is capped at 50%. An option to change designated pension fund managers is also allowed. However, a major disadvantage of the NPS is that the proceeds upon maturity are taxable. Furthermore, there is no guarantee of the returns that can be earned from the NPS.

**Purchase of National Savings Certificates (NSC)**

NSCs are eligible for tax breaks for the financial year in which they are purchased. Investments of up to Rs 1.5 lakh in NSCs can be made to save taxes under Section 80C. NSCs can be bought from designated post offices and come with a lock-in period of 5 years. The interest is compounded annually but is taxable. The current interest rate for FY2016-17 on NSC is 8.1%.

**Investments in Unit Linked Insurance Plans (ULIP)**

ULIPs are a mix of insurance and investment. A part of the invested amount in ULIPs is used to provide insurance and the rest of the amount is invested in the stock markets. Investments of up to Rs 1.5 lakh in ULIPs are eligible for tax breaks under Section 80C. ULIPs don’t offer guaranteed returns because they are an equity market-linked product. The disadvantage of ULIPs is that they don’t offer clarity on where the investments are made and how much of the invested amount is deducted for commissions and expenses.

**Investments in Sukanya Samriddhi Yojana**

Deposits of up to Rs 1.5 lakh can be added to a Sukanya Samriddhi Yojana account for tax saving under Section 80C. The current interest rate for FY2016-17 on Sukanya Samriddhi Yojana deposits has been set at 8.6%. Deposits in this scheme have to be made for a girl child by the
parent or guardian. The interest is compounded annually and is fully exempt from tax. The receipts upon maturity are also tax-free. The Sukanya Samriddhi Yojana account matures 21 years after opening the account. A partial withdrawal of up to 50% of the previous year’s balance is allowed after the account holder turns 18.

**Investments in Senior Citizens Savings Scheme (SCSS)**

The SCSS is a scheme exclusively for anyone who is over 60 years old or someone over 55 who has opted for retirement. The scheme has a maturity period of 5 years and gives 8.6% per annum. Investments of up to Rs 1.5 lakh in SCSS can be made to save taxes under Section 80C.

**Investments eligible as tax-saving deductions under Section 80CCG**

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Details of Deduction</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Eligible Investments</strong></td>
<td>Investment in listed equity shares – Rajiv Gandhi Equity Savings Scheme</td>
</tr>
<tr>
<td><strong>Amount of Deduction</strong></td>
<td>Least of the following shall be allowed as deduction:</td>
</tr>
<tr>
<td></td>
<td>a. 50% of the amount invested;</td>
</tr>
<tr>
<td></td>
<td>b. INR 25,000</td>
</tr>
<tr>
<td></td>
<td>The deduction shall be allowed for three consecutive assessment years</td>
</tr>
<tr>
<td><strong>Additional Conditions</strong></td>
<td>• The gross total income shall not exceed INR 12 Lakh Rupees</td>
</tr>
<tr>
<td><strong>for Deduction</strong></td>
<td>• New retail investor</td>
</tr>
<tr>
<td></td>
<td>• Lock in period of 3 years</td>
</tr>
</tbody>
</table>

Health Insurance Premium Section 80 D
<table>
<thead>
<tr>
<th>Scenarios</th>
<th>Self, Spouse &amp; Dependant Children</th>
<th>Parents (whether dependant or not)</th>
<th>Total deduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>No one in your family has attained 60 years</td>
<td>Upto Rs. 25,000</td>
<td>Upto Rs. 25,000</td>
<td>Rs. 50,000</td>
</tr>
<tr>
<td>The eldest member in your family is less than 60 years and Your parents are above 60 years</td>
<td>Upto Rs. 25,000</td>
<td>Upto Rs. 30,000</td>
<td>Rs. 55,000</td>
</tr>
<tr>
<td>The eldest member in your family has attained 60 years and Your parents are above 60 years</td>
<td>Upto Rs. 30,000</td>
<td>Upto Rs. 30,000</td>
<td>Rs. 60,000</td>
</tr>
</tbody>
</table>

**Dependant with disability 80DD**

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Details of Deduction</th>
</tr>
</thead>
</table>
| Eligible Investments | • Expenditure for the medical treatment (including nursing), training and rehabilitation of a dependant, being a person with disability or  
• Paid any amount to LIC or any |
other insurer in respect of a scheme for the maintenance of a disabled dependant.

| Amount of Deduction | • A fixed amount of INR 75,000 irrespective of expenditure
|                     | • In case of severe disability (80% or more disability) - INR 125,000

| Additional Conditions for Deduction | • Expenditure includes nursing, training and rehabilitation of a dependent being a person with disability
|                                     | • Any contribution with LIC or any other insurer for maintenance of dependent.
|                                     | • A disability certificate from medical practitioner must be obtained and
|                                     | • Dependent of the assessee includes spouse, children, parents and brothers and sisters.
Conclusion

The above mentioned information gives an overview of the provisions pertaining to Income from salary and the tax saving investment options available to assesses.

References

- www.incometaxindia.gov.in
- Union Budget 2017
THE PRACTICES OF HUMAN RESOURCE TRAINING AND DEVELOPMENT IN FIVE SELECTED CIVIL SERVICE ORGANIZATIONS OF AFAR REGIONAL STATE

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Abstract

This study sought to investigate the practices of human resource training and development in five selected civil service organizations of Afar Regional State. For this purpose, five organizations namely Education Bureau, pastoral Agriculture Bureau, Health Bureau, Capacity Building Bureau, and Management Institute were selected randomly. From these organizations overall 145 sample respondents were selected based on stratified random sampling. Questionnaire and interview were the major instrument used for data gathering. The quantitative data collected by means of questionnaire was processed through SPSS version 16.0 computer software and it was analyzed by using techniques such as frequency, percentage, mean ranking and chi-square. The data collected by the open ended questionnaire and interview were also analyzed qualitatively. The study had emphasized to investigate whether the organizations understudy follows the four systematic basic approach of training and development (TD) process or they operate in an ad hoc and haphazard way. Accordingly, it was discovered that the organizations conducted TD needs assessment. Objectives were also set before the design and implementation of the TD program. The organizations employed different on the job as well as off the job TD methods to train and develop their staff. However, the
fourth basic step of TD process that is TD evaluation was neglected. Therefore, the organizations could not strictly follow the systematic approaches of TD process. Having observed all these problems recommendations were suggested to follow all the systematic basic approach of staff TD processes by the organizations involved in this study to avoid wastage of the scarce resources, time and energy.

**Key words**: training and development, human resource, training and development process,

1. **INTRODUCTION**

1.1. **Background of the Study**

Organizations have both human and non-human resources in order to achieve their objectives. Therefore, people are the most significant resources of any organization. However, there may be a gap between the employees knowledge and skill and what the job demands. The gap must be filled and people should be kept updated with the growing technologies and their efforts, attitudes, and skills have to be sharpened to meet the organizational goals. This is achieved through Training and Development (TD) programs. Hence, employee TD is one of the major ways that organizations attempt to maintain the competency levels of their human resources development and organizational performance (Vemić, 2007).

Oribabor (2000) reported that staff TD aims at developing competencies such as technical, human, conceptual and managerial for the furtherance of individual and organizational growth. Absence of TD program often manifests tripartite problems of incompetency, inefficiency, and ineffectiveness.

A number of studies indicate that an employee TD has a positive impact on corporate job performance. For example, Isyaku (2000) generally tested the hypothesis that in addition to improving the competency of
employees, TD also improves their productivity which is reflected in an improvement in the firm’s performance. Betcherman et al. (1998) claims that firms that have training programs tended to perform better in terms of productivity, revenues, profitability, viability and prospects. Saks et al. (2002) also found a positive relationship between training and performance, productivity, profit, revenue and client satisfaction. Accordingly, it is now a day apparent that a number of government offices and other organizations are increasingly practicing and providing training opportunities to their employees and managers inside and outside their organizations.

In the early 1990s, the government of Ethiopia identified the need for strengthened, re-oriented, and revitalized Human Resource Training and Development (HRTD) in different organizations as a key to the success of socio-economic policies and strategies. The need was felt during the Transitional Period (1991-1994) when a serious shortage of trained, able, and adaptable workforce and leaders at different levels within the new government structure was encountered (Teshome, 2003).

It is obviously known that these Civil Service Organizations of Afar Regional State (for example, education bureau, agriculture bureau, capacity building, health bureau, and management institute) have been practicing HRTD program to their employees. Though the practice is there, no scientific research assured whether the TD program practiced in these organizations follows the basic systematic approaches of Dessler’s model in which the researchers were interested in and were initiated to conduct their study on this issue. These systematic approaches of Dessler’s model are TD needs assessment, setting TD objectives, selecting TD methods, and evaluating TD effectiveness. So, the researchers were initiated to conduct this study on the practices of
regional civil service organizations of Afar Regional State in applying such basic systematic approaches of TD process to their employees.

1.2. Statement of the Problem

In an era of high technology and global competition, human resources are vital in order for an organization to excel. They are the most valuable assets of any organization. With the machines, materials and even the money, nothing gets done without man-power. The effectiveness and success of an organization therefore lies on the people who form and work within the organization. It follows therefore that, the employees in an organization to be able to perform their duties and make meaningful contributions to the success of the organizational goals need to acquire the relevant skills and knowledge. In appreciation of this fact, organizations like educational organizations conduct continuous TD programs for the different levels of their manpower.

Vemic (2007) argues that investing in HRTD has larger business effects than investing in equipment and other material resources. Educational organizations must harmonize their approach to employee development with the changes. HRTD has to be connected with the organizational goals and strategy; they need to fulfill the new requirements of the environment. HRTD needs to become a managerial function. Some managers, however, are under the influence of prejudices such as: training is expensive, training is an expense burdening the current business, training is not rewarding, training is for the young, etc. Knowledge is expensive, but ignorance is even more expensive. Human possibilities to learn are unlimited, unless individuals do not limit their abilities within their minds.

Although such TD is of paramount importance in successfully achieving organizational objectives, they might be drastically affected if they are not carefully studied and planned to follow the systematic approaches of TD processes. According to Olaniyan and Ojo (2008), before TD
programs are conducted, organized efforts are being made through individuals and organizational appraisals to identify the training need, based on the need, objectives are formulated, and appropriate methods selected. After the TD programs, an evaluation is carried out to ascertain the effectiveness of the program in line with the need which had been identified.

In light of the above, Libanos (2008) has conducted a research on the application of the systematic approaches of TD processes in some private colleges of Ethiopia. Nevertheless, no research was conducted in the Civil Service Organizations of Afar Regional State. This is the underlining reason that initiated this study to be conducted. Therefore, this study investigated the practices of Civil Service Organizations of Afar Regional State in conducting HRTD program. To this end, this research was intended to answer the following leading questions.

1. What were the practices of the organizations in conducting TD need assessment before the implementation of the programs?
2. Do the organizations set TD objectives before it is implemented?
3. What were the TD methods or techniques employed by the organizations to train and develop their staff?
4. What were the practices of the organizations in conducting TD evaluation to assess its effectiveness?

1.3. Objectives of the Study

The specific objectives of the study were to:

1. Examine the practices of the organizations in conducting TD needs assessment before the implementation of the programs
2. Examine whether the organizations set TD objectives before it is implemented or not
3. Identify the TD methods employed by the organizations to train and develop their staff.

4. Examine the practices of the organizations in conducting TD evaluation to assess its effectiveness.

2. RESEARCH METHODOLOGY

2.1. Research Design

Descriptive survey design was employed to depict the existing TD practices of civil service organizations of Afar Regional State.

2.2. Sources of Data

The data required for this study were collected from primary sources. This was collected from the permanent employees of the organizations and some concerned officials (coordinators) of HRTD program of the organizations through the means of questionnaire and structured interview.

2.3. Sample and Sampling Techniques

Of all regional civil service organizations of Afar Regional State, five organizations namely, Education Bureau, Pastoral Agriculture Bureau, Capacity Building Bureau, Health Bureau, and Management Institute were randomly selected. Simple random sampling was used to select these organizations for the reason that all civil service organizations of Afar Regional State conduct HRTD and all of them are equally accessible in location to the organization or work place of the researchers. A total of 145 (i.e., 104 males and 41 females) Sample respondents were drawn from these organizations based on stratified random sampling. Personal interview was also made with purposively selected HRTD officials of the organizations.
2.4. Procedures of Data Collection

After closed and open ended questionnaires were prepared, it was pretested to check whether it can generate the expected information. Then, after the instrument is piloted; suggestions and recommendations learnt was incorporated and thereby redesigned. Next to this, the refined (improved) instrument was distributed to the respondents. Finally, after they were completed by the respondents, they were collected and analyzed. The interview items were also commented by experts before they were forwarded to the expected interviewees.

2.5. Data Analysis

The data were analyzed quantitatively and qualitatively. The data gathered through the closed ended questionnaire was identified, edited, tallied, and tabulated and analyzed through descriptive statistics and inferential statistics using the Statistical Package for the Social Sciences (SPSS) version 16. In descriptive statistics frequency counts, mean rank, and percentage were employed to analyze the magnitude of the respondents’ reaction for each item whereas in the inferential statistics chi-square at 0.05 alpha levels was employed. The data obtained from open ended questionnaire and interviews was also analyzed qualitatively through interpretation, description, and appreciation of facts. Finally, the results obtained through the two data gathering tools were triangulated to make the study holistic or comprehensive.

3. RESULTS AND DISCUSSION

3.1. General Practices of Training and Development in the organizations

This section deals about the practice of the organizations in offering staff TD programs. Moreover, it explores the staff’s level of
participation in the programs and the existence of responsible body accountable for coordinating and overseeing the TD program.

Table I. Respondents’ Participation in Training and Development Programs

<table>
<thead>
<tr>
<th>No</th>
<th>Items</th>
<th>Response</th>
<th>Respondents’ Category</th>
<th>Total</th>
<th>Chi-square</th>
<th>(p-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Male</td>
<td>Female</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>F %</td>
<td>F %</td>
<td>F %</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Have you had any form of training and development in your organization?</td>
<td>Yes</td>
<td>92.3</td>
<td>38</td>
<td>92.7</td>
<td>13 4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9</td>
<td>6</td>
<td>3</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>7.7</td>
<td>3</td>
<td>7.3</td>
<td>11 7.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8</td>
<td>7.7</td>
<td>3</td>
<td>7.3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>100</td>
<td>41</td>
<td>100</td>
<td>14 5</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>100</td>
<td>100</td>
<td></td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

NS= Not significant at 0.05

As shown in item 1 of table I above, respondents were asked if they had participated in any form of TD program organized in and/or outside of their organization since they joined their organization as an employee. Thus majority of them that is 96(92.4%) and 38(92.7%) of the male and female respondents respectively confirmed as they had participated in one form or the other of TD program of their organization or outside their organization. On the other hand, the remaining few respondents confirmed as they never participated. Therefore, it is fair to say that the organizations understudy facilitates HRTD programs for their staff and most of the respondents have participated. From the results of the chi-square, there was no statistically significant difference among the response of the male and female staff in their participation.

Table II. Existence of central office that coordinates the Training and Development program
In item 2 Table II above, respondents were enquired a question to indicate whether there was a central office in their organization that is accountable for coordinating and overseeing the TD program or not. Accordingly, majority, 74 (71.2%) and 32(78%) of the male and female respondents respectively replied that there was a central office in their organization that is accountable and responsible for coordinating and overseeing the TD program. The rest few of them reflected the reverse. Therefore, it is fair to say that there was a central office in the organizations that is accountable and responsible for coordinating and overseeing the TD program. From the results of the chi-square, there was no statistically significant difference among the response of the male and female respondents in their reflection.
3.2 Training and Development Processes

According to Dessler (1994), any TD program basically consists of four basic steps. It involves assessment to determine the TD needs, then, if one or more needs that can be eliminated through TD program are identified, the TD objectives should be set. In the next step, the actual TD methods are chosen and the TD takes place. Finally there should be an evaluation step in which the trainees’ pre and post training performance are compared and the effectiveness of the TD program is thus evaluated.

3.2.1. Training and Development needs assessment

According to Dessler (1994), TD needs assessment is the first and most important basic step of T&D process. Therefore, the table below shows the practices of the organizations understudy in conducting TD needs assessment.

Table III. The Practices of the conducting Training and Development Needs Assessment

<table>
<thead>
<tr>
<th>No</th>
<th>Items</th>
<th>Response</th>
<th>Respondents’ Category</th>
<th>Total</th>
<th>Chi-square</th>
<th>(p-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Male</td>
<td>Female</td>
<td>F</td>
<td>%</td>
</tr>
<tr>
<td>1</td>
<td>Before conducting the actual program of TD is there a process for</td>
<td>Yes</td>
<td>75</td>
<td>72.1</td>
<td>26</td>
<td>63.4</td>
</tr>
<tr>
<td></td>
<td>assessing TD needs in your organization?</td>
<td>No</td>
<td>28</td>
<td>26.9</td>
<td>14</td>
<td>34.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>undecided</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>10</td>
<td>100</td>
<td>41</td>
<td>100</td>
</tr>
<tr>
<td>2</td>
<td>Does your organization have a training program?</td>
<td>Yes</td>
<td>53</td>
<td>70.7</td>
<td>20</td>
<td>76.9</td>
</tr>
</tbody>
</table>
As it is shown in item 1 of Table III above, respondents were asked to reflect whether there was a process for assessing the TD needs before conducting TD program in their organization or not. Hence, majority of them, that is 75 (72.1%) and 26(63.4%) of the male and female respondents respectively confirmed that there was a process of assessing TD needs before conducting the TD program. The rest few replied as the practice of needs assessment was not there. However, one male and one female were not sure whether it is conducted or not. Therefore, it can be pointed out that the practice of conducting needs assessment before conducting the actual TD program was in place. From the results of the chi-square, there was no statistically significant difference among the response of the male and female respondents in their response. Similarly, the result of the interview indicated that, though it was not much satisfactory, concerned bodies of the organizations attempted to conduct TD needs assessment based on the skill gap of the employees.

Since conducting a need assessment is not an end by itself, those respondents who agreed on the fact that there was a practice of assessing the TD needs before conducting the TD program in their organization were asked further question to reflect whether their organization implement the chosen TD needs accordingly or not in item 2 of the same table. Hence, majority of them, that is 53 (70.7%) and 20(76.9%) of the male and female respondents respectively confirmed that their organization implement the chosen staff TD needs accordingly. The rest few respondents replied the reverse. From the
results of the chi-square, there was no statistically significant difference among the response of the male and female respondents in their response. According to the result obtained from items 1 and 2 of table 4, it can be understood that TD needs assessment was conducted and the organizations implement the chosen TD needs accordingly.

3.2.2. Setting Training and Development objectives

According to Dessler’s (1994) model, setting TD objectives is the second basic step of TD process. Once TD needs assessment is made at the first step, objective of the TD should be drawn. Therefore the practices of the organizations in setting TD objectives are shown below.

Table IV. The Practice of Setting TD Objectives in the Organizations

<table>
<thead>
<tr>
<th>No</th>
<th>Items</th>
<th>Response</th>
<th>Respondents’ Category</th>
<th>Total</th>
<th>Chi-square</th>
<th>(p-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Male</td>
<td>Female</td>
<td>Total</td>
<td>F</td>
<td>%</td>
</tr>
<tr>
<td>1</td>
<td>Does your organization set TD objectives before the design and implementation of the TD program?</td>
<td>Yes</td>
<td>80</td>
<td>32</td>
<td>112</td>
<td>76.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>23</td>
<td>8</td>
<td>31</td>
<td>22.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>undecided</td>
<td>1</td>
<td>1</td>
<td>2.4</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>104</td>
<td>41</td>
<td>145</td>
<td>100</td>
</tr>
<tr>
<td>2</td>
<td>Does the objective indicate the expected outcomes of the T&amp;D program?</td>
<td>Yes</td>
<td>68</td>
<td>28</td>
<td>96</td>
<td>85</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>12</td>
<td>4</td>
<td>16</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td></td>
<td>undecided</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>80</td>
<td>32</td>
<td>112</td>
<td>100</td>
</tr>
<tr>
<td>3</td>
<td>Are the T&amp;D objectives communicated to the trainees?</td>
<td>Yes</td>
<td>65</td>
<td>24</td>
<td>89</td>
<td>65</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>15</td>
<td>8</td>
<td>23</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>undecided</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>80</td>
<td>32</td>
<td>112</td>
<td>100</td>
</tr>
</tbody>
</table>
NS = Not significant at 0.05 level

As indicated in item 1 table IV above, respondents were asked whether their organization set TD objectives before the design and implementation of the TD program or not. Thus, majority that is 80 (76.9%) and 32(78%) of the male and female respondents confirmed that their organization set TD objectives before the design and implementation of the program. Only 23 (22.1%) and 8(19.5%) of the male and female respectively reflected as their organization did not set. However 2(1.4%) of the respondents could not decide. Therefore, it is fair to say that the organizations set TD objectives before the design and implementation of the TD program. From the results of the chi-square, there was no statistically significant difference among the response of the male and female respondents in their response.

Respondents who believe the fact that their organization set T&D objectives before the design and implementation of the T&D program were also asked if the T&D objectives indicate the expected outcome of the program in item 2 of the same table above. Hence, majority of them, 68 (85%) and 28 (87.5%) of the male and female respondents respectively, agreed that the T&D objectives undertaken by their organization indicated the expected outcome of the program. The rest few reflected as the T&D objectives did not indicate the expected outcome of the program. Therefore, most of the male and female respondents agreed about the fact that the T&D objectives indicated the expected outcome of the program at no any statistical difference among the response of the male and female respondents.

In T&D, it is also good to have trainees know the objectives for each program they participate in. Thus, the respondents were asked in item No 3 of table IV if the objectives were communicated to them or if they were clear about the objectives of each T&D program in which they participated in. Thus, vast majority that is 65 (81.2%) and 24 (65%) of
the male and female respondents respectively replied that the T&D objectives were communicated, clearly defined and stated to them. The rest few respondents reflected the reverse. Therefore, it can be concluded that most of the staff agreed on the point that the T&D objectives were communicated and clearly defined and stated in the organizations at no statistically significant level of difference among the response of the male and female respondents. This result contradicts with the finding of Laing (2009) in which 74.5% of the respondents were not clear about the objectives of the T&D provided by their organization.

3.2.3. Methods of training and development

Good TD initiatives often feature a combination of several different methods that blended together produce one effective TD program. Therefore, this part deals with the rank order of on the job as well as off the job TD methods according to the frequency or recurrence of these methods application in the organizations understudy.

Table V. Rank order of Training and Development Methods Applied in The Organizations

<table>
<thead>
<tr>
<th>No</th>
<th>Method’s Category</th>
<th>Methods</th>
<th>Total</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mean</td>
<td>Rank</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>On the job methods</td>
<td>Mentoring</td>
<td>3.84</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>induction training</td>
<td>4.23</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>learning by doing</td>
<td>2.92</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>job rotation</td>
<td>2.46</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>apprentice ship</td>
<td>2.30</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Off the job methods</td>
<td>Lecture</td>
<td>7.68</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Seminar</td>
<td>7.02</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Audiovisual</td>
<td>6.73</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>
The table above contains lists of on the job as well as off the job TD methods so that respondents rank them according to the frequency or recurrence they are applied in their organization. For the methods under on the job category, they ranked 1-5 while for methods under off the job category, they ranked 1-9. The response of each individual was given a score in such a way that the highest value was given to the first priority. That means for the items which was ranked first by the respondents in the on the job methods category was given score of 5 since there were 5 items to be ranked where as for the item ranked first by individual respondent in the off the job category was given score of 9 since there were 9 items to be ranked. Finally, the total scores were added and mean score was calculated and they were ranked accordingly.

At the first methods category (i.e., on the job TD methods), the ranking of the responses showed that induction training is considered as it was the most frequently applied. As a result, it was ranked first. This is closely followed by mentoring, which is ranked second. Next is learning by doing, which is ranked third. This is followed by job rotation (ranked fourth) lastly apprenticeship was ranked respectively; whereas for methods under off the job category, the ranking of the responses showed that lecture was considered as it is applied most frequently as a result it was ranked first. This is closely followed by seminar, which is ranked second. Next is audiovisual training, which is ranked third. This is followed by conference, role play, and simulation, etc which were
ranked as the fourth, fifth and sixth respectively. Majority of the interviewees also reflected the same with the stated methods

3.2.4. Training and Development Evaluation

Evaluation of the TD programs is a step that will indicate feedback on the effectiveness of the trainee, trainer and the training program. Therefore, this section deals with the practice of the organizations in conducting TD evaluation activities before, during, and after the program.

Table VI. The Practice of Conducting Different Activities of TD Evaluation in the organizations

<table>
<thead>
<tr>
<th>No</th>
<th>Items</th>
<th>Response Category</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
<th>Chi-square</th>
<th>(p-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Are the results of training programs monitored and evaluated before</td>
<td>Yes</td>
<td>27</td>
<td>F 26.0</td>
<td>8</td>
<td>35</td>
<td>1.572</td>
</tr>
<tr>
<td></td>
<td>and after the TD session in your organization?</td>
<td>No</td>
<td>75</td>
<td>F 72.1</td>
<td>3</td>
<td>10</td>
<td>74.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>undecided</td>
<td>2</td>
<td>F 1.9</td>
<td>0</td>
<td>2</td>
<td>1.4</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td>10</td>
<td></td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Does your organization arranges formal assessment program to get</td>
<td>Yes</td>
<td>24</td>
<td>F 23.1</td>
<td>7</td>
<td>31</td>
<td>1.039</td>
</tr>
<tr>
<td></td>
<td>feedback from the trainees</td>
<td>No</td>
<td>79</td>
<td>F 76.0</td>
<td>3</td>
<td>11</td>
<td>77.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>undecided</td>
<td>1</td>
<td>F 1.1</td>
<td>1</td>
<td>2</td>
<td>1.4</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td>10</td>
<td></td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>
As it is clearly depicted in item 1 of table 6 above, a question was posed to respondents whether the results of TD programs were monitored and evaluated before, during, and after the TD session in their organization. Thus, overwhelming majority of the respondents, that is 75 (72.1%) and 33(80.5%) of the male and female respondents respectively asserted that the results of TD programs were not monitored and evaluated before, during, and after the TD session in their organization. On the other hand, 27 (26%) and 8(19.5%) of the male and female respondents respectively revealed the reverse. 2(1.4%) respondents couldn’t decide. This clearly depicts that the results of TD programs were not monitored and evaluated before, during, and after the TD session in organization. From the results of the chi-square, there was no statistically significant difference among the response of the male and female respondents in their response. The result of the interview also coincides with this finding. Majority of the interviewees assured that monitoring and evaluation of the TD process before, during, and after it is conducted was lacking. Furthermore, due to lack of time and some workloads, the TD programs undertaken in the organizations were not monitored to ensure that they were practiced as prescribed.
In item 2 of the same table respondents were asked to show whether their organization arranges formal assessment program to get feedback from trainees. Hence, vast majority of them that is 79 (76%) and 33(80.5%) of the male and female respondents respectively revealed that it does not arrange while the rest few and negligible number of them replied the reverse and undecided respectively. From the results of the chi-square, there was no statistically significant difference among the response of the male and female respondents in their response. Therefore, the majorities of the respondents clearly asserted that their organization did not arrange formal assessment program to get feedback from trainees.

Regarding item 3 of table VI, respondents were also asked to show whether their organization applies focus group sessions, interview, oral or written tests, questionnaires etc to know the trainees’ reactions to the TD program or not. Accordingly, most of them that is 80 (76.9%) and 31(75.6%) of the male and female respondents respectively revealed that it never holds where as the rest few respondents indicated the reverse. Therefore, it is possible to conclude that the organizations did not applies focus group sessions, interview, oral or written tests, questionnaires etc to know the trainees’ reactions. From the results of the chi-square, there was no statistically significant difference among the response of the male and female respondents in their response.

4. CONCLUSIONS AND RECOMMENDATIONS

4.1. Conclusions

In light of the findings, the following conclusions were drawn.

i. The organizations under study have conducted a number of TD programs and most of the staff have participated.
ii. The organizations understudy could not strictly follow all the systematic approaches of TD processes. The implementation of these systematic approaches is shown as follows:

- The results obtained from the study revealed that there was a practice of conducting TD needs assessment in the organizations and it was implemented accordingly.

- The TD objectives were set before the design and implementation of the TD program of the organizations. These objectives were clearly communicated to the trainees and could indicate the expected outcome of the TD program.

- Different kinds of on-the-job TD methods such as, mentoring, learning by doing, job rotation, and apprenticeship respectively etc. as well as off the job methods such as lecture, seminar, audiovisual training, conference, role playing, simulation training, and sensitivity training respectively etc. were selected to train and develop the trainees.

- The result of the analysis obtained revealed that there was no activity of monitoring and evaluation before, during, and after the TD program in the organizations.

4.2. Recommendations

i. Human resource training and development (HRTD) officers and other concerned bodies of the organizations should take a closer look at how they can best empower their employees and give them access to continuous TD opportunities in order to enhance their effectiveness.

ii. TD officers and other concerned bodies of the organizations should see the cost of TD as an investment. Therefore, the economic policy should initiate these organizations to invest resources, including time and money to ensure that employees have the information,
skills, and competencies they need to work effectively in their organization.

iii. HRTD should not run emotionally but thoughtfully. HRTD officers and other concerned bodies of the organizations should enact a policy that leads to follow the four basic systematic approaches which generally follows a sequence of activities involving the establishment of need assessment, followed by setting TD objective, selecting TD methods, and finally conducting evaluation and training feedback for further action.

iv. To see their picture of yesterday’s TD effectiveness and decide what should be tomorrow, HRTD officers and other concerned bodies of the organizations should develop TD follow-up mechanism and TD evaluation.

v. It is also recommended that TD officers and other concerned bodies should assess the organizational problems at ground and should alleviate all or at least to minimize the bottle necks of HRTD in their organization.

References


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FINANCIAL SUPPORT AND SERVICE REQUIREMENTS OF THE SHG WOMEN ENTREPRENEURS

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Abstract

Finance is the life blood of any enterprise. It is the back bone of any entrepreneurial activity by the SHG women though their requirement is less as compared to other non-SHG women entrepreneur. Guntur district of Andhra Pradesh state is purposively selected for the present study. The district has three revenue divisions (RDs) namely, Tenali (forward revenue division), Guntur (moderate revenue division) and Narasaraopet (backward revenue division). Out of three revenue divisions two divisions such as forward revenue division (Tenali) and backward revenue division (Narasaraopet) have been selected. The present study is a pioneering attempt to study of the effectiveness the financial support service requirements of the Self Help Groups and the constraints in getting them of through an exploratory research. Based on the primary information provided by the DRDA 120 SHGs from backward revenue division and another 120 SHGs from forward revenue division area were chosen for the study accounting for more than 1 per cent of the total. The study found that the SHG women entrepreneurs affirm that they face problems from banks and institutions in securing finance.

Keywords: SHGs, Women, Entrepreneurs, Finance, Institutions, Banks

Introduction:

Entrepreneurship development in India has received much attention during the past few years. Several policies, programmes and institutional schemes have been formulated to support promotion and development of entrepreneurship among women in India. The network of institutions established under the auspicious of government to support Self Help Group women entrepreneurs drives home an observation that a number of institutions are functioning with the
same objective direction serving the same target group. This multiplicity of institutions does not help women to better their entrepreneurial performance. Even though institutions have been developed for assistance in financial, technological upgradation, consultancy, training, marketing etc, assistance provided by the institutions has been limited only to financial assistance and training at the time of promotion of the enterprise.

Finance is the life blood of any enterprise. It is the back bone of any entrepreneurial activity by the SHG women though their requirement is less as compared to other non-SHG women entrepreneur.

**Objectives of the Study**

The specific objectives are as follows:

1. to study the financial support service requirements of the Self Help Group women entrepreneurs and the constraints in getting them; and

2. to forward such suggestions those reinvigorate the spirit of entrepreneurship among women Self Help Groups in Guntur district.

**Methodology**

The present study is a pioneering attempt to study of the effectiveness the financial support service requirements of the Self Help Groups and the constraints in getting them of through an exploratory research. A structured interview schedule is used to elicit the profile of financial support of the Self Help Group women entrepreneurs, their competencies for the survival of the group and various support service requirements.

Guntur district of Andhra Pradesh state is purposively selected for the present study. Moreover, Guntur district has been on par with the other leading districts of the state, so far as the coverage of Self Help Groups assistance is concerned. Guntur district has three revenue divisions’ viz., Tenali (forward revenue division), Guntur (moderate revenue division) and Narasaraopet (backward revenue division). No study of this sort has been conducted so far in the district. The study is about the informal sector where the women members of the SHGs who initially worked as thrift group and are now able to run
an enterprise on their own individually or as a group. Based on the primary information provided by the DRDA 120 SHGs from backward revenue division and another 120 SHGs from forward revenue division area were chosen for the study accounting for more than 1 per cent of the total. The study purposively selected the sample respondents as one respondent from each group. So, the total sample size is 240 respondents from 240 groups from two revenue divisions.

Analysis and Discussion

Financial resources for starting the entrepreneurial activity:

The financial resources profile is studied by taking the financial requirement at the startup and the finance required for running the day to day activities of the enterprise. Table -1 shows the sources of finance for starting the entrepreneurial activity of the sample SHG women entrepreneurs. As evident from the table different sources of finance for starting entrepreneurial activity by the SHG women consist of loan from the commercial banks, own assets of the members, and loan from group it self to the members. It can be seen that the loan from banks to the SHG groups is the single largest source of finance. As evident from the fact that, the loan from bank constitute 80.84 per cent in the total resources for starting up the SHG entrepreneurial activity. And it is followed by own assets of the members (10.83 per cent) and the loan from the groups to its members (7.50 per cent). In the forward and the backward revenue divisions respectively loan from the banks, as a dominant source of finance for starting the SHG entrepreneurial activity constitute 76.67 per cent and 85 per cent respectively. Moreover, the chi-square value of 14.700 at a level of significance 0.001 denotes that there is significant association with respect to the sources of finance for starting the entrepreneurial activity by SHG women in the two revenue divisions.

Type of institutions providing financial support to the SHG:

Table -2 depicts the type of institutions that provide financial support to the SHG women entrepreneurs. It can be seen from the table that, commercial banks are reported by 74.63 per cent of SHG women as the major institutions providing financial support to the SHG women entrepreneurs. The regional rural banks (13.17 per cent), state financial corporations (8.78 per cent) and other financial institutions (3.42 per cent) follow. The scenario is the almost similar
both in the case of forward and backward revenue divisions respectively
where commercial banks are reported by 86.17 per cent and 64.17 per
cent of the SHG women entrepreneurs as providing financial support.
It can be observed through the analysis that, the commercial banks
followed by regional rural banks stand as the major providing financial
support to the SHG women entrepreneurs.

Table -1: Sources of finance for starting the entrepreneurial
activity

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Financial resources</th>
<th>Forward Revenue Division</th>
<th>Backward Revenue Division</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>No. of Respondents</td>
<td>Per cent</td>
<td>No. of Respondents</td>
</tr>
<tr>
<td>1.</td>
<td>Own assets of members</td>
<td>10</td>
<td>8.33</td>
<td>16</td>
</tr>
<tr>
<td>2.</td>
<td>Loan from banks for the group</td>
<td>92</td>
<td>76.67</td>
<td>102</td>
</tr>
<tr>
<td>3.</td>
<td>Loan from family</td>
<td>2</td>
<td>1.67</td>
<td>Nil</td>
</tr>
<tr>
<td>4.</td>
<td>Loan from group to its members</td>
<td>16</td>
<td>13.33</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>120</strong></td>
<td><strong>100.00</strong></td>
<td><strong>120</strong></td>
</tr>
</tbody>
</table>

Source: Survey
Note: Figures in parenthesis are percentages.
Chi-Sq = 14.700, P-Value = 0.001
Table - 2: Type of institutions providing financial support to the SHG women entrepreneurs

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Type of institutions</th>
<th>Forward Revenue Division</th>
<th>Backward Revenue Division</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>No. of Respondents</td>
<td>Per cent</td>
<td>No. of Respondents</td>
</tr>
<tr>
<td>1.</td>
<td>Commercial Banks</td>
<td>81</td>
<td>86.17</td>
<td>72</td>
</tr>
<tr>
<td>2.</td>
<td>Regional Rural Banks</td>
<td>8</td>
<td>8.50</td>
<td>19</td>
</tr>
<tr>
<td>3.</td>
<td>State Financial Corporations</td>
<td>2</td>
<td>2.13</td>
<td>16</td>
</tr>
<tr>
<td>4.</td>
<td>Other Financial Institutions</td>
<td>3</td>
<td>3.20</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>94</td>
<td>100.00</td>
<td>111</td>
</tr>
</tbody>
</table>

Source: Survey  
Note: Figures in parenthesis are percentages.  
Rank Correlation = 0.800, P-Value = 0.200.

Type of problems faced in the process of financing:

Some important problems faced by women entrepreneurs from the banks are sanction of loan, under finance providing collateral security, unique delay and disbursement after training, etc. Out of 120 sample respondents of forward revenue division, about 37 respondents (30.88 per cent) reported that they are facing the problems from banks in the process of financing. Whereas in the backward revenue division it is 59 respondents i.e. 49.17 per cent. Table -3 analyses the type of problems that have been faced from the financial institutions by the sample SHG women entrepreneurs. As evident from the table the major
problems reported by 50 per cent of the SHG women entrepreneurs is with regard to the sanction of loan followed by the problems of under financing (29.17 per cent) and undue delay and procedures in loan disbursement (11.46 per cent). The intensity of the problem with respect to the sanction of loan and under financing is observed greater in the case of the SHG women entrepreneurs in the backward revenue division compared to those in the forward revenue division. It is evident from the fact that 62.71 per cent is in the backward revenue division, as against 29.73 per cent is in the forward revenue division reported the problem regarding to sanction of loan. Moreover, 30.51 per cent of the SHG women entrepreneurs in the backward revenue division, as against 27.03 per cent is in the forward revenue division reported the problem of under finance. In addition, the problem undue delay and procedures in disbursement of loan has been reported and more in its intensity in the forward revenue division compared to that in the backward revenue division.

Table -3: Facing any problems from banks in the process of financing of the SHG women entrepreneurs

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Response</th>
<th>Forward Revenue Division</th>
<th>Backward Revenue Division</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>No. of Respondents</td>
<td>Per cent</td>
<td>No. of Respondents</td>
</tr>
<tr>
<td>1</td>
<td>Yes</td>
<td>37</td>
<td>30.83</td>
<td>59</td>
</tr>
<tr>
<td>2</td>
<td>No</td>
<td>83</td>
<td>69.17</td>
<td>61</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>120</td>
<td>100.00</td>
<td>120</td>
</tr>
</tbody>
</table>

Source: Survey

Note: Figures in parenthesis are percentages.

Chi-Sq = 8.403, P-Value = 0.004
Gap between loan sanction and release:

All loans sanctioned under the SHGs are to be treated as advances under priority sector. Loans sanctioned should ordinarily be released within a period of 15 days and in any case not later than one month from the date of receipt of the application. Table -4 reveals the gap between loan sanction and release to the sample SHG women entrepreneurs. As evident from the table in a majority of 44.58 per cent of the cases are there and 45.83 per cent is in the forward revenue division in 43.33 per cent is in the backward revenue division the gap between the sanction of loan and its release is 15-25 days. In 30.84 per cent of the cases it is more than 35 days. Moreover, the proportion of the SHG women entrepreneurs who reported the gap between the sanction and release of the loan is more than 35 days 35.84 per cent is in the backward revenue division, as against 25.84 per cent is in the forward revenue division. On the whole it can be surmised that the gap between the loan sanction and the release is reported as more than the reasonable period of 15 days by a greater proportion of 75.42 per cent of the SHG women. Only 24.58 per cent of the total SHG women entrepreneurs only reflected that the gap between the loan sanction and release is within 15 days. In this regard, there is no significant association between the forward and backward revenue divisions as evident from the calculated chi-square value of 3.403.

Table -4: Gap between loan sanction and disbursement to the SHGs

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Response (in days)</th>
<th>Forward Revenue Division</th>
<th>Backward Revenue Division</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. of Respondents</td>
<td>Per cent</td>
<td>No. of Respondents</td>
<td>Per cent</td>
</tr>
<tr>
<td>1.</td>
<td>&lt; 15 days</td>
<td>34</td>
<td>25</td>
<td>28.33</td>
</tr>
<tr>
<td>2.</td>
<td>15-25 days</td>
<td>55</td>
<td>52</td>
<td>45.83</td>
</tr>
</tbody>
</table>
Group Life Insurance (GLI):

The member of the Self- Help Groups aged not less than 18 years and not more than 60 years are covered under a GLI Scheme being provided by the Life Insurance Corporation (LIC). This scheme comes into operation from the date on which the asset is disbursed to the SHG member till she completes the age of 65 years or a period of 5 years from the date of commencement of the cover whichever is earlier. A sum of ₹ 6, 000 in case of natural death and ₹ 12, 000 in case of accidental death shall be payable to the nominee of the diseased SHG member. Table -5 presents the involvement of SHG members in the group life insurance. As evident from the table 100 per cent of the members of SHG groups are observed involved in the group life insurance both from the forward and backward revenue divisions.

Table -5:Involvement of Group Life Insurance of the SHG women entrepreneurs

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Response</th>
<th>Forward Revenue Division</th>
<th>Backward Revenue Division</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>No. of Respondents</td>
<td>Per cent</td>
<td>No. of Respondents</td>
</tr>
<tr>
<td>1.</td>
<td>Yes</td>
<td>120</td>
<td>100.00</td>
<td>120</td>
</tr>
<tr>
<td>2.</td>
<td>No</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>120</td>
<td>100.00</td>
<td>120</td>
</tr>
</tbody>
</table>

Chi-Sq = 3.403, DF = 2, P-Value = 0.182
Business insurance cover of an enterprise:

Like in any other business, an enterprise of SHG women entrepreneurs created out of loan are prone to various risks such as cyclones, floods, earthquake, famine conditions, fire, war, riots and strikes diseases etc. In the event of such accidents of the assets may be damaged partially or fully. Besides loan default, such conditions also impair an enterprise of the women entrepreneurs. As the loan becomes overdue, the SHG women entrepreneurs will become ineligible for further assistance, which they may require actually to re-establish their activity. Coverage of the SHG women enterprises under the insurance is presented in Table -6. As evident from the table all the cent per cent of the SHG women entrepreneurs are reported to have covered their enterprises under the insurance cover for various risks.

Table -6: Insurance cover of an enterprise of the SHG women entrepreneurs

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Insurance cover of an enterprise</th>
<th>Forward Revenue Division</th>
<th>Backward Revenue Division</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>No. of Respondents</td>
<td>Per cent</td>
<td>No. of Respondents</td>
</tr>
<tr>
<td>1.</td>
<td>Yes</td>
<td>120</td>
<td>100.00</td>
<td>120</td>
</tr>
<tr>
<td>2.</td>
<td>No</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>120</td>
<td>100.00</td>
<td>120</td>
</tr>
</tbody>
</table>

Source: Survey Note: Figures in parenthesis are percentages.
Satisfaction with the terms and conditions of the loan:

Table -7 indicates the satisfaction with the terms and conditions of the loan by the sample SHG women entrepreneurs. It can be seen from the table that, a majority of 55.42 per cent of the SHG women entrepreneurs stated that they satisfied with the terms and conditions of the loan whereas 11.67 per cent of them only are dissatisfied. Moreover, the proportion of SHG women entrepreneurs who are satisfied with the terms and conditions of the loan is 62.50 per cent is in the forward revenue division as against 48.33 per cent is in the backward revenue division. Further, the chi-square value of 11.328 reveals that there is a significant association between the two revenue divisions with respect to the satisfaction of the SHG women entrepreneurs with terms and conditions of the loan.

Table -7: Satisfaction with the terms and conditions of the loan

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Response</th>
<th>Forward Revenue Division</th>
<th>Backward Revenue Division</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>No. of Respondents</td>
<td>Per cent</td>
<td>No. of Respondents</td>
</tr>
<tr>
<td>1.</td>
<td>Satisfied</td>
<td>75</td>
<td>62.50</td>
<td>58</td>
</tr>
<tr>
<td>2.</td>
<td>Dissatisfied</td>
<td>6</td>
<td>5.00</td>
<td>22</td>
</tr>
<tr>
<td>3.</td>
<td>No idea</td>
<td>39</td>
<td>32.50</td>
<td>40</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>120</td>
<td>100.00</td>
<td>120</td>
</tr>
</tbody>
</table>

Source: Survey  
Note: Figures in parenthesis are percentages.

Chi-Sq = 11.328, DF = 2, P-Value = 0.003

Repayment of the Loan:

Loan amount repaid highly depends on the economic condition and debt repaying attitude, ability and habit of the respondents. Annual income of the respondent, expenditure of the respondent
household, total number of earning members in the family, business
status and debt burden of the respondents, no doubt, also generally
affect the repayment of the loan. Due to the reasons personal, familial
and circumstantial, the SHG women entrepreneurs are observed that,
the loan amount is repaid by them from different money sources. To
reflect on this, the information is elicited and presented in Table -8. As
evident from the table a majority of 84.17 per cent of the women
entrepreneurs are observed repaying from their income generated from
given asset followed by 6.67 per cent from existing from old savings and
5.83 per cent by borrowings from money lenders. Further, both in the
forward and backward revenue divisions, repayment of loan through
the income generated from the given asset stands major as evident
from the fact that 85 per cent of the SHG women entrepreneurs from
the forward revenue division and 83.33 per cent from the backward
revenue division have been observed repaying their loan only from the
income generated from the given asset. Moreover, the chi-square value
of 15.163 denotes that there is an association between the forward and
backward revenue divisions regarding to the sources of repayment of
loan by SHG women entrepreneurs.

Table -8: Source for the repayment of the loan by the sample
respondents

<table>
<thead>
<tr>
<th>S. No.</th>
<th>The loan re-paid by</th>
<th>Forward Revenue Division</th>
<th>Backward Revenue Division</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>No. of Respondents</td>
<td>Per cent</td>
<td>No. of Respondents</td>
</tr>
<tr>
<td>1.</td>
<td>Through income generated from given asset</td>
<td>102</td>
<td>85.00</td>
<td>100</td>
</tr>
<tr>
<td>2.</td>
<td>Existing old saving</td>
<td>8</td>
<td>6.67</td>
<td>8</td>
</tr>
<tr>
<td>3.</td>
<td>Borrowing from money lender</td>
<td>2</td>
<td>1.67</td>
<td>12</td>
</tr>
</tbody>
</table>
Reasons for failure in repaying the loan:

The Self Help Group women entrepreneurs in small and micro enterprise sector borrow year by year, but they found that they are not in a position to regularly clear off the loans because of the insufficiency or non-availability of the funds or the low returns generated from the business. The main cause for indebtedness of the SHG micro entrepreneurs is the gap in the income generation and the interest on the business. Secondly, the moneylenders are responsible to some extent for the indebtedness. The funds provided by the banks are not sufficient and these people are more interested in borrowing the money from moneylender on mortgage of their assets, which in turn intensify the indebtedness and consecutively force loose the mortgaged asset to the moneylenders. Table -9 presents the reasons for regular repayment or inability to repay the loan by the SHG women entrepreneurs. As evinced in the table a majority of 57.50 per cent of the SHG women entrepreneurs stated good business as the soul reason for the regular repayment. It is the case both with the forward and backward revenue divisions where 62.50 per cent and 52.50 per cent respectively of the SHG women entrepreneurs stated that they are able to repay the loan regularly because their business is good. On the other hand, among the reasons stated for non repayment or irregular payment of the loan are heavy competition (10.83 per cent), absence of support from the Government (23.34 per cent), lack of infrastructure facilities (5 per cent) and lack of demand for the product (3.33 per cent). With respect to the reasons stated by the SHG women entrepreneurs for repayment or non payment of the loan amount there is an association between the forward and backward revenue divisions as evident from the chi-square value of 12.009.

<table>
<thead>
<tr>
<th>No response</th>
<th>8</th>
<th>6.66</th>
<th>Nil</th>
<th>0</th>
<th>8 (3.33)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>120</td>
<td>100.00</td>
<td>120</td>
<td>100.00</td>
<td>240 (100.00)</td>
</tr>
</tbody>
</table>

Source: Survey  Note: Figures in parenthesis are percentages.

Chi-Sq = 15.163, P-Value = 0.002
### Table -9: Reasons for repayment or non-payment by the sample respondents

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Reasons for paid or non-paid by</th>
<th>Forward Revenue Division</th>
<th>Backward Revenue Division</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>No. of Respondents</td>
<td>Per cent</td>
<td>No. of Respondents</td>
</tr>
<tr>
<td>1.</td>
<td>Business is good</td>
<td>75</td>
<td>62.50</td>
<td>63</td>
</tr>
<tr>
<td>2.</td>
<td>Lack of demand for the product</td>
<td>4</td>
<td>3.33</td>
<td>4</td>
</tr>
<tr>
<td>3.</td>
<td>Lack of facilities and infrastructur e</td>
<td>4</td>
<td>3.33</td>
<td>8</td>
</tr>
<tr>
<td>4.</td>
<td>Competition is heavy</td>
<td>18</td>
<td>15.00</td>
<td>8</td>
</tr>
<tr>
<td>5.</td>
<td>Absence of support from the Government</td>
<td>19</td>
<td>15.84</td>
<td>37</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>120</td>
<td>100.00</td>
<td>120</td>
</tr>
</tbody>
</table>

**Source:** Survey  
**Note:** Figures in parenthesis are percentages.  
Chi-Sq = 12.009, P-Value = 0.017
Findings

- It is observed that the loan from bank constitutes 80.84 per cent in the total resources for starting the SHG entrepreneurial activity and it is followed by own assets of the members (10.83 per cent) and the loan from the groups to its members (7.50 per cent).

- It is observed that 40 per cent of the SHG women entrepreneurs affirm that they face problems from banks and institutions in securing finance. The proportion of SHG women, reported that facing the problems from banks and institutions in securing finance is greater at 49.17 per cent in the backward revenue division as compared to 30.83 per cent in the forward revenue division.

- It is found that the major problems reported by 50 per cent of the SHG women entrepreneurs is with regard to the sanction of loan followed by the problems of under financing (29.17 per cent) and undue delay and procedures in loan disbursement (11.46 per cent). Further, it is found that the intensity of the problem with respect to the sanction of loan and under financing is observed greater in the case of the SHG women entrepreneurs in the backward revenue division compared to those in the forward revenue division. It is observed that 62.71 per cent in the backward revenue division, as against 29.73 per cent in the forward revenue division reported the problem regarding sanction of loan.

- It is observed that in the case of not less than 46 per cent is in forward revenue division and a little over 43 per cent is in the backward revenue division the gap between the sanction of loan and its release is 15-25 days. In 30.84 per cent of the cases it is more than 35 days. Moreover, the proportion of the SHG women entrepreneurs who reported the gap between the sanction and release of the loan is more than 35 days as stated by 35.84 per cent in the backward revenue division, as against 25.84 per cent in the forward revenue division. On the whole, it can be surmised that the gap between the loan sanction and the release is reported as more than the reasonable period of 15 days by a greater proportion of 75.42 per cent of the SHG women as only
24.58 per cent of the total SHG women entrepreneurs only reflected that the gap between the loan sanction and release is within 15 days.

- It is observed that 89.58 per cent of the SHG women entrepreneurs stated that there is no insistence on security for the loan by the banks. Same phenomenon is reflected both in forward and backward revenue divisions as 98.33 per cent in the forward revenue division in relation to 80.83 per cent in the backward revenue division opined that the banks do not insist on security for the loan sanction.

- It is found that a majority of 55.42 per cent of the SHG women entrepreneurs stated satisfied with the terms and conditions of the loan whereas 11.67 per cent of them only are dissatisfied. Further, it is found that the proportion of SHG women entrepreneurs who are satisfied with the terms and conditions of the loan is 62.50 per cent in the forward revenue division as against 48.33 per cent in the backward revenue division.

- It is found that a majority of 84.17 per cent of the women entrepreneurs are observed repaying from their income generated from given asset followed by 6.67 per cent from existing savings and 5.83 per cent by borrowings from money lenders. Further, it is found that both in the forward and backward revenue divisions, repayment of loan through the income generated from the given asset stands major as it is evident from the fact that 85 per cent of the SHG women entrepreneurs from the forward revenue division and 83.33 per cent from the backward revenue division have been observed repaying their loan only from the income generated from the given asset.

- It is found that a majority of 57.5 per cent of the SHG women entrepreneurs stated good business as the sole reason for the regular repayment. Among the reasons stated for non repayment or irregular payment of the loan are heavy competition (10.83 per cent), absence of support from the government (23.34 per cent), lack of infrastructure facilities (5 per cent) and lack of demand for the product (3.33 per cent).
Suggestions

- It is opined both in the forward and the backward revenue divisions the loan from the banks, is found to be dominant source of finance for starting the SHG entrepreneurial activity. The financial institutions such as banks and other funding agencies should provide sufficient financial assistance to the SHG women entrepreneurs on in time.

- The proportion of SHG women, reported facing problems from banks and institutions in the process of financing, is greater in the backward revenue division as compared to forward revenue division. Since SHG women enterprises are economically weak subsidy and assistances offered to small enterprises should not only be continued but also be improved. The government can play a positive role in creating terms and conditions for removing such barriers by encouraging banks to give special business loans to successful SHG women entrepreneurs in the backward revenue division.

- The intensity of the problem with respect to the sanction of loan and under financing is observed greater in the case of the SHG women entrepreneurs in the backward revenue division compared to those in the forward revenue division. Major problems reported by the SHG women entrepreneurs are with regard to the sanction of loan and under finance. The adoption of timely procedure for sanctioning of loans for SHG women entrepreneurs would avoid time-lags and following the scientifically fixed scale of finance norms and financing accordingly would avoid the problem of under financing.

- The loaning procedure should be simplified and streamlined to reduce the time gap between applying, sanctioning and release for the loan. The sanctioning authority and bankers should discuss and simplify the loaning procedure so that the SHG women entrepreneurs could be facilitated to obtain sufficient financial assistance within 15 days in the backward revenue division as stipulated by the funding agencies.

- Support to existing units should be provided in the form of credit guarantee, subsidized loans, sponsoring marketing
consortium etc. Technological upgradation of existing units should also be made considerably in Guntur district.

References


EFFECT OF ADDITION OF NANOADDITIVES ON COMBUSTION, PERFORMANCE AND EMISSION CHARACTERISTICS OF BIODIESEL AND ITS BLENDS-A REVIEW

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Abstract:

The importance given to biodiesel in CI diesel engines has gained much attention over past decades, due to its various environmental and economical benefits than conventional fuel. This paper discusses the review of effect of different nanoadditives on combustion, performance and emission characteristics of CI diesel engine fuelled with biodiesel and also with different blends of biodiesel. This study is based on the previous research articles published. Many researches are carried out with nanoparticles as additives in biodiesel to improve the thermo physical properties. Based on the results available in the literature, it has been found that by using nanoadditives with blend of biodiesel, the combustion, performance and emission characteristics were improved and the exhaust emissions were reduced significantly. In this paper, several observations made from the literatures are listed on combustion, performance and emission characteristics and a detailed summary are reported in the conclusion.
I. INTRODUCTION

About 95% of energy requirements all over the world are derived from conventional non-renewable energy sources. It is estimated that these reserves are not going to last for not more than 50 years. Hence there comes the problem of energy crisis. In this context of fossil fuel crisis, the importance of alternative fuel research for Internal Combustion engines needs importance. Diesel engines have been widely used in power generation sector, heavy load carriers and public transport due to their high reliability and performance. There exists two main challenges to hold their positioning as one of the most common power generators. The first is related to the limited crude oil resource which is available on land and second is concerned with the environmental hazard. It is hard to minimize the emission of nitrogen oxide (NOx) and smoke simultaneously in diesel engines, due to the trade-off relationship between them. Therefore, the control of both NOx and smoke emissions are still the major dilemma in the development of diesel engines. There are major approaches to reduce diesel emissions by using biodiesel includes design modification of engine, combustion characteristics improvement, and using after treatment of exhaust gases. The improvement of engine combustion appears to be the most recommended technique; essentially because it may require only small modifications of engine systems rather than the use of new designs or the use of additional systems. This approach is understood by regulating the fuel properties, improving fuel injection timing, and/or adding fuel additives. In this regard, the use of biodiesel as an oxygenated fuel was found to be a promising alternative to the conventional diesel fuel. The biodiesel fuels have significant benefits in terms of emission and resource. The utilization of biodiesel fuels can reduce the amount of diesel consumed, and major emissions without major modification of the engine. Consequently, such fuels have wide
applicability to future vehicles as well as those in the present use since they can be stored in liquid form and easily transported.

The recent advances in nanotechnology lead the way to produce nanoscale energetic materials, which have tremendous advantages over micron sized materials which can be used as additives for fuel. Many researchers have analyzed the applications, preparation and challenges of nanofluids, but also identified the barriers of the nanofluid, as research gaps for further research. Based on the literature survey, it was noticed that a review on the effects of nanoadditives on the combustion, performance and emission characteristics of a CI engine fuelled with biodiesel and its blends need to be studied for further forthcoming research. In this regard, the objective of the present study is to review the impact of nanoadditives on a CI diesel engine with respect to combustion, performance and emission behavior.

II. EFFECT OF VARIOUS NANOADDITIVES ON COMBUSTION CHARACTERISTICS

Sadhik Basha and Anand investigated the effect of carbon nanotube with Jatropha Methyl Ester (JME) emulsion fuels (JME2S5W100CNT), neat JME, JME emulsion fuel (JME2S5W) on single cylinder constant speed diesel engine. The JME emulsion fuel was prepared in the proportion of 93% JME, 5% of water and 2% of surfactants (by volume). The combustion characteristics such as the variation in cylinder gas pressure and the heat release rate with respect to crank angle for of JME2S5W100CNT, JME2S5W and JME are discussed. The cylinder gas pressure of of JME2S5W100CNT, JME2S5W and JME are 72.15, 79.77 and 72.3 bar. The heat release rates are 40.18, 46.48 and 40.11 J/deg.CA. The comparison of ignition delay for of JME2S5W100CNT, JME2S5W and JME with respect to bmep are 2.7, 4.6 and 11.52 deg.CA [1].
C. Syed Aalam and C. G. Saravanan investigated the effects of nano metal oxide blended Mahua biodiesel on CRDI diesel engine. The metal oxide used is aluminium oxide nanoparticles (ANPs). The experiment was conducted in a CRDI diesel engine at a constant speed of 1500rpm using neat biodiesel and Mahua biodiesel blend (MME20) and ANP-blended MME20. The combustion characteristics such as variation in cylinder pressure and heat release rate with respect to crank angle are studied. It is observed that at peak pressure, 63.19bar in case of MME20 whereas for ANP-blended MME20 it is 64.35bar at full load. It is observed that the heat release rate for ANP-blended MME20 is higher than that of biodiesel fuel [2].

C. Syed Aalam, C. G. Saravanan and M. Kannan have done experimental investigations on a CRDI system assisted diesel engine fuelled with aluminium oxide nanoparticle blended biodiesel. The biodiesel used in this experiment is ziziphus jujube methyl ester blended fuel (ZJ ME25). The experiments were conducted on a four stroke single cylinder air cooled and common rail direct injection (CRDI) system assisted diesel engine with aluminium oxide nanoparticle blend with ZJ ME25 and ZJ ME25. The combustion characteristics such as variation in cylinder pressure and heat release rate with respect to crank angle are studied for ZJ ME25, AONP25 and AONP50. It is observed that at the cylinder pressure increases for AONP25 and AONP50 was 66.115 and 69.946bar. The heat release rate was found to be increased with addition of ANOP biodiesel. The value of heat release rate for ZJ ME25, AONP25 and AONP50 are 154.727, 178.818 and 197.928 KJ/m³deg respectively [3].

M. Srinivasa Rao and R. B. Anand investigated the performance and emission characteristics improvement studies on a biodiesel fuelled DICI engine using water and Al(OH) nanoparticle. The biodiesel used in this experiment is Jatropha oil. The experiments were carried out for test fuels such as neat diesel, biodiesel (BD), water-biodiesel emulsion fuels (BD5W, BD10W) and Al(OH) nanoparticle blended water.
biodiesel emulsion fuels (BD5W25, BD5W50, BD5W100, BD10W25, BD10W50 and BD10W100) in a single cylinder four stroke air-cooled Direct Injection Compression Ignition (DICI) engine. The combustion characteristics such as the variation in cylinder gas pressure and heat release rate related to all test fuels at full load is studied. The magnitude of peak pressure is 70.13, 69.46, 70.38 and 71.21 bar for neat diesel, neat biodiesel, BD5W, BD10W. Also the magnitude of peak pressure is 69.91, 69.74, 69.24, 70.64, 70.38 and 69.55 bar for BD5W25, BD5W50, BD5W100, BD10W25, BD10W50 and BD10W100 respectively. The magnitude of heat release rate is 23.11, 20.22, 22.95 and 23.85 J/deg CA for neat diesel, neat biodiesel, BD5W, BD10W. Also, the magnitude of Heat release rate is 21.80, 22.20, 22.36, 22.92, 23.11 and 23.46 J/deg CA for BD5W25, BD5W50, BD5W100, BD10W25, BD10W50 and BD10W100 respectively [4].

T. Shaafi and R. Velraj investigated the influence of alumina nanoparticles; ethanol and isopropanol blend as additive with diesel-soyabean biodiesel blend fuel. The experiment was conducted in a single cylinder, air cooled, constant speed compression ignition engine, fuelled with two modified fuel blends such as Diesel-soyabean biodiesel (B20) and diesel-soyabean biodiesel-ethanol blends with alumina as a nanoadditive (D80SBD15E4S1+alumina). The combustion characteristics such as variation of the cylinder pressure and heat release rate with crank angle at full load condition were studied. The peak pressure is 64.61 bar in case of D80SBD15E4S1+alumina fuel blend whereas neat diesel and B20 blend, the values are 63.03 and 62.41 bar respectively. The heat release rate is observed as 62 J/CA for D80SBD15E4S1+alumina fuel blend whereas it is 51.60 and 53.12 J/CA for neat diesel and B20 blend respectively [5].
III. EFFECT OF VARIOUS NANOADDITIVES ON ENGINE PERFORMANCE

Nanofuels are a new class of fuels, and the application of nanoscale energetic material in conventional fuel is an interesting concept, yet unexplored to its fullest potential. Very few studies have been carried out on the addition of various potential nanoparticles as additives to biodiesel and its blends. In this work, the literature survey on the effects of various nanoadditives on engine performance is discussed.

Sadhik Basha and Anand investigated the effect of carbon nanotube with Jatropha Methyl Ester (JME) emulsion fuels (JME2S5W100CNT), neat JME, JME emulsion fuel (JME2S5W) on single cylinder constant speed diesel engine. The JME emulsion fuel was prepared in the proportion of 93% JME, 5% of water and 2% of surfactants (by volume). The performance characteristics such as brake thermal efficiency and brake specific fuel consumption are discussed with reference to bmep. It is observed that brake thermal efficiency of JME2S5W100CNT, JME2S5W and JME are 28.45%, 27.89% and 24.80%. The brake thermal efficiency of JME2S5W100CNT is high compared to neat JME and JME2S5W due to high release rate and accelerated combustion. The enhancement in the brake thermal efficiency for the JME2S5W100CNT has reflected lower brake specific fuel consumption when compared to JME2S5W, JME. It is observed that brake specific fuel consumption of JME2S5W100CNT and JME2S5W are 0.301 and 0.346 kg/KWh [1].

Sajith and Sobhan investigated the effects of Cerium Oxide Nanoparticle as a fuel additive on biodiesel. The experiment tests were conducted on a single cylinder compression ignition engine with modified and base fuel. The fuel used for the investigation is from Jatropha. Thus, the base fuel is Jatropha and the modified fuel is addition of cerium oxide in Jatropha. The performance tests were conducted on the diesel engine with standard biodiesel and modified
fuel. The results show that brake thermal efficiency of the modified fuel increases 1.5% than the base fuel [6].

C.SyedAalam and C.G.Saravanan investigated the effects of nano metal oxide blended Mahua biodiesel on CRDI diesel engine. The metal oxide used is aluminium oxide nanoparticles (ANPs). The experiment were conducted in a CRDI diesel engine at a constant speed of 1500rpm using neat biodiesel and Mahua biodiesel blend (MME20) and ANP-blended MME20. The performance characteristics such as brake thermal efficiency and specific fuel consumption (SFC) with brake power. It is observed that specific fuel consumption reduces 7.66% for ANP-blended MME20 compared to MME20 and neat biodiesel [2].

C.SyedAalam, C.G.Saravanan and M.Kannan has done experimental investigations on a CRDI system assisted diesel engine fuelled with aluminium oxide nanoparticle blended biodiesel. The biodiesel used in this experiment is zizipus jujube methyl ester blended fuel (ZJ ME25). The experiments were conducted on a four stroke single cylinder air cooled and common rail direct injection (CRDI) system assisted diesel engine with aluminium oxide nanoparticle blend with ZJ ME25 and ZJ ME25. The performance parameters such as brake specific fuel consumption and brake thermal efficiency with brake power for AONP blended biodiesel and ZJ ME25. The specific fuel consumption decreases for about 6% for AONP blended biodiesel compared to ZJ ME25. The brake thermal efficiency is increased by 2.5% for AONP blended biodiesel compared to ZJ ME25 [3].

M.Srinivasa Rao and R.B.Anand investigated the performance and emission characteristics improvement studies on a biodiesel fuelled DICI engine using water and AlO(OH) nanoparticle. The biodiesel used in this experiment is Jatropha oil. The experiments were carried out for test fuels such as neat diesel, biodiesel (BD), water-biodiesel emulsion fuels (BD5W, BD10W) and AlO(OH) nanoparticle blended water biodiesel emulsion.
fuels (BD5W25, BD5W50, BD5W100, BD10W25, BD10W50 and BD10W100) in a single cylinder four stroke air-cooled Direct Injection Compression Ignition (DICI) engine. The performance characteristics such as the variation of brake specific fuel consumption (BSFC) and brake thermal efficiency (BTE) with respect to engine brake load that was expressed in terms of bmep for the test fuels. It is noted that the BSFC is higher for water biodiesel emulsion than for neat biodiesel and neat diesel. The values of BSFC are 0.269, 0.331, 0.344 and 0.350 kg/KWh for neat diesel, neat biodiesel, BD5W, BD10W. It is also observed that the BSFC decreases with an increase in dosage level of AlO(OH) nanoparticles in biodiesel emulsion fuels against water emulsified biodiesel. The value of BSFC at full load condition is 0.344, 0.335, 0.328 and 0.320 kg/KWh for BD5W25, BD5W50, BD5W100, BD10W25, BD10W50 and BD10W100. The magnitude of BTE is 31.44, 27.2, 27.8 and 29% for neat diesel, neat biodiesel, BD5W, BD10W. Also, the BTE is 27.8, 28.6, 29.1 and 29.9% for BD5W25, BD5W50, BD5W100, BD10W25, BD10W50 and BD10W100 respectively [4].

T. Shaafi and R. Velraj investigated the influence of alumina nanoparticles, ethanol and isopropanol blend as additive with diesel-soyabean biodiesel blend fuel. The experiment was conducted in a single cylinder, air cooled, constant speed compression ignition engine, fuelled with two modified fuel blends such as Diesel-soyabean biodiesel (B20) and diesel-soyabean biodiesel-ethanol blends with alumina as a nanoadditive (D80SBD15E4S1+alumina). The performance characteristics such as brake thermal efficiency and specific fuel consumption tested under different loading conditions. It is observed that there is an increase in brake thermal efficiency of 15.8 and 17.9% for B20 and D80SBD15E4S1+alumina compared to neat biodiesel at full load condition respectively. The Brake Specific fuel Consumption is low compared to neat biodiesel and B20. The BSFC is
Soner Gumus, Hakan Ozcan, Mustafa Ozbay and Bahattin Topaloglu investigated the effect of aluminium oxide and copper oxide nanodiesel in a compression ignition engine. The experiment was carried out in a four stroke, water cooled diesel engine with neat diesel, CuO and Al$_2$O$_3$ additive doped diesel fuel. The performance characteristics were studied. The variation of engine power and torque with engine speed shows that engine power slightly increases compared to neat diesel fuel with the addition of nanoparticles into the diesel fuel. The performance of engine showed a slightly increase for brake power with CuO and Al$_2$O$_3$ additive doped diesel fuel. The variation of BSFC with engine speed shows that BSFC is lower for the nanodiesels than neat diesel at all engine speed. The BSFC decreases by up to 0.5% with CuO additive and decreases by up to 1.2% with Al$_2$O$_3$ additive respectively [7].

IV. EFFECTS OF VARIOUS NANOADDITIVES ON ENGINE EMISSIONS

Diesel engines are well known for their extremely low hydrocarbon and carbon monoxide emissions. However, they have also been rejected by many for their odorous and sooty exhaust, that is characterized by high nitric oxide (NOx) and particulate matter emissions (PM). Although the improvements in the modern diesel engine design and combustion conditions have led to significant reductions in both NOx and PM emissions, these reductions have not been sufficient to meet the new standards without additional control measures. In this work, the literature survey on the effects of various nanoadditives on engine emissions is discussed.

Sadhik Basha and Anand investigated the effect of carbon nanotube with Jatropha Methyl Ester (JME) emulsion fuels (JME2S5W100CNT), neat JME, JME emulsion fuel (JME2S5W) on single cylinder constant speed diesel engine. The JME emulsion fuel was prepared in the...
proportion of 93% JME, 5% of water and 2% of surfactants (by volume). The emission characteristics such as NO\textsubscript{x}, HC, CO and smoke opacity are discussed with reference to bmep. It is observed that NO\textsubscript{x} emission of JME2S5W100CNT, JME2S5W and JME are 910,1001 and 1282ppm and HC emission of JME2S5W100CNT, JME2S5W and JME are 57,63 and 59ppm. The CO emission of JME2S5W100CNT and JME2S5W are 0.006% and 0.085 % (by vol). The smoke opacity of JME2S5W100CNT, JME2S5W and JME are 49%, 60% and 69% respectively [1].

C.SyedAalam and C.G.Saravanan investigated the effects of nano metal oxide blended Mahua biodiesel on CRDI diesel engine. The metal oxide used is aluminium oxide nanoparticles(ANPs). The experiment were conducted in a CRDI diesel engine at a constant speed of 1500rpm using neat biodiesel and Mahua biodiesel blend(MME20) and ANP-blended MME20. The emission parameters such as Hydrocarbon, Carbon monoxide, Oxides of Nitrogen(NO\textsubscript{x}) and smoke with respect to brake power. It is observed that there was a reduction if 26.04% hydrocarbon emission for ANP-blended MME20 compared to MME20 at full load. The CO decrements are about 48% for ANP-blended MME20 compared to neat biodiesel. It is noted that the NO\textsubscript{x}emission increases by 7.95% for ANP-blended MME20 compared to neat biodiesel. The smoke emission is less for ANP-blended MME20 compared to neat biodiesel [2].

C.SyedAalam, C.G.Saravanan and M.Kannan has done experimental investigations on a CRDI system assisted diesel engine fuelled with aluminium oxide nanoparticle blended biodiesel. The biodiesel used in this experiment is zizipus jujube methyl ester blended fuel(ZJME25). The experiments were conducted on a four stroke single cylinder air cooled and common rail direct injection(CRDI) system assisted diesel engine with aluminium oxide nanoparticle blend with ZJME25 and ZJME25. The emission parameters such as smoke density, NO\textsubscript{x}, Carbon
monoxide and hydrocarbon with respect to brake power were discussed. The smoke density of AONP blended biodiesel decreased by about 15-20% compared to ZJ ME25, which is similar to the trend of biodiesel fuel. The NO\textsubscript{x} emission for ZJ ME25 is 3.148g/KWh whereas on the addition of aluminium oxide, it increases to 3.729g/KWh for dosage of 50ppm AONP. At full load the CO emissions for ZJ ME25, AONP25 and AONP50 were 8.079, 3.951 and 6.284 g/KWh. It is observed that the HC emissions for ZJ ME25, AONP25 and AONP50 were 0.216, 0.162 and 0.138 g/KWh respectively [3].

M. Srinivasa Rao and R.B. Anand investigated the performance and emission characteristics improvement studies on a biodiesel fuelled DICI engine using water and AlO(OH) nanoparticle. The biodiesel used in this experiment is Jatropha oil. The experiments were carried out for test fuels such as neat diesel, biodiesel(BD), water-biodiesel emulsion fuels(BD5W,BD10W) and AlO(OH) nanoparticle blended water biodiesel emulsion fuels(BD5W25, BD5W50, BD5W100, BD10W25, BD10W50 and BD10W100) in a single cylinder four stroke air-cooled Direct Injection Compression Ignition (DICI) engine. The variation of carbon monoxide (CO), unburned hydrocarbons (UHC) smoke opacity levels, nitrogen oxide (NO) emission and exhaust gas temperature in the exhaust emission with respect to bmeP for the test fuels is studied. The level of CO emission is 0.06, 0.03, 0.04 and 0.05% for neat diesel, neat biodiesel, BD5W, BD10W at full load condition. Also, the level of CO emission is 0.04, 0.03, 0.03, 0.05, 0.04 and 0.03% for BD5W25, BD5W50, BD5W100, BD10W25, BD10W50 and BD10W100 respectively at full load. The UHC emission level is 33, 19, 22 and 25ppm for neat diesel, neat biodiesel, BD5W, BD10W at full load condition. Similarly, the UHC emission level is 21, 20, 18, 24, 22 and 20ppm for BD5W25, BD5W50, BD5W100, BD10W25, and BD10W50 and BD10W100 at full load condition. The level of smoke
opacity is 59.8, 54.8, 52 and 50.2% for neat diesel, neat biodiesel, BD5W, BD10W at full load condition. Also, the smoke opacity is 50.1, 48.2, 46.3, 49.2, 47.8 and 44.8% for BD5W25, BD5W50, BD5W100, BD10W25, BD10W50 and BD10W100 at full load condition. The level of NO emission at full load is 1502, 1637, 1420 and 1180 ppm for neat diesel, neat biodiesel, BD5W, BD10W. Also, the level of NO emission is 1354, 1374, 1160, 1120, 1025 and 940 ppm for BD5W25, BD5W50, BD5W100, BD10W25, BD10W50 and BD10W100 respectively. The magnitude of EGT at full load is 265, 279, 262 and 243°C for neat diesel, neat biodiesel, BD5W, BD10W. Also, the EGT at full load is 255, 250, 244, 238, 232, 229°C for BD5W25, BD5W50, BD5W100, BD10W25 and BD10W50 and BD10W100 respectively [4].

T. Shaafi and R. Velraj investigated the influence of alumina nanoparticles, ethanol and isopropanol blend as additive with diesel-soyabean biodiesel blend fuel. The experiment was conducted in a single cylinder, air cooled, constant speed compression ignition engine, fuelled with two modified fuel blends such as Diesel-soyabean biodiesel (B20) and diesel-soyabean biodiesel-ethanol blends with alumina as a nanoadditive (D80SBD15E4S1+alumina). The emission characteristics such as exhaust gas temperature, NOx, UBHC, CO and CO2 with respect to various load condition. It is observed that the Exhaust gas Temperature is higher for neat biodiesel than in the case of D80SBD15E4S1+alumina blend. The magnitude of NOx emission observed at full load is 1792 ppm for neat biodiesel whereas it is 1921 and 1971 ppm for B20 and D80SBD15E4S1+alumina fuel blend respectively. The CO emission is higher for D80SBD15E4S1+alumina fuel blend by 66% at 25% load compared to both B20 and neat biodiesel and reduces at full load to the extent of 40% compared to neat diesel and B20 blend. It is observed that in case of neat diesel there is a slow and uniform increase of UBHC as the load increases whereas for B20 and D80SBD15E4S1+alumina fuel blend there are small fluctuations.
in the UBHC as load increases. Also, it is observed that the percentage of \( \text{CO}_2 \) emission at full load, the B20 blend has 2.2\% higher emission compared to neat diesel and the D80SBD15E4S1+alumina fuel blend has 3.3\% lower emission compared to neat diesel [5].

Sajith and Sobhan investigated the effects of Cerium Oxide Nanoparticle as fuel additives on biodiesel. The experiment tests were conducted on a single cylinder compression ignition engine with modified and base fuel. The fuel used for the investigation is from Jatropha. Thus, the base fuel is Jatropha and the modified fuel is addition of cerium oxide in Jatropha. The emissions have been measured for both base fuel and the modified fuel. Hydrocarbon emission is found to be significantly reduced on the addition of cerium oxide. The \( \text{NO}_x \) emission found to be reduced on the addition of additive. But the carbon monoxide emission is high for cerium oxide additive fuel compared to base fuel [6].

SonerGumus, HakanOzcan, Mustafa Oz beyand Bahattin Topaloglu investigated the effect of aluminium oxide and copper oxide nanodiesel in a compression ignition engine. The experiment was carried out in a four stroke, water cooled diesel engine with neat diesel, CuO and Al\(_2\)O\(_3\) additive doped diesel fuel. The exhaust emission measurements for the diesel fuel with Al\(_2\)O\(_3\) additives showed that CO, HC and \( \text{NO}_x \) is reduced by up to 11\%, 13\% and 6\%, respectively. The emissions test for CuO observed that there is a reduction of up to 5\% HC emission, 8\% CO emission and 2\% \( \text{NO}_x \) emission respectively [7].

V. Major Issues and Further Research Requirements

i. The most eye-catching features of the use of nanoadditives in diesel engine are improved engine performance and reduction in emission. However, from the detailed literature study, the major issues in the use of nanoadditives in CI engine have been identified and given below
ii. Safety for public concern during production and its use are rarely attempted. The production cost are major factors that hinder the commercialization of nanofluids.

iii. The properties of nanofluids strongly depend on the shape and property of the additive. Currently, available nanoparticles are limited and also their physiochemical properties are not accurate. Better characterization of nanofluids is one of the major requirements for its effective usage. The problems of nanoparticle aggregation, settling and erosion all need to be examined in detail in the applications.

iv. The main limitation of the experiments is the non-availability of nanoparticles of different sizes for same material which can conclusively indicate the effect of particle size.

v. Despite the exciting opportunities, lack of agreement among experimental results, poor characterization of suspension, inadequate theoretical understanding of the mechanisms of heat transfer by nanofluid are serious impediments against large scale commercial exploitation of nanofluids for thermal management in important fields such as electronics, transportation and thermal engineering.

vi. Though there are advantages in the performance and emission reduction, the following long term investigations are required before commercializing the nanoadditives.

vii. Nanofluids employed in experimental research have to be well characterized with respect to particle size, size distribution, shape and clustering so as to render the results most widely applicable.

viii. Efforts are also to be made to obtain the optimum combinations of parameters such as preparation time, nanoparticle size for the best performance of the fuel. Analysis of the combustion and
flame characteristics of the catalyst enhanced fuel using visualization techniques should be carried out.

ix. Understanding the fundamental mechanisms of nanoadditives effects on the performance, emission and combustion characteristics of the conventional fuels remains a key challenge which limits their application. Therefore, in order to find the appropriate nanofluids in the combustion applications, more experiments are needed to explore the different related mechanisms.

x. The emphasis was to explore the difference between nano suspensions and micron suspensions and to understand the effect of particle size on suspension quality and droplet burning characteristics. Other factors—such as the effect of particle concentration, type of metal particles with or without surface fictionalization, and the type of surfactants/dispersants—are to be explored in the future studies.

xi. Some of the nanoadditives are considerably surface reactive, and hence, long term investigations on the life of the engine/exhaust train are required.

VI. CONCLUSION

The present survey provides an overview of the research progress in the use of dispersion of various nanoadditives for the engine performance enhancement and emission reduction in a diesel engine. The major conclusions arrived from the review are summarized below.

1. It is evident from all the studies that the diesel engine performance improves appreciably with nanoadditives for all the cases of diesel, biodiesel and emulsified fuels. Some of the studies carried out with various nanoadditive concentrations showed that increasing the concentration of the nanoadditives does not increase the performance proportionately, and in some cases, it is insensitive beyond a certain
concentration level. Hence, the estimation of the optimum dosage is essential for every nanoadditives.

2. It is understood from the emission characteristics

(i) There is an increase in NOx when nanoadditives are mixed with pure diesel due to increased peak temperature.

(ii) In the case of biodiesel, since the peak temperature is low compared to the diesel, the addition of nanoadditives reduces the NOx in all the cases.

(iii) Emulsification of diesel found to be the best solution to reduce the peak temperature to reduce the NOx emission. However, the addition of increased concentration of water in the emulsion reduces the performance as it absorbs large quantity of heat for the evaporation. The nanoadditives are very useful to achieve the same level of micro explosion with lower concentration of water in the emulsion due to its enhanced surface area contact which will be very useful to improve the performance with reduced NOx emission.

(iv) The CO emission also reduces due to complete combustion of the fuel. Only in the case fuel with magnetic nanofluid the CO level is increased, compared to the cases without nanoadditives and the reasons are to be investigated further.

3. The major issues associated with the use of nanoadditives with the various fuels used in the diesel engine and also the further research required in this field are summarized in detail.

REFERENCES


EXPERIMENTAL STUDY ON THE PERFORMANCE AND EMISSION OF CI ENGINE FUELED WITH BLENDED PONGAMIA BIODIESEL

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Abstract:

To meet the growing global energy requirement, an ever increasing demand of fuels has been a challenge for today’s scientific workers. The fossil fuel resources are dwindling day by day. Biodiesel seem to be a solution for future. Main objective of the present study is to compare the performance, emissions and combustion characteristics of biodiesel derived from non-edible Pongamia oil in an unmodified diesel engine and to compare the results with baseline results of neat diesel. The performance parameters are evaluated in the present study of Pongamia biodiesel with different compositions at 20%, 35% and 50% with mineral Diesel. Also, emissions parameters such as carbon monoxide, carbon dioxide, HC, oxides of nitrogen and smoke opacity for different test fuels were also measured. The combustion analysis was done using peak cylinder pressure and heat release rate with respect to crank angle. The results from the experiments suggest that biodiesel from non-edible oil like Pongamia and its blends with diesel could be a potential fuel for diesel engine and play a vital role in the near future especially for small and medium energy product.

Keywords: Pongamia, Performance, Emission, Blends.
1. Introduction:

Biodiesel is a renewable fuel produced from vegetable and animal fats that can be used in diesel engine with little or no modification. Biodiesel is typically blended with diesel fuel. Biodiesel can also be used in its pure form (B-100), but it may require engine modifications to avoid maintenance and performance problems. Biodiesel is gaining more and more importance as an substitute fuel due to the depletion of petroleum resources and price hike of petroleum products. Biodiesel produced from various edible (groundnut, rapeseed, castor, soybean, sun flower) and non-edible (Pongamia oil, cotton seeds, jatropha etc.) vegetable oil. Moreover, edible oils would be more expensive to use as fuels as compared to conventional petroleum fuels. Hence, the use of non-edible oils such as Pongamia (Pongamia Pinnata) would be more sustainable for biodiesel production. Pongamia tree is one of the underutilize types grown for shade on the roadside. Its seeds remain unattended as a non-profitable business and goes waste. Such unused sources of biomass are required to be converted into a potential source of energy. In the present study, Pongamia oil has been identified as a potential non-edible vegetable oil for biodiesel production. Biodiesel from Pongamia oil was obtained by using transesterification and major physico-chemical properties were evaluated in accordance with relevant ASTM standards. The performance, emission and combustion studies were carried out on a medium capacity compression ignition engine which was fueled with Pongamia methyl ester and its blends with diesel. Exhaustive experiments were carried out on the test rig to evaluate the performance, emissions and combustion characteristics of neat Pongamia biodiesel and its blends with diesel fuel and the results were compared with baseline data of diesel.

2. What is Pongamia Oil?

2.1 Pongamia Oil:
It belongs to the family leguminaceae, commonly known as Pongamia Pinnata. Other name of Pongamia oils are Karanja oil or Honge oil. Pongamia is widely distributed in tropical Asia. The tree is hardy, reasonably drought resistant and tolerant to salinity. It is attractive because it grows naturally through much of arid India, having very deep roots to reach water, and is one of the few crops well-suited to commercialization by India’s large population of rural poor. The Pongamia tree is of medium size, reaching a height of 15-25 meters. The tree bears green pods which after some 10 months change to a tan color. The pods are flat to elliptic, 5-7cm long and contain 1 or 2 kidney shaped brownish red kernels. The yield of kernels per tree is reported between 8 and 24 kg. The composition of typical air dried kernels is: Moisture 19%, Oil 27.5%, and Protein 17.4%. The oil content varies from 27%-39%.

2.2 Production of biodiesel through Transesterification reaction:

The transesterification process is the reaction of triglyceride (fat/oil) with an alcohol in the presence of acidic, alkaline or lipase as a catalyst to form mono alkyl ester that is biodiesel and glycerol. However the presence of strong acid or base accelerates the conversion. It is reported that alkaline catalyzed transesterification is fastest and require simple set up therefore, in current study the oil of Pongamia Pinnata were transesterified with methyl alcohol in presence of strong alkaline catalyst like sodium hydroxide or potassium hydroxide in a batch type transesterification reactor.
The transesterification reaction is given above has been widely used to reduce the high viscosity of triglycerides. To prepare biodiesel from Pongamia crude oil first sodium hydroxide was added into the methyl alcohol to form sodium methoxide, simultaneously oil was heated in a separate vessel of transesterification reactor and subjected to heating and stirring. When the temperature of oil reached at 60°C then sodium methoxide was mixed into the oil and reaction mixture was stirred for one and half hour. After reaction completion, the reaction mixture was transferred in separating funnel.

The mixture of glycerol and methyl ester was allowed to settle for 8 hours. After settling for 8 hours glycerol and methyl esters was
separated manually. The methyl ester was the washed with hot water to remove traces of sodium hydroxide impurity. The washed biodiesel then distilled to remove moisture and last good quality biodiesel was subjected for chemical analysis.

3. Experimental Setup:

A constant speed, Kirloskar make, single cylinder, air cooled, direct injection TV1 model diesel engine was selected for the present experimentation. The detailed technical specifications of the engine are given in Table 1. The schematic diagram of the experimental setup along with all instrumentation is shown in Fig. 2. The engine trial was conducted as specified by IS: 10000. The fuel injection system was a traditional one consisting of single-hole pintle nozzle which injects the fuel at 200 to 205bar. AVL 437 smoke meter and AVL Di Gas Analyzer were used for the measurements of various exhaust gas emissions. Fuel tank is provided in the set up. By using a single way valve, the engine was then allowed to run on various blends. Three sets of experimental investigations were conducted in the present study and average of the three readings was taken for further analysis. The engine was gradually loaded in the range of no load, 20%, 40%, 60%, 80% and 100% load. The performance emission and combustion characteristics of, different blends of biodiesel and diesel (20% Biodiesel and 80% Diesel named as B20, 35% biodiesel and 65% Diesel named as B35, 50% biodiesel and 50% Diesel named as B50) were evaluated and compared with the baseline data of diesel fuel (D100).

<table>
<thead>
<tr>
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</tr>
<tr>
<td>No. of strokes</td>
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<tr>
<td>Fuel</td>
<td>Diesel</td>
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</table>
Table 1: Engine Specification

<table>
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<th>Specification</th>
<th>Value</th>
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<tr>
<td>Rated power</td>
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<tr>
<td>Speed</td>
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</tr>
<tr>
<td>Cylinder diameter</td>
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</tr>
<tr>
<td>Stroke length</td>
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<tr>
<td>Orifice diameter</td>
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<tr>
<td>Dynamometer arm length</td>
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</table>

Figure 3: Experimental Engine Setup

4. Result and discussion:

The analysis of combustion characteristic of diesel and biodiesel of Pongamia were carried out. It is clear from Fig. 4 using cylinder pressure difference with respect to crank angle, B20 have the peak cylinder pressure of 72bar which is very much nearer to base value of diesel and all the other blends comparatively have lower cylinder pressure. B50 have the very low cylinder pressure of 43bar, from this we can conclude that B20 have the combustion characteristics near to diesel fuel.
Fig. 4 shows the combustion characteristics between crank angle and net heat release rate. Similar to the cylinder pressure, B20 has peak heat release rate of 82.9 W at the crank angle of 357° and neat diesel has comparatively lower value of heat release than the B35. B50 has poor heat release hence engine needs a modification for this blend.

Fig. 5 shows the variation of graph between the brake thermal efficiency and the indicated thermal efficiency with that of full loading conditions. Indicated thermal efficiency of B50 has relatively higher values than the neat diesel. B20 and B35 are lesser in value to the B20 at peak load.
Brake thermal efficiency of B20 at different loads are nearer to the base line data while the other two blends are having low efficiencies.

![Figure 6: Performance Graph](image)

<table>
<thead>
<tr>
<th>EMISSION</th>
<th>Diesel</th>
<th>B20</th>
<th>B35</th>
<th>B50</th>
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<tr>
<td>CO %</td>
<td>0.153</td>
<td>0.317</td>
<td>0.287</td>
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<td>45</td>
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</table>

Table 2: Emission data at 100L

The carbon monoxide, HC and carbon dioxide contents of B50 is most suitable and leads to better combustion when compared to other blends B20 and B35. However the NOx emission of B50 is significantly more than the emission results of diesel. Smoke opacity percentage of B20 is even than lesser than that of the diesel, so cleaner air is ensured with B20.
5. Conclusion:

The present study carried on an unmodified diesel engine and the objectives of investigation is to evaluate the efficiencies, heat release, and maximum cylinder pressure and emission characteristics of different blends of Pongamia biodiesel. The performance results indicate that an increase of 5-8% with Pongamia biodiesel and its blends with respect to neat diesel. The peak cylinder pressure and the maximum heat release rate with respect to the crank angle were observed in Blends B20 and B35 respectively. The emission results indicate that B50 has lesser levels of CO, UBHC and CO$_2$, but NO$_x$ emissions are of high value. The study has shown that biodiesel from non-edible oil source like Pongamia has the capacity to give effective performance and emission results even more than, that of neat diesel, thus the biodiesel derived from Pongamia and its blends could be used a conventional fuel for diesel Engines.

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THE EFFECT OF B₄C IN ALUMINIUM BASED COMPOSITES

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Abstract:

For the last few years there has been a rapid increase in the utilisation of aluminium alloys, particularly in the automobile industries, due to low weight, density, coefficient of thermal expansion, and high strength, wear resistance. Among the materials of tribological importance, Aluminium metal matrix composites have received extensive attention for practical as well as fundamental reasons. In our project, the influence of B₄C on the mechanical behavior of Al 7075 composites is identified. Al 7075 particle reinforced composites were produced through stir casting in the composition of 10% and 15% by weight ratio. The samples of Al 7075 composites were tested for hardness, tensile, impact and SEM analysis. The test results showed increasing hardness and impact strength of the composites increased.

Keywords: Metal Matrix Composites, stir casting, hardness, tensile strength

1. INTRODUCTION

The aim involved in designing metal matrix composite materials is to combine the desirable attributes of metals and ceramics. The addition of high strength, high modulus refractory particles to a ductile
metal matrix produce a material whose mechanical properties are intermediate between the matrix alloy and the ceramic reinforcement. Aluminium is the most abundant metal in the Earth’s crust, and the third most abundant element, after oxygen and silicon. It makes up about 8% by weight of the Earth’s solid surface. Due to easy availability, high strength to weight ratio, easy machinability, durable, ductile and malleable Aluminium is the most widely used non-ferrous metal in 2005 was 31.9 million tonnes.

A composite material is a material made from two or more constituent materials with significantly different physical or chemical properties that, when combined, produce a material with characteristics different from the individual components. The individual components remain separate and distinct within the finished structure. The new material may be preferred for many reasons: common examples include materials which are stronger, lighter, or less expensive when compared to traditional materials. Composites are made up of individual materials referred to as constituent materials. There are two main categories of constituent materials: matrix and reinforcement. At least one portion of each type is required. The matrix material surrounds and supports the reinforcement materials by maintaining their relative positions. The reinforcements impart their special mechanical and physical properties to enhance the matrix properties. A synergism produces material properties unavailable from the individual constituent materials, while the wide variety of matrix and strengthening materials allows the designer of the product or structure to choose an optimum combination.

2. PROBLEM IDENTIFICATION

The problem is to study the mechanical behavior of Aluminium alloy 7075 with addition of varying percentage composition of Boron Carbide particle. The tensile strength, Hardness, impact like mechanical properties will also be taken into consideration. For the
achievement of the above, an experimental set up is prepared where all the necessary inputs were made. The aim of the experiment is to study the effect of variation of the percentage composition to predict the mechanical properties of the metal matrix composites (MMC). The experiment was carried out by preparing the sample of different percentage composition by stir casting technique. The present work emphasizes the literature review of Al alloys and its composites. There are many manufacturing processes to form composites commercially. But the technique adopted here is stir casting process.

3. EXPERIMENTAL DETAILS

3.1. Abbreviations and Acronyms Muffle furnace

Muffle Furnace was used to heat the material to desired temperatures by conduction, convection, or black body radiation from electrical resistance heating elements. A muffle furnace (sometimes, retort furnace) in historical usage is a furnace in which the subject material is isolated from the fuel and all of the products of combustion including gas, sand, flying ash.

3.2. Stirrer

The function of a stirrer was to agitate liquids for speeding up reactions. Stirrer was designed to homogenous mixing of liquid, oilment, solution, viscous material and solid-liquid.

3.3. Sieve analyse test

A sieve analysis was used to assess the particle size distribution of a granular material. The size distribution is often of critical importance to the way the material performs in use. A sieve analysis can be performed on any type of non-organic or organic granular materials including sands, crushed rock, clays, granite, feldspars, coal, soil, a wide range of manufactured powders, grain and seeds, down to a minimum sized depending on the exact method. In this experiment
particles of 100 micron size were used. Sieve analysis Tester was used to get desired granular size.

3.4. Graphite Crucible

Graphite Crucible is a headstrong compartment utilized for metal, glass, and color generation and in addition various present day research facility forms, which can withstand temperatures sufficiently high to dissolve or generally adjust its substance. Truly, they have generally been made of dirt, yet they can be made of any material with a higher temperature resistance than the substances they are intended to hold Graphite crucible.

3.5. Experimental procedure

3.6.

3.7. Working procedure

1. Motor
2. Shaft
3. Molten Aluminium
4. Thermocouple
5. Particle Injection Chamber
6. Insulation Hard Chamber
7. Furnace
8. Graphite Crucible

3.8. Experimental Work

Aluminium Alloy was melted in a crucible by heating it in a muffle furnace at 800°C for three to four hours. Boron carbide particles were preheated at 1000°C respectively for one to three hours to make their surfaces oxidized. The furnace temperature was first raised above the liquidus temperature of aluminium near about 750°C to melt the Al alloy completely and was then cooled down just below the liquidus to keep the slurry in Semi solid state. Automatic stirring was carried out with the help of radial drilling machine at stirring rate of 200 RPM. At this stage, the preheated B4C particles were added manually to the vortex.

In the final mixing processes the furnace temperature was controlled within 700±10°C. After stirring process the mixture was pour in the other mould to get desired shape of specimen. The presence of reinforcement throughout the specimen was inspected by cutting the casting at different locations and under microscopic examination.

Following procedure was followed after the casting preparation

1. Specimens, prismatic in shape with dimensions 10 mm × 10 mm × 10 mm for SEM, Tensile strength specimen(d=12.5mm, gauge length=56mm)

2. Hardness of specimen was measured on hardness testing machine.

4. RESULT AND DISCUSSION

4.1 Tensile strength test

Tensile tests were used to assess the mechanical behaviour of the composites and matrix alloy. The composite and matrix alloy rods were machined to tensile specimens with a diameter of 6 mm and gauge length of 30 mm. Ultimate tensile strength (UTS), often shortened to tensile strength (TS) or ultimate strength, is the maximum stress that a material can withstand while being stretched or pulled before necking which is when the specimen’s cross sections starts to significantly contract.

Fig 1. Specimen of B₄C composites before testing

The below table shows the result of tensile strength at various composition.

Table 1. Tensile strength result

<table>
<thead>
<tr>
<th>Composition</th>
<th>Yield strength N/mm²</th>
<th>Tensile strength N/mm²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Al 100%</td>
<td>572</td>
<td>502</td>
</tr>
</tbody>
</table>

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4.2 Hardness testing

A Rockwell hardness tester machine used for the hardness measurement. The surface being tested generally requires a metallographic finish and it was done. Load used on Rockwell’s hardness tester was 500 kgf at dwell time 20 seconds for each sample. The result of Rockwell’s hardness test for simple alloy without reinforcement and the wt. % variation of reinforcements such B4C with Al alloy 7075.

The below figure show the specimen made for the Hardness test at various compositions

![Specimen](image)

**Fig 2. Specimen for Hardness Test at Al 90%+B4C 10%**

The below table shows the result of hardness at various composition.

<table>
<thead>
<tr>
<th>compositions</th>
<th>Rockwell hardness</th>
<th>Mean hardness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Al 90%+ B4C 10%</td>
<td>67.35</td>
<td>84.74</td>
</tr>
<tr>
<td>Al 85%+ B4C 15%</td>
<td>71.05</td>
<td>90.44</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>----------------</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>Al 100%</td>
<td>48</td>
<td>51</td>
</tr>
<tr>
<td>Al 90%+ B_4C 10%</td>
<td>51</td>
<td>50</td>
</tr>
<tr>
<td>Al 85%+ B_4C 15%</td>
<td>55</td>
<td>59</td>
</tr>
</tbody>
</table>

**Fig. 3.** Rockwell hardness of B_4C reinforced in Aluminium Metal Matrix
5. CONCLUSION

The conclusions drawn from the present investigation are as follows:

- Aluminium matrix composites have been successfully fabricated by stir casting technique with fairly uniform distribution of B₄C particles.
- Dispersion of B₄C particles in aluminium matrix improves the hardness of the matrix material.
- In the Stir casting process, stirring speed, stirring time, particle-preheating temperature, particle incorporation rate are identified as process parameters.
- The Tensile Strength results shows that the B₄C reinforcement Al7075 is less compared to Al7075.
- Hardness results shows that the B₄C reinforcement Al7075 is less compared to Al7075.

6. REFERENCES


ARDNESS TEST ON ALUMINIUM BASED COMPOSITES

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¹(Student U.G, Mechanical, RMK College of Engineering and Technology, India.
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³(Student U.G, Mechanical, RMK College of Engineering and Technology, India.
⁴(Assistant Professor, Mechanical, RMK College of Engineering and Technology, India.
⁵(Student U.G Mechanical, RMK College of Engineering and Technology, India.

Abstract:

Aluminium is the most predominant and appropriate material for light weight applications. The alloying elements with aluminium contribute to the strength, hardness, corrosion resistant, operating temperature to a certain level. Aluminium alloy Al7075 is the material of interest in aerospace and automotive application due to its flexibility for manufacturing and machining. The aluminium metal matrix composite materials is the combination of two constituents in which one is matrix and other is filler materials (reinforcements). The Silicon carbide (SiC), Boron Carbide (B₄C), Titanium Carbide (TiC), Alumina (Al₂O₃) reinforced in aluminium metal matrix composites. The reinforced materials are varied composition by 5%, 10% and 15% in weight. The aluminium metal matrix composites are prepared by stir casting technique. The hardness Test is carried prepared composites.

Keywords: Metal Matrix Composites, Silicon carbide (SiC), Boron Carbide (B₄C), Titanium Carbide (TiC), Alumina (Al₂O₃), Hardness
1. INTRODUCTION

Metal matrix is combination of two or more metals. The properties depend upon the particle size shape and orientation in matrix. The aluminium metal matrix composite is manufactured by Stir casting, Squeeze casting, Centrifugal casting and powder metallurgy. The non-metallic ceramic particles like Silicon carbide, Boron Carbide, Alumina, Fly ash and Titanium carbide are used as reinforcements in aluminium metal matrix.

The aim is to check regarding the improvement of Hardness attribute to the addition of various reinforcements.

2. EXPERIMENTAL DETAILS

2.1 Materials:

Aluminium is used as metal matrix and Sic is added as reinforcements and composite material are produced. The chemical composition of Al7075 is given in Table 1. To increase the wettability of the SiC, B₄C, TiC, and Al₂O₃ particles in the molten aluminium, 2% wt of Magnesium (ribbon type) is added to the molten aluminium. SiC, B₄C, TiC, and Al₂O₃ particles of 300 mesh size is used.

<table>
<thead>
<tr>
<th>Elements</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fe</td>
<td>0.50</td>
</tr>
<tr>
<td>Si</td>
<td>0.35</td>
</tr>
<tr>
<td>Mn</td>
<td>0.33</td>
</tr>
<tr>
<td>Cu</td>
<td>1.50</td>
</tr>
<tr>
<td>Mg</td>
<td>2.25</td>
</tr>
<tr>
<td>Cr</td>
<td>0.17</td>
</tr>
<tr>
<td>Zn</td>
<td>5.15</td>
</tr>
<tr>
<td>Al</td>
<td>Balance</td>
</tr>
</tbody>
</table>
2.2 Preparation of Composites:

Al7075 is melted in the furnace at 780°C, magnesium is added in the molten material. The SiC, B_4C, TiC, and Al_2O_3 is preheated to 800°C in Muffle furnace for two hours. The Die is also preheated to 800° for an hour in muffle furnace. A Hardened Steel blade is employed as stirrer for stirring method. The reinforcements are like SiC, B_4C, TiC, and Al_2O_3 in the molten metal the mixture is stirred for 30 minutes at 550 rpm. Finally the composites are poured in Die. The molten metal’s is allowed to solidify in the Die.

3. EXPERIMENTAL TESTING:

Hardness is the property of a material that enables it to resist plastic deformation, usually by penetration. However, the term hardness may also refer to resistance to bending, scratching, abrasion or cutting. Hardness test is been conduction using Rockwell hardness testing machine, Vickers hardness testing machine and Brinell hardness testing machine.

The specimens are prepared according to ASTM E18 - 16 for Rockwell Hardness test. The specimens are prepared according to ASTM E92 - 16 for Vickers Hardness test. The specimens are prepared according to ASTM E10 - 15 for Rockwell Hardness test. Hardness of the composite material is determined using 963 – 210 HR – 110MR Rockwell hardness testing machine, AVK-C0 HV-100 Vickers hardness testing machine and AKB 3000 Brinell hardness testing machine. Samples were mounted with Bakelite so that samples could not move when the load was applied. To avoid the segregation effect of the reinforcements in the matrix, five readings were taken for each sample.
4. RESULTS AND DISCUSSION

4.1 Rockwell Hardness Test:

The resistance of materials against surface indentation is known as hardness. The hardness of the composites evaluates the bonding strength between Aluminium and SiC, B4C, TiC, and Al2O3. A ball indenter is impressed on the materials for 15 seconds with a load of 100 kgf.

Table 2. Rockwell Hardness Test Details

<table>
<thead>
<tr>
<th>S.No</th>
<th>Composition</th>
<th>Rockwell Value HRB</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Al</td>
<td>53</td>
</tr>
<tr>
<td>2</td>
<td>Al+5%SiC</td>
<td>58</td>
</tr>
<tr>
<td>3</td>
<td>Al+10%SiC</td>
<td>63</td>
</tr>
<tr>
<td>4</td>
<td>Al+15%SiC</td>
<td>68</td>
</tr>
<tr>
<td>5</td>
<td>Al+5%B4C</td>
<td>55</td>
</tr>
<tr>
<td>6</td>
<td>Al+10%B4C</td>
<td>61</td>
</tr>
<tr>
<td>7</td>
<td>Al+15%B4C</td>
<td>67</td>
</tr>
<tr>
<td>8</td>
<td>Al+5%TiC</td>
<td>57</td>
</tr>
<tr>
<td>9</td>
<td>Al+10%TiC</td>
<td>62</td>
</tr>
<tr>
<td>10</td>
<td>Al+15%TiC</td>
<td>65.5</td>
</tr>
<tr>
<td>11</td>
<td>Al+5%Al2O3</td>
<td>55</td>
</tr>
<tr>
<td>12</td>
<td>Al+10%Al2O3</td>
<td>59</td>
</tr>
<tr>
<td>13</td>
<td>Al+15%Al2O3</td>
<td>62</td>
</tr>
</tbody>
</table>
Fig. 1. Rockwell Hardness Test on reinforced in Aluminium Metal Matrix

Fig. 1. Shows the hardness test value of aluminium metal matrix with varying SiC, B$_4$C, TiC, and Al$_2$O$_3$ in % of wt. The Hardness value is increasing by increasing the %wt of Reinforcement materials.

4.2 Brinell Hardness Test:

The hardness of the composites evaluates the bonding strength between Aluminium and SiC, B$_4$C, TiC, and Al$_2$O$_3$. A ball intender is impressed on the materials for 15 seconds with a load of 500 kgf.

Table 2. Brinell Hardness Test Details

<table>
<thead>
<tr>
<th>S.No</th>
<th>Composition</th>
<th>Brinell Value HBN</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Al</td>
<td>88</td>
</tr>
<tr>
<td>2</td>
<td>Al+5%SiC</td>
<td>100</td>
</tr>
<tr>
<td>3</td>
<td>Al+10%SiC</td>
<td>111</td>
</tr>
<tr>
<td>4</td>
<td>Al+15%SiC</td>
<td>119</td>
</tr>
</tbody>
</table>
Table 1: Brinell Hardness Test Results

<table>
<thead>
<tr>
<th>No</th>
<th>Composition</th>
<th>Hardness Value (HBN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Al+5% B$_4$C</td>
<td>102</td>
</tr>
<tr>
<td>6</td>
<td>Al+10% B$_4$C</td>
<td>115</td>
</tr>
<tr>
<td>7</td>
<td>Al+15% B$_4$C</td>
<td>121</td>
</tr>
<tr>
<td>8</td>
<td>Al+5%TiC</td>
<td>98</td>
</tr>
<tr>
<td>9</td>
<td>Al+10%TiC</td>
<td>107</td>
</tr>
<tr>
<td>10</td>
<td>Al+15%TiC</td>
<td>114</td>
</tr>
<tr>
<td>11</td>
<td>Al+5%Al$_2$O$_3$</td>
<td>95</td>
</tr>
<tr>
<td>12</td>
<td>Al+10%Al$_2$O$_3$</td>
<td>102</td>
</tr>
<tr>
<td>13</td>
<td>Al+15%Al$_2$O$_3$</td>
<td>108</td>
</tr>
</tbody>
</table>

**Fig. 2. Brinell Hardness Test on reinforced in Aluminium Metal Matrix**

Fig. 2. Shows the hardness test value of aluminium metal matrix with varying SiC, B$_4$C, TiC, and Al$_2$O$_3$ in % of wt. The Hardness value is increasing by increasing the %wt of Reinforcement materials.

**4.3 Vicker’s Hardness Test:**
The hardness of the composites evaluates the bonding strength between Aluminium and SiC, B₄C, TiC, and Al₂O₃. A Diamond intender is impressed on the materials for 15 seconds with a load of 10kgf.

**Table 3. Vickers Hardness Test Details**

<table>
<thead>
<tr>
<th>S.No</th>
<th>Composition</th>
<th>Vickers Value HV</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Al</td>
<td>170</td>
</tr>
<tr>
<td>2</td>
<td>Al+5%SiC</td>
<td>180</td>
</tr>
<tr>
<td>3</td>
<td>Al+10%SiC</td>
<td>183</td>
</tr>
<tr>
<td>4</td>
<td>Al+15%SiC</td>
<td>187</td>
</tr>
<tr>
<td>5</td>
<td>Al+5%B₄C</td>
<td>182</td>
</tr>
<tr>
<td>6</td>
<td>Al+10%B₄C</td>
<td>186</td>
</tr>
<tr>
<td>7</td>
<td>Al+15%B₄C</td>
<td>189</td>
</tr>
<tr>
<td>8</td>
<td>Al+5%TiC</td>
<td>170</td>
</tr>
<tr>
<td>9</td>
<td>Al+10%TiC</td>
<td>174</td>
</tr>
<tr>
<td>10</td>
<td>Al+15%TiC</td>
<td>178</td>
</tr>
<tr>
<td>11</td>
<td>Al+5%Al₂O₃</td>
<td>162</td>
</tr>
<tr>
<td>12</td>
<td>Al+10%Al₂O₃</td>
<td>165</td>
</tr>
<tr>
<td>13</td>
<td>Al+15%Al₂O₃</td>
<td>169</td>
</tr>
</tbody>
</table>
Fig. 3. Vickers Hardness Test on reinforced in Aluminium Metal Matrix

Fig. 3. Shows the hardness test value of aluminium metal matrix with varying SiC, B₄C, TiC, and Al₂O₃ in % of wt. The Hardness value is increasing by increasing the %wt of Reinforcement materials.

5. CONCLUSION

In this experimental study the Aluminium metal matrix composite is prepared by stir casting technique. Addition of SiC, B₄C increase the hardness, compare with TiC, and Al₂O₃. The addition of reinforcements more than 15 % of weight results in cluster formation of reinforcements.

6. REFERENCES


CHARACTERISATION AND COHESIVE ZONE MODELLING OF ADHESIVES AND BONE CEMENTS USED IN PROSTHESIS FIXATION SURGERIES

Dr. Juan Carlos del Real Romero\textsuperscript{a}, Dr. Jesus Jimenez\textsuperscript{a}, Hariharasakthisudan\textsuperscript{b}, Ragul Manoharan\textsuperscript{b}, Rufus Inbaraj\textsuperscript{b}

\textsuperscript{a} A-Escuela Técnica Superior de Ingeniería, Spain.
\textsuperscript{b} B-Loyola-ICAM College of engineering and Technology, India.

Abstract

As there is a huge demand for the development and characterisation of proper Adhesives and Bone cements in the field of orthopaedic surgery which is used to fix the Prosthesis. We have taken this opportunity which is available in the field of orthopaedic surgery to characterise the mechanical properties of the Adhesive made of Cyanoacrylate and Bone Cements made of Poly Methyl Methacrylate (PMMA). The basic Static Testings like Tensile and Shear were made on the ASTM standard specimens of Cow Bones which is being fixed using the above mentioned Adhesive and Bone Cements. Almost 30 pairs of bones were machined in order to have the mechanical testings. A comparison study is made between the Adhesives and Bone Cements on it’s efficiency of Adhering to the bone. A Cohesive Zone Model for the bones which is fixed by Adhesives and Bone cements is also developed in ANSYS.

Keywords: Prosthesis, Bone Cements, Poly Methyl Methacrylate, Cyanoacrylate

Introduction

The current surgical therapy of midfacial fractures involves internal fixation in which bone fragments with a suitable biocompatible adhesive remains highly attractive to orthopaedic surgeons. Despite decades of research, no suitable system that fully meets all the requirements for such an adhesive has not been identified. This article reviews the requirements and challenges of testing one common bone...
adhesive and two bone cement for fracture repair in knee replacement. The bone adhesives are generally classified into two groups: synthetic and biological adhesives. Earlier the synthetic adhesives include (polymethylmethacrylate) and related polymers, cyanoacrylates and polyurethanes. These adhesives are differentiated by relatively good mechanical properties. Yet they lack in few biodegradable and compatibility issues post-surgery. Recent adhesive systems based on lactide-methacrylate address these issues completely. Biological adhesives include fibrin based systems and they have good bio compatibility and biodegradability but lack the cohesive strength to have good adhesion to bone. The challenge to develop the adhesive systems themselves a further need is for greater consistency in the testing of adhesion to bone due to the stresses involved in the adhesive layer.

Furthermore, clear clinical need and vast market opportunity depicts there are no products available today as adhesives for bone. There are many bone cements but none of these claim any adhesive properties. Probably the best known of these products is polymethylmethacrylate(PMMA) bone cement that has long been used for the fixation of implants such as hip and knee replacements into bone. So, we decided to use the Cyanoacrylate adhesive and two bone cement named Palacos-R and Palacos LV depending upon their various properties.

**Preparation of the specimens**

Initially we planned to test the adhesives with the cut pieces of cow bone to plot the tensile and shear strength (specimens are made according to ASTM and ASME standards) of the adhesives and bone cements. The frozen parts of cow bone were prepared by allowing it to cool down to the room temperature and washed to clear the flesh and blood from the bone. As shown in the figure the bone was cut into
rectangular shape in the approximate dimensions of (30*60) cm. The rectangular part was divided into segments with the dimensions of (10*20) cm for each individual specimen uniformly with the permanent marker. After these operations the bone specimen is made to hold in the cutting machine. The cutting machine was fixed with the abrasive tool to cut the bone specimens to reduce the tension between the bone surface and cutting tool. It also prevents from the breaking of bone during the cutting process. We continued this process until we got totally 15 individual specimens for tensile test and 15 individual specimens for shear test. Tensile test specimens were separated and each specimen was exactly divided into two-half by marking in the middle of the specimen. The midpoint of the first half was marked using the Vernier caliper and the same procedure was continued on the other half of the specimen. The midpoint was marked to drill hole at those marked points to hold the specimens in the universal testing machine. A 1.6 mm drill bit was used to drill the hole in the specimen. Finally, after plotting all the marking on the individual specimen it was cut in the midpoint and those two pieces are from the single specimen. The cut specimen is rubbed with the swiss-made emery sheet to produce uniform adhesive layer. From the figure you can see that the cut specimen and they were marked at cutting surface to remember where the adhesive should be applied during the testing process. The exact procedure was followed for all the remaining tensile specimens and marked in their cutting surface. For the shear specimens it included the same process but the last task of cutting the specimen was not necessary as it was the shear test.

Application of adhesives

Cyanoacrylate is the most extensively studied group of adhesives for bone, and other tissue based adhesive applications. The adhesion of a wide range of cyanoacrylates to bone under varying storage conditions and times have been reported successful. Cyanoacrylates
have been used extensively in wound closure and there are several commercial products that exists, no product has emerged with great success in the orthopaedic arena. Cyanoacrylate has the stability upto 6 weeks but later there was inadequate for successful healing. The specimens were tested by cleaning the adhesive surface with a PBS solution for ten minutes to eradicate any infections and to produce a wet condition on the surface for the adhesive to stick to the bone specimen. A little drop of cyanoacrylate was applied on the surface carefully and evenly spread all over the surface. The part “b” of the same specimen is placed on top of the adhesive surface coherently. This process is carried out very rapidly because the cyanoacrylate gets attached to the surface at a faster pace. Simultaneously, the adhesive is applied to all the specimens at the same time and prepared for the tensile and shear test. From the figure we can see the specimens before and after the application of adhesives and the difference between them.

Palacos is bone cement which is successfully used to anchor artificial knee joints especially. It fills the free area between the prosthesis and the bone which plays a major role of an elastic zone. The bone cement must absorb the forces acting on the hip to ensure the artificial implant remains in place over the long term. It had excellent fatigue strength compared to other bone cements and the risk ratio was less in palacos bone cement and it has excellent bonding strength between the bone and the implant. The green color bone cement improves the vision from the bones. We applied the bone specimens with palacos bone cement to proceed with the tensile and shear test and promising results were found.

Palacos LV is a similar bone cement with the addition of zirconium dioxide in the cement composition. It is suitable for small and medium sized joints. As the name suggests it has low viscosity which reduces the tedious work involved in applying the bone cements
on the specimen surface. Both the cements contain the same properties and results are obtained from the procedure.

**Fracture Mechanics(cohesive and adhesive zone modal)**

The Crack Tip Opening Displacement (CTOD) model for the bone along with Adhesives and Bone Cement is developed. New material library is created in ANSYS version 18 by obtaining data like Young’s Modulus, density and Poisson’s ratio for adhesives and bone cements from CES-Edupack Software.

The density of Cow’s femur is found to be $1.32 \times 10^3$ kg/m$^3$ and Young's Modulus is $3.75 \times 10^9$ Pa.

The Density of Bone cement is found to be $1.22 \times 10^3$ kg/m$^3$ and Young’s Modulus is $3.8 \times 10^9$ Pa.

The Poisson ratio of bone and Adhesives lie between the range of 0.30 to 0.45.

The semi elliptical Crack with tetrahedron meshing is developed in the region between bone and Adhesives and it’s mode of fractures ($K_1,K_2,K_3$) and J-Integral Values are studied by applying a pressure of 1000 Pa on the top surface of the bone.

The fracture mechanics design is only made for the optimum bone geometry.

**Conclusion**

- The Bone Cements is comparatively working better in the fixation of the bones.

- The Sterility and Wetness of the bone plays a major role in the Adhering strength of the Bones.
• The Surface finish of the adhering surfaces plays an important role in fixation.

• Low viscous Bone Cement gives a better Adhering Strength.

• Cyanoacrylate produces less exothermic reaction than the Poly Methyl Methacrylate

• Curing time needed for the bone Cements is much higher than the Adhesives.

• Bone cements needs vigorous Mixing of the polymers.

**Figures:**

Figure 1: *For Bone without any fixation*

a-Mode 1 Fracture  
b-Mode 2 Fracture  
c-Mode 3 Fracture  
d-Strain energy release rate (J-integral)

Figure 2: *For Bone stuck with Bone cements (Palacos and Palacos-LV)*

a-Mode 1 Fracture  
b-Mode 2 Fracture  
c-Mode 3 Fracture  
d-Strain energy release rate (J-integral)

Figure 3: *For Bone stuck with Adhesive (cyanoacrylate)*

a-Mode 1 Fracture  
b-Mode 2 Fracture
c-Mode 3 Fracture

d-Strain energy release rate(J-Integral)

Figure 4:
a-Initial Cow’s Femur
b-Abrasive Cutter for Bone
c-Grinding to get proper surface finish
d-ASTM specimen of bone
e-Testing of stuck bone

Tables

Table 1- Consists of Tensile and Shear Stress of Bones stuck with adhesives and Bone cement.
<table>
<thead>
<tr>
<th>S.NO</th>
<th>ADHESIVE</th>
<th>SPECIMEN NUMBER</th>
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<th>TENSILE FORCE (N)</th>
<th>SHEAR FORCE (N)</th>
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Acknowledgement:

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A REVIEW ON MECHANICAL PROPERTIES OF STIR CAST ALUMINIUM MATRIX COMPOSITES
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Abstract:
In the past few years the global need for low cost, low weight with high performance materials, so the research in composite materials play a major revolution in manufacturing industries. In case of Metal Matrix composites, aluminium matrix composite plays a major role due their high strength to weight ratio, low cost and high wear resistance are widely manufactured and used in structural applications along with aerospace and automobile industry. The reinforcements like alumina, silicon carbide, boron carbide, alumina, graphite, fly ash etc added to molten aluminium and casted by stir casting method. This paper presents a review on the mechanical properties of aluminium metal matrix composites containing single and multiple reinforcement. Alumina to aluminium has shown an increase in its mechanical properties. Organic reinforcement like fly ash, coconut ash also improved the tensile and yield strength. Self-lubricating property of graphite improved the machinability of aluminium. Many authors have also reported about modified stir casting route.

Keywords: Metal Matrix Composites, Silicon carbide (SiC), Boron Carbide (B₄C), Alumina (Al₂O₃), Hardness, Tensile Strength
1. INTRODUCTION

A composite material is a material system composed with two or more reinforcements with an interface separating them that differ in form and weight composition and are essentially insoluble in each other [1]. According to the chemical properties of the matrix phase, composite materials are classified as metal matrix (MMC), polymer matrix (PMC) and ceramic matrix composites (CMC). Research in MMC is increased to alter the physical properties like density, thermal expansion, thermal diffusivity and mechanical properties like tensile and compressive behaviour, creep, tribological behaviour etc. In Aluminium Metal Composites the matrix phase is of pure aluminium or an alloy of it and the reinforcement used is a non-metallic ceramic such as SiC, Al₂O₃, TiC, B₄C, fly ash, Graphite etc., Aluminium alloys have good corrosion resistance, high damping capacity, low density and good electrical and thermal conductivities. This paper presents a detailed review of stir cast aluminium matrix composite regarding their improved mechanical properties.

2. STIR CASTING TECHNIQUE

In Stir casting method the composite materials are fabricated, by adding reinforced ceramic particles, is mixed with amolten matrix metal by means of mechanical stirring. In [2] alumina particles into aluminium melt by stirring molten aluminium alloys containing the ceramic particles. The Reinforcements with up to 30% of volume fractions can be manufactured by stir casting technique [3]. The major problem in stir casting technique is segregation of reinforcement’s particles settling at the bottom during solidification. The distribution of reinforcements depending upon the mechanical stirring and wetting condition of particles. In order to increase the wettability the Magnesium ribbon is added. In order to overcome the drawbacks of stir casting technique the recent development of double stir casting technique is used. The Aluminium is heated above the melting point...
temperature and cooled down to temperature so that the aluminium is in semi-solid state. The preheated reinforcement particles are added and mixed with mechanical stirrer. Then the slurry in once again heated to liquid state and mixed for a period of time depend upon the percentage of reinforcement materials. The double stir casting technique the reinforcement particles is uniformly distributed compared with conventional stir casting method.

The major advantage of stir casting process is suitable for mass production. Compared to other fabrication methods like Compo casting, Squeeze casting, Centrifugal casting, Powder metallurgy, Stir casting process costs as low as $1/3^{rd}$ to $1/10^{th}$ for mass production of metal matrix composites [4]. Because of the above reasons, stir casting is the most widely used commercial method of producing aluminium based composites.

3. **Mechanical Properties**

The mechanical properties of aluminium matrix composite depends upon the reinforcements, size, shape, and quantity. The mechanical properties like hardness and tensile strength is been reviewed in this paper.

The mechanical properties of Aluminium 6061 with Al$_2$O$_3$ is studied [5]. The Micro-Vickers hardness were measured on the polished samples using diamond cone indenter with a load of 20N and the value reported is average of 100 readings taken at different locations[5].The presence of stiffer and harder Al$_2$O$_3$ reinforcement leads to the increase in constraint to plastic deformation of the matrix during the hardness test. The % of Al$_2$O$_3$ increase of hardness of composites also increased.
Fig 1. The variations of Hardness with wt% of Al$_2$O$_3$ [5]

The Tensile test is done in a computerized universal testing machine as per ASTM standards. Three sample readings are taken and average value is taken. The tensile properties like tensile strength and % elongation is determined [5]. The tensile strength increases with increase in amount of reinforcement, while there is decrease in ductility with increasing amount of reinforcement. The ductility of the composite drops down when compared to that of unreinforced material [5].
The mechanical properties of Aluminium 7075 with SiC is studied [6]. The resistance of materials against surface indentation is termed as hardness. The micro hardness of composites valuates the interface bonding strength between reinforcing particles and matrix [6]. Vickers hardness is determined using Future Tech - FV 800 Vickers hardness testing machine. Samples were mounted with bakelite so that samples could not move when the load was applied. A diamond indenter was impressed on material at a load of 5 kg for 10 seconds. To avoid the segregation effect of the reinforcements in the matrix, four readings were taken for each sample [6].
Table 1. Vickers hardness of SiC reinforced AMCs [6]

<table>
<thead>
<tr>
<th>Materials</th>
<th>Vickers Hardness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Al + 0% SiC</td>
<td>24.50 ± 0.35</td>
</tr>
<tr>
<td>Al + 5% SiC</td>
<td>38.67 ± 1.81</td>
</tr>
<tr>
<td>Al + 10% SiC</td>
<td>42.30 ± 2.43</td>
</tr>
<tr>
<td>Al + 20% SiC</td>
<td>45.40 ± 1.06</td>
</tr>
</tbody>
</table>

Tensile test was performed using computerized Instron tensile testing machine. The test was conducted using strain rate of 2mm/min at room temperatures. Fig. 5 shows the relation between tensile strength and wt. % of SiC reinforcements of fabricated composites. From the tensile test results, the tensile strength of Aluminium metal composite is greater than unreinforced Al. Increase of tensile strength in AMCs can be attributed due to the applied tensile load transfer to the strongly bonded SiC reinforcements in Al matrix [6].

Fig 4. The variations of Tensile Strength with wt% of SiC[6]

The mechanical properties of Aluminium 7075 with B_4Cis studied [7]. The hardness tests were carried out according to ASTM E10-00 standards using Brinell hardness testing machine. A 10 mmball indenter is loaded on the specimen with a load of 500 kg. The test was
conducted at room temperature and the measurement of hardness was taken at different places on each sample to obtain an average value of hardness [7].

Tensile tests were conducted as per ASTM E08-8 on the samples, with the computerised universal tensile testing machine (UTE40) at room temperature (30°C). The compression strength was conducted as per ASTM E09-9 standard using the universal tensile testing machine [7].

Fig 5. The variations of Hardness with Vol% of B₄C [7]

Fig 6. The variations of Tensile Strength with Vol% of B₄C [7]

Fig 7. The variations of Compression Strength with Vol% of B₄C [7]
4. CONCLUSION

The Stir casting method is used to manufacture Aluminium metal matrix composite with desired properties. Reinforcing Aluminium and its alloys with ceramics particles has shown an appreciable increase in its mechanical properties. Addition of Al₂O₃, SiC, B₄C etc. particles in aluminium improves the hardness, yield strength, tensile strength while ductility is decreased. Hybrid ceramic reinforcement has increased the mechanical properties.

5. REFERENCES


AN INVESTIGATION OF MECHANICAL BEHAVIOUR OF AL7075 WITH AL$_2$O$_3$

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$^b$ $^d$ Staffs Department of Mechanical Engineering, R.M.K College of Engineering and Technology, Puduvoyal

Abstract:

Aluminium alloy are widely used in various sector due to their good mechanical properties, better corrosion resistance and low melting point as compare to others. The most important property of these materials are relatively light weight and having low manufacturing cost which make them attractive for different applications from technological point of view. The purpose of metal matrix composite is to add the desired attributes and strength of metals and ceramics. This research work is to understand the change in behaviour of Al7075 by adding different amount of "AL2O3" composites. Various tests like hardness test, tensile test and impact test are carried out on these samples to understand the mechanical behaviour which are produced by stir casting. Further it is concluded that as the weight percentage of reinforcement goes on increasing the mechanical properties such as hardness increases.

Keywords: Metal Matrix Composites, stir casting, hardness, tensile strength

INTRODUCTION

Aluminium is the world’s most available metal and it is the third most common element, comprising 8% of the earth’s crust. Although aluminium compounds have been used for thousands of years, aluminium metal was first produced around 170 years ago. In the 100 years since the first industrial quantities of aluminium were
produced, worldwide demand for aluminium has grown to around 29 million tons per year.

About 22 million tons is new aluminium and 7 million tons is recycled aluminium scrap. The use of recycled aluminium is economically and environmentally compelling. Normally it takes 14000 kWh power to produce one tonne of new aluminium. In contrast, it takes only 5% of this to re-melt and recycle one tonne of aluminium. There is no bigger difference in quality between new and recycled aluminium alloys.

Pure aluminium is very soft, ductile, high electrical conductivity and have high corrosion resistant. It is widely used as aluminium foil and conductor cables, but alloying with other elements is very much needed to provide the higher strength for other applications.

The point required in outlining metal matrix composite materials is to consolidate the attractive characteristics of metals and earthenware production. The expansion of high quality, high modulus obstinate particles to a bendable metal framework deliver a material whose mechanical properties are transitional between the lattice amalgam and the artistic fortification. Aluminum is the most bounteous metal in the Earth's hull, and the third most plentiful component, after oxygen and silicon. It makes up around 8% by weight of the Earth's strong surface. Because of simple accessibility, high quality to weight proportion, simple machinability, solid, bendable and pliability Aluminum is the most generally utilized non-ferrous metal in 2005 was 31.9 million tons.
EXPERIMENTAL DETAILS: MATERIALS

Aluminium oxide, ordinarily alluded to as alumina, has solid ionic interatomic bonding offering ascend to its alluring material attributes. It can exist in a few crystalline stages which all return to the most stable hexagonal alpha stage at elevated temperatures. This is the period quite compelling for basic applications and the material accessible from Accuratus. Alpha stage alumina is the most grounded and stiffest of the oxide ceramics. Its high hardness, superb dielectric properties, refractoriness and great thermal properties settle on it the material of decision for an extensive variety of uses.

High purity alumina is usable in both oxidizing and reducing atmospheres to 1925°C. Weight reduction in vacuum ranges from 10^-7 to 10^-6 g/cm² over a temperature scope of 1700° to 2000°C. The Thickness of AL2O3 is 55 Micro meter. It opposes assault by all gasses aside from wet fluorine and is impervious to every single basic reagent with the exception of hydrofluoric corrosive and phosphoric corrosive. The composition of the ceramic body can be changed to upgrade specific attractive material qualities. An illustration would be increases of chrome oxide or manganese oxide to enhance hardness and change shading. Different increases can be made to enhance the straight forwardness and consistency of metal films let go to the fired for consequent brazed and fastened get together. The Structure of AL2O3 is shown below.
PREPARATION OF COMPOSITES

Muffle Furnace was utilized to warm the material to sought temperatures by conduction, convection, or dark body radiation from electrical resistance warming components. A muffle furnace in authentic utilization is a heater in which the subject material is separated from the fuel and the majority of the results of burning including gas sand flying powder. Stirrer was to unsettle fluids for accelerating responses. Stirrer was intended to homogeneous blending of fluid, ointment, arrangement thick material and strong fluid.

A Sieve Analysis was utilized to survey the molecule measured is appropriation of a granular material. The estimated is dispersion is regularly of basic significance to the way the material performs being used. A sieve examination can be performed on a non-natural or natural granular materials including sands, pulverized shake, mud, stone, coal, soil, an extensive variety of fabricated powders, grain and seeds, down to a base estimated relying upon the correct strategy. In this trial particles of 100 micron size were utilized. Sifter investigation Tester was utilized to get fancied granular size.

Graphite Crucible is a headstrong compartment utilized for metal, glass, and colour generation and in addition various present day research facility forms, which can withstand temperatures sufficiently
high to dissolve or generally adjust its substance. Truly, they have generally been made of dirt, yet they can be made of any material with a higher temperature resistance than the substances they are intended to hold Graphite crucible.

A Power Hacksaw (or electric hacksaw) was a kind of hacksaw that was controlled either by its own particular electric engine. A hacksaw is a fine-tooth saw with a sharp edge under pressure in a casing, utilized for cutting materials, for example, Aluminium composite into little pieces so is to keep the alloy into pot.

First blocks of aluminium AL7075 are purchased and are cut into small pieces and these pieces are put into a furnace and is heated at 750°C and is converted into molten metal. Now the AL2O3 powder is preheated in a muffle furnace. The composite is prepared by Stir Casting method. The AL2O3 powder is added to the molten metal and various proportions and it constantly stirred with the help of a stirrer the velocity of stirring is about 200 rpm. After ample stirring the molten metal is shifted into the die to be casted into the required shape.

**EXPERIMENTAL TESTING**

A Rockwell hardness analyzer machine utilized for the hardness measurement. The surface being tried for the most part requires a metallographic complete and it was finished. Load utilized on Rockwell's hardness analyzer was 500 kgf at dwell time 20 seconds for every specimen. The result of Rockwell's hardness test for simple combination without support and the wt.% variety of reinforcements such B4C with Al compound 7075 are shown in Table. The underneath example demonstrates that 10&15% organizations of AL2O3 without hardening.
Tensile tests were utilized to survey the mechanical conduct of the composite and matrix alloy. The composite bars were machined to tensile specimen with a diameter of 6mm and gauge length of 30 mm. Ultimate tensile strength is the most extreme anxiety that a material can withstand while being extended or pulled before necking which is the point at which the specimen's cross segments begins to altogether contract.

**RESULTS AND DISCUSSION: HARDNESS**

The resistance of materials against surface indentation is known as hardness. The hardness of the composites evaluates the bonding strength between Aluminium and AL2O3.

<table>
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<tr>
<td>AL 100%</td>
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<td>Al90%+10% AL2O3</td>
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<tr>
<td>Al85%+15% AL2O3</td>
<td>55</td>
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*Table1. Hardness values of various composites*
Table 2. Shows the relation between tensile strength and wt. % of AL2O3 reinforcements of casted composites. From the tensile test results, it is observed that the tensile strength increased by adding AL2O3. Increase of tensile strength in Aluminium metal matrix can be attributed due to the applied tensile load transfer to the strongly bonded reinforcements in Aluminium metal matrix.

In a composite containing strong matrix with strong interface, the crack has to propagate across both matrix and reinforcements. With the increase of wt. % AL2O3, the porosity also increases but increase of strength due to strong interfacial bond contributes to enhance the tensile strength of Aluminium metal matrix.

Fig. 4. Specimen for Tensile test after the testing
Table 2. Tensile Strength of various composite

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<th>Yield strength</th>
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<tr>
<td>Al 100%</td>
<td>503</td>
<td>572</td>
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<tr>
<td>Al 90% + AL2O3 10%</td>
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<td>Al 85% + AL2O3 15%</td>
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<td>140.158</td>
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</table>

CONCLUSION

The conclusions drawn from the present examination are as follows:

- By utilizing stir casting technique both the composites have been effectively manufactured. We found that the blend throwing process which makes the conveyance of composites consistently all through the materials.

- In this procedure, aluminium Al7075 is blended with aluminium oxide. What's more, the outcomes found that the hardness of the material is expanded at various %. The affect quality is diminished because of option adding % of the support to the standard material.

- By adding 10 to 15% of AL2O3 with aluminium the percentage increase in hardness of aluminium matrix is between 4 to 12%

- By adding 10% of AL2O3 the tensile and yield strength increases by 37% and 51%. By adding 15% of AL2O3 the tensile and yield strength increases by 120% and 145%.

- Thus this Composite can be used in places where light weight and high Strength and high hardness material is required.
REFERENCE


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పిచిగురు నాటకాలు - విశ్వనాథ విలిక్షణాత

బాహ్మన్‌ విషయంలో ప్రత్యేకంగా వికుటలు

1. కన్యా - ప్రాణశిల్పులు, 2. రామాయణం, 3. మధురు, 4. మహాత్మా, 5. అష్్టాకాలం అని వాస్తవంలో ప్రమాణం చెప్పవచ్చు. వాస్తవం షాయి ప్రత్యేకంగా బాహ్మన్‌ విషయంలో చిత్రింపబడిన చిత్రాలు వివిధ నిణాసాలకు సాధ్యం చేస్తుంది. దీని చిత్రాలు రాత్రు నింటే నిఘంటు ప్రతి నిమిత్తం రాసి వచ్చింది. దాని ప్రతి రాష్ట్రం లోని నిఘంటు ప్రతి ప్రతిభాత్మకం చేస్తుంది. భారతం, భారతం, భారతం వింతే ఇంద్రాస్తుంది.

పత్రికల కృతిలు:


1) పిచిగురు నాటకం
2) కన్యా నాటకం ఒక్కే
3) రామాయణం నాటకం

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ఇతను చరిత్రకారుడు సాంప్రదాయం కోసం ఎంతా లోఇనానికీ వచ్చాడు. ఇంతా నైనా పడడము చేయడానికి మనం తయారా చేసామని కోసం. ఇంతే ప్రారంభమైని చరిత్రకారుడు ముఖ్యమైన పదములు మనం నేడు పడడానికి చేసామని తెలిపించాడు. ఇక్కడి ఫినిష్ట్రింగు కాంప్యూటర్ మీద ప్రారంభమైని పాతిసెండ్ మీడియా కంటే పెద్దదిగా ఉంది. అంది ఉపయోగానికి చేసాం. ఇక్కడి ఎగుమత ఎందుకంటే ఉంది. 

చరిత్రకారుడు పరిస్థితులు పెట్టడానికి పడడము చేయడానికి మనం తయారా చేసామని కోసం. ఇంతే ప్రారంభమైని చరిత్రకారుడు మనం తయారా చేసామని కోసం. ఇక్కడి ఫినిష్ట్రింగు కాంప్యూటర్ మీద ప్రారంభమైని పాతిసెండ్ మీడియా కంటే పెద్దదిగా ఉంది. అంది ఉపయోగానికి చేసాం. 

సరైనని ముఖ్యంగా ఎంతా లోఇనానికి వచ్చాడు. ఈ మార్గం జపానీస్ ఎంపెట్స్ పదములు మనం నేడు పడడము చేసామని కోసం. ఇక్కడి ఫినిష్ట్రింగు కాంప్యూటర్ మీద ప్రారంభమైని పాతిసెండ్ మీడియా కంటే పెద్దదిగా ఉంది. అంది ఉపయోగానికి చేసాం. 

ఇక్కడి ఎగుమత ఎందుకంటే ఉంది. ఇక్కడి ఎగుమత ఎందుకంటే ఉంది. ఈ మార్గం జపానీస్ ఎంపెట్స్ పదములు మనం నేడు పడడము చేసామని కోసం. ముఖ్యంగా ఎంతా లోఇనానికి వచ్చాడు. ఇక్కడి ఎగుమత ఎందుకంటే ఉంది. ఈ మార్గం జపానీస్ ఎంపెట్స్ పదములు మనం నేడు పడడము చేసాం.
ప్రశ్నిస్తుల కోర్ణం:-

ప్రయత్నించిన మాధ్యమాంధ్ర స్భావన ప్రయత్నించిన మనం రాణు పిలువడం. మాంధ్యమాంధ్ర స్థాయి విద్యార్థులు ప్రయత్నించిన మనం రాణు పిలువడం. తాగొంటే వాటి మనం పిలువడం. మాంధ్యమాంధ్ర స్థాయి విద్యార్థులు ప్రయత్నించిన మనం రాణు పిలువడం. తాగొంటే వాటి మనం పిలువడం. మాంధ్యమాంధ్ర స్థాయి విద్యార్థులు ప్రయత్నించిన మనం రాణు పిలువడం. తాగొంటే వాటి మనం పిలువడం. మాంధ్యమాంధ్ర స్థాయి విద్యార్థులు ప్రయత్నించిన మనం రాణు పిలువడం. తాగొంటే వాటి మనం పిలువడం. మాంధ్యమాంధ్ర స్థాయి విద్యార్థులు ప్రయత్నించిన మనం రాణు పిలువడం. తాగొంటే వాటి మనం పిలువడం. మాంధ్యమాంధ్ర స్థాయి విద్యార్థులు ప్రయత్నించిన మనం రాణు పిలువడం. తాగొంటే వాటి మనం పిలువడం. మాంధ్యమాంధ్ర స్థాయి విద్యార్థులు ప్రయత్నించిన మనం రాణు పిలువడం. తాగొంటే వాటి మనం పిలువడం. మాంధ్యమాంధ్ర స్థాయి విద్యార్థులు ప్రయత్నించిన మనం రాణు పిలువడం. తాగొంటే వాటి మనం పిలువడం. మాంధ్యమాంధ్ర స్థాయి విద్యార్థులు ప్రయత్నించిన మనం రాణు పిలువడం. తాగొంటే వాటి మనం పిలువడం. మాంధ్యమాంధ్ర స్థాయి విద్యార్థులు ప్రయత్నించిన మనం రాణు పిలువడం. తాగొంటే వాటి మనం పిలువడం. మాంధ్యమాంధ్ర స్థాయి విద్యార్థులు ప్రయత్నించిన మనం రాణు పిలువడం. తాగొంటే వాటి మనం పిలువడం. మాంధ్యమాంధ్ర స్థాయి విద్యార్థులు ప్రయత్నించిన మనం రాణు పిలువడం. తాగొంటే వాటి మనం పిలువడం. మాంధ్యమాంధ్ర స్థాయి విద్యార్థులు ప్రయత్నించిన మనం రాణు పిలువడం. తాగొంటే వాటి మనం పిలువడం. మాంధ్యమాంధ్ర స్థాయి విద్యార్థులు ప్రయత్నించిన మనం రాణు పిలువడం. తాగొంటే వాటి మనం పిలువడం.
అస్వభావితం: తెలుగు జనాపడా సహిత్యం వర్గీకరణ ద్వారా నిర్మాణం చేయబడింది. అస్వభావితం కారణంగా ఇది నిర్మాణం చేయబడింది. నిర్మాణం చేయబడి ఉండవచ్చని జింకును నిలిచింది. అస్వభావితం ప్రధానంగా ఉండవచ్చని ధాన్యం ఇది నిర్మాణం చేయబడింది. ఇది అస్వభావితం ప్రధానంగా ఉండవచ్చని ధాన్యం వాటికి ఉండవచ్చని నిర్మాణం చేయబడింది.

నిర్మాణం చేయబడి ఉండవచ్చని తెలుగు జనాపడా సహిత్యం వర్గీకరణ ప్రధానంగా ఉండవచ్చని ధాన్యం నిర్మాణం చేయబడింది. ఇది అస్వభావితం ప్రధానంగా ఉండవచ్చని ధాన్యం వాటికి ఉండవచ్చని నిర్మాణం చేయబడింది.

“అస్వభావితం ప్రధానంగా ఉండవచ్చని ధాన్యం నిర్మాణం చేయబడింది
ధాన్యం అస్వభావితం ప్రధానంగా ఉండవచ్చని ధాన్యం వాటికి ఉండవచ్చని నిర్మాణం చేయబడింది
ధాన్యం అస్వభావితం ప్రధానంగా ఉండవచ్చని ధాన్యం వాటికి ఉండవచ్చని నిర్మాణం చేయబడింది”.

(లెకేంటెమ్ - లెకేంటెమ్ - 35)

రామనుజ కంపెంట్ చేయబడి లేకేంటెం ఉంది. లేకేంటెం ఉంది ప్రధానంగా ఉండవచ్చని ధాన్యం నిర్మాణం చేయబడింది. లేకేంటెం ఉంది ప్రధానంగా ఉండవచ్చని ధాన్యం వాటికి ఉండవచ్చని నిర్మాణం చేయబడింది.

సాధనా విస్త్రమే లేకేంటెం ప్రధానంగా ఉండవచ్చని ధాన్యం వాటికి ఉండవచ్చని నిర్మాణం చేయబడింది. లేకేంటెం ఉంది ప్రధానంగా ఉండవచ్చని ధాన్యం నిర్మాణం చేయబడింది.

ధాన్యం వాటికి ఉండవచ్చని లేకేంటెం ప్రధానంగా ఉండవచ్చని ధాన్యం నిర్మాణం చేయబడింది. లేకేంటెం ఉంది ప్రధానంగా ఉండవచ్చని ధాన్యం వాటికి ఉండవచ్చని నిర్మాణం చేయబడింది.

ప్రధానంగా ఉండవచ్చని లేకేంటెం ఉంది. లేకేంటెం ఉంది ప్రధానంగా ఉండవచ్చని ధాన్యం నిర్మాణం చేయబడింది. లేకేంటెం ఉంది ప్రధానంగా ఉండవచ్చని ధాన్యం వాటికి ఉండవచ్చని నిర్మాణం చేయబడింది.

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అందించడం: (Oral Literature)
మనం తెలుగు భాష మాటలు సంపాదించడానికి, ఏమిటి ఏమిటి బ్రిటిష్చరియా రాజకీయానికి వాడారు. "మాత్రమే సాధనాత్మక తలం తెలుగు భాష విశేషాంశానికి లభిస్తుంది. మన తెలుగు భాష రాజకీయానికి లభిస్తుంది. అంతేతో తెలుగు భాష మన రాజకీయానికి లభిస్తుంది. ప్రభుత్వం తెలుగు భాష విశేషాంశానికి లభిస్తుంది. దేశం తెలుగు భాష విశేషాంశానికి లభిస్తుంది.

సాధనాత్మక తలం తెలుగు భాష విశేషాంశానికి లభిస్తుంది. అంతేతో తెలుగు భాష విశేషాంశానికి లభిస్తుంది. అంతేతో తెలుగు భాష విశేషాంశానికి లభిస్తుంది. అంతేతో తెలుగు భాష విశేషాంశానికి లభిస్తుంది.

పాకించడం: (Material Culture)
మనం తెలుగు భాష విశేషాంశానికి లభిస్తుంది. మనం తెలుగు భాష విశేషాంశానికి లభిస్తుంది. మనం తెలుగు భాష విశేషాంశానికి లభిస్తుంది. మనం తెలుగు భాష విశేషాంశానికి లభిస్తుంది.

పాకించడం: (Social Folk Custom)
మనం తెలుగు భాష విశేషాంశానికి లభిస్తుంది. మనం తెలుగు భాష విశేషాంశానికి లభిస్తుంది.

పాకించడం: (Social Folk Custom)
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ఇంటర్నేషనల్ జూఅరేషన్ ఆఫ్ మ్యూలిడిస్పిల్న్యూరీ ఎడ్యూకేషనల్ రెసెచ్
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భారతిస్త్రియ (Folk Performing Arts)

అన్ని జాతురులు, మనుష్యాలు తన జీవితం నిర్భయంగా అందరికించాం. అయిదు కలపం అంటే
మనుష్యం తన సంప్రదాయం నిర్భయంగా ఇది కోసం చేస్తుంది. మనుష్యం, అతను ప్రతిభకుడిగా నిర్భయంగా కోసం చేస్తుంది. కానీ, అతను ప్రతిభకుడిగా నిర్భయంగా కోసం చేస్తుంది.

మనుష్యం, క్షమతను అందించే, అన్ని సంస్థలు, మనుష్యం, మనుష్యం, నిర్భయంగా ఇది కోసం చేస్తుంది. మనుష్యం, అతను ప్రతిభకుడిగా నిర్భయంగా కోసం చేస్తుంది. కానీ, అతను ప్రతిభకుడిగా నిర్భయంగా కోసం చేస్తుంది.

అంటే ప్రతిభకుడి ప్రతి సంస్థ నిర్భయంగా అందరిచాలని అంటాం. ప్రతిభకుడి ప్రతి సంస్థ నిర్భయంగా అంటాం. ప్రతిభకుడి ప్రతి సంస్థ నిర్భయంగా అంటాం. ప్రతిభకుడి ప్రతి సంస్థ నిర్భయంగా అంటాం. ప్రతిభకుడి ప్రతి సంస్థ నిర్భయంగా అంటాం.

అంటే ప్రతిభకుడి ప్రతి సంస్థ నిర్భయంగా అంటాం. ప్రతిభకుడి ప్రతి సంస్థ నిర్భయంగా అంటాం. ప్రతిభకుడి ప్రతి సంస్థ నిర్భయంగా అంటాం. ప్రతిభకుడి ప్రతి సంస్థ నిర్భయంగా అంటాం. ప్రతిభకుడి ప్రతి సంస్థ నిర్భయంగా అంటాం.

ప్రతిభకుడి ప్రతి సంస్థ నిర్భయంగా అంటాం. ప్రతిభకుడి ప్రతి సంస్థ నిర్భయంగా అంటాం. ప్రతిభకుడి ప్రతి సంస్థ నిర్భయంగా అంటాం. ప్రతిభకుడి ప్రతి సంస్థ నిర్భయంగా అంటాం. ప్రతిభకుడి ప్రతి సంస్థ నిర్భయంగా అంటాం.

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ప్రతిభకుడి ప్రతి సంస్థ నిర్భయంగా అంటాం. ప్రతిభకుడి ప్రతి సంస్థ నిర్భయంగా అంటాం. ప్రతిభకుడి ప్రతి సంస్థ నిర్భయంగా అంటాం. ప్రతిభకుడి ప్రతి సంస్థ నిర్భయంగా అంటాం. ప్రతిభకుడి ప్రతి సంస్థ నిర్భయంగా అంటాం.

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7) తెలుగు సాధనాలు ఉపయోగించి సంపాదన సంస్థలు
8) సాధనాలు ప్రతి సాధనానికి సంపాదన సంస్థలు
9) సాధనాల సంపాదన మార్గాలు సంస్థలు
10) విధానాల - యొక్క సంస్థలు చాటుతుంది సంస్ధలు (హెచ్డి లేదా సంస్ధలు)
11) సాధనాల సంపాదన కేంద్రాలు నిర్వహణ - సాధనాల సంపాదన వ్యవస్థలు ఏ మార్గాలు అంటాయి సాధనాల సంస్థలు నిర్వహణ కేంద్రాల సంస్ధలు
12) సాధనాల సంపాదన వ్యవస్థలు కేంద్రాల సంస్థలు సంపాదన సంస్థలు
13) సాధనాల సంపాదన వ్యవస్థలు కేంద్రాల సంస్థలు సంపాదన సంస్థలు సంస్థలు సంపాదన సంస్థలు

విశేష రిపోసిడ్

1) సోషల్ మార్కాటి విస్తరణ సాధనాలు - సాధనాల
2) సాధనాల సంస్థ రిస్క్మించడానికి - సాధనాలు సంస్థ రిస్క్మించడానికి
3) సాధనాల సంస్థ సంపద సంపాదన సంస్థలు
4) సాధనాల సంపద సంపాదన వ్యవస్థలు - సాధనాల సంపద సంపాదన వ్యవస్థలు
5) సాధనాల సంపద సంపాదన వ్యవస్థలు
6) సాధనాల సంపద సంపాదన వ్యవస్థలు
7) సాధనాల సంపద సంపాదన వ్యవస్థలు.