‘Change is the only constant in life’ is an old proverb. It is an all-pervasive and continuous process. We are experiencing rapid changes in all spheres of our life. Developments in technology, ever-changing needs of the society and globalization of organizations have given momentum to the need for change and its successful implementation for the survival of any kind of organization. The world we live in continues to change. “Change today is not only inevitable, but continual. It is illogical to expect a break from change or to count a period of consolidation.” (Gallacher, 1999). Change underlies a qualitatively different way of perceiving, thinking & behaving to improve over the present. Change is an alteration on the existing field of forces that tend to affect the equilibrium. The organization we work in or rely on to meet our needs & wants are also changing dramatically in terms of their strategies, their structures, their systems, their boundaries & of course expectations of their staff & managers. Thus any factor in the environment that infers with organization’s ability to alter the human, financial and material resources, its needs or to produce and market its services becomes a force of change. (Harigopal, 2001)

Change can be summarized as follows:

- Change can be seen as continuous and inevitable
- Change underlies a qualitatively different way of perceiving, thinking and behaving to improve over the past and existing practices.
- Change can be uncertain and unpredictable.
- Change can be slow, sudden as well as planned.
- Many a times, the rate of change is faster than our ability to comprehend and cope with it.

2.1 CHANGES IN LIBRARIES

Libraries are facing the challenges of changes. Successful management of these technological changes is compulsory for their future survival. Library professionals are supposed to adapt and successfully manage these changes to serve the user community in technological era.

Due to penetration of technology all over libraries are expected to adapt these changes without any delay. Change within libraries requires modifications in services and products, staff’s responsibilities, customer relationships and behavior of individuals within the library. Changes that library and information services face are of an unknown and unpredictable nature. It is impossible for library managers to predict future trends accurately. Traditional change management techniques
are inadequate to deal with the changing environment that libraries are facing. It is a scenario where one has to brace oneself for whatever occurs. Under these conditions it is crucial that libraries make optimal use of the entire workforce. It is of fundamental importance that customer service be given top priority. It is also essential that flexible organizational structures be created where workload and responsibilities are shared and trust and responsibility are the norm rather than control. (Pugh, 2000)

Changes in Libraries are being brought about by the following key reasons

2.1.1 Technological revolution: Technological revolution has placed the libraries in a permanent transition period. It has changed the traditional ways of operating library. Technology has revolutionized the ways a library serves to its users. Even users are very familiar to these technologies as they are growing with it. They know how effectively these technologies can be utilized for their survival in their respective fields by getting timely information with in least possible time. Libraries are fully appreciated by its users if they are getting better services using these technologies.

2.1.2 Users’ changing information needs: Today’s technology driven users are more aware of their information needs and from where to get it. Their information needs are changing constantly due to their increasing dependence on Internet, Google and World Wide Web. Users want relevant and up to date information in their respective areas right on their desktops, laptops, mobiles, etc. This attitude has forced library professionals to adapt changes at the earliest and develop skills to serve future generation.

2.1.3 Electronic information environment: Information environment is constantly changing. Technological revolution has created an electronic information environment where easy transfer and exchange of information is possible through online subscription, e-mail, e-alerts, development of consortia, etc. Users can easily access and share information with little efforts.

2.2 FORCES FOR CHANGE

An organizational change is any alteration of activities in an organization. The alteration of activities may be the result of change in the structure of the organization, transfer of tasks, new product introduction, or changes in attitudes of group members or process, or any number of events inside and outside the organization. (Carson, 1999). There are various reasons which are forcing libraries and information centers to change:
Robbins (2001) summarizes six specific forces which are acting as stimulants for change:

Table 2.1 Forces of Change

<table>
<thead>
<tr>
<th>FORCES FOR CHANGES. No.</th>
<th>Forces</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Nature of the workforce</td>
<td>• More cultural diversity</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Increase in professionals</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Many new entrants with inadequate skills</td>
</tr>
<tr>
<td>2.</td>
<td>Technology</td>
<td>• Faster and cheaper computers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• TQM programs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Reengineering programs</td>
</tr>
<tr>
<td>3.</td>
<td>Economic shocks</td>
<td>• Asian real estate collapse</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Russian devaluation of the ruble</td>
</tr>
<tr>
<td>4.</td>
<td>Competition</td>
<td>• Changes in oil prices</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Global competitors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Mergers and consolidations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Growth of e-commerce</td>
</tr>
<tr>
<td>5.</td>
<td>Social trends</td>
<td>• Attitude toward smokers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Delayed marriages by young people</td>
</tr>
<tr>
<td>6.</td>
<td>World politics</td>
<td>• Popularity of sport-utility vehicles</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Collapse of Soviet Union</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Opening of markets in China</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Black rule of South Africa</td>
</tr>
</tbody>
</table>
Pandya and Pandya (2010) have described the following forces of change:

1. **Nature of the work force**
   - More cultural diversity
   - Increase in professional ethics
   - Many new entrants with inadequate skills

2. **Technology**
   - Faster library services
   - Global access to the information
   - Digital Library, RFID, Scanners etc.

3. **Economic shocks**
   - Rise and fall funding
   - Changing cost of services
   - Competition
   - Global competitors
   - Mergers and Consolidations
   - Growth of E-commerce

4. **Social trends**
   - Internet chat rooms
   - Library 2.0 & Online Libraries
   - Increased interest in urban living
   - Changing needs of the users

### 2.3 TYPES OF CHANGE

Klatt, Murdock and Schuster (1978) opine that each manager must be concerned with introducing four types of changes in the human resource system:

1. Innovations by subordinates;
2. Changes which the manager originates;
3. Changes imposed by higher management;
4. Changes imposed by the environment.
Carson (1999) has mentioned three kinds of change:-

i) Adaptive change- This change involves reimplementation of a change in the same organizational unit. Adaptive change is not considered threatening.

ii) Innovative change- This involves changes that are generally new and unfamiliar. The innovative changes create a kind of uncertainty and fear in organizations.

iii) Radically Innovative change- This is the most intimidating type of change. This type of change is most resisted in organizations. Implementation of radical change in an organization requires a long-term strategy.

Changes (http://www.eGyanKosh.ac.in) in organizations can also be categorized as:-

- Reactive change- This is change brought about by a sudden or unplanned event.
- Planned change- This is a systematic, deliberate change in the way part or all of an organization functions. In Planned change the focus is on process, people or technology; and one person, a project team, a department or the entire firm can be involved in the change process.

### 2.4 NEED FOR CHANGE

Change is essential for libraries and information centers as it aims at providing better infrastructure and favorable working conditions to staff which in turn provide up-to-date and relevant information in required form to its user community in their respective fields with in the least possible time. Change is necessary for the growth and survival of libraries. Change is necessary in libraries and information centers because of following reasons:-

- To meet the ever changing and ever increasing demands of users
- To keep up with technological innovations
- To develop improved methods and techniques to make work faster and easier
- To improve better working conditions
- To achieve academic excellence
- To expedite the services to users
- To handle competencies in their respective fields
- To improve the status of libraries
- To open better ways for resource sharing and exchange of services among libraries by using technologies
- To make easy and immediate access of information from anywhere at any time and at any place with in the least possible time

2.5 CHANGE MANAGEMENT

Change management refers to the task of making changes in a well planned manner and managing it successfully for the survival of organization. Change management is a fundamental competence needed to manage the change in any organizations as the speed of change continues to increase & affect all the sectors of life. Change management can be used to create and maintain a healthy organization, improve operations and culture and anticipate & manage change. The organizations are realizing that the need for change is increasing & the capability to change is becoming essential for organizations to survive & succeed in today’s marketplace. ‘Reason, relationship and results’ are the three Rs of change management. (Harigopal, 2001) Reason management, the first R, deals with employees’ perceptions and beliefs, their cognitions. "Most often messages of change are laden with negative emotions and with uncertainty of the future," rules Harigopal. "If employees have to be tuned to change, communications should lead to optimism, hope and a positive outcome.” The second R, relationship management, recognizes that any change affects our relationship with people and things, and so focuses on employees' feelings. You can create positive emotions in your staff by empowering them, advises the author. "Encourage employees to take active role in their work, relate to their jobs positively and involve them to take responsibility to improve their performance." Results management, the third R, emphasizes that change management is "about getting results while overcoming one's habitual behaviors and reluctance to acquire new skills." Cross-training can help in this.

In case of libraries and information centers change management is not just a matter of managing change but a question of proper organizing of men, material, resources and technologies to cope with any challenge that comes across.

The current definition of Change Management includes both organizational change management process and individual change management models, which together are used to manage the people side of change. (www.wikipedia.org)
2.5.1 Organisational change management is the management of change from the perspective of the top leadership looking down into the organisation. It focuses on the broad change management practices and skills to help the organisation comprehend, accept and support the required changes. It provides the knowledge and skill to implement proper methodology for managing a change throughout an organisation. Organisational change management involves top level and middle level managers and the human resource managers who sponsor the change in the organisation.

2.5.2 Individual change management is the management of change from the perspective of the employees who are at the bottom level. These are the people who actually implement the change. Here the focus is on empowering them by providing them the tools and required training in navigating their way through the change” (http://www.eGyanKosh.ac.in).

In the coming years, no other competency will be more important to your organization than the ability to manage change. Flexible and adaptable organizations will be the benchmark for long-term growth and sustainability. With an ever increasing velocity of change - more changes happening more frequently than ever before - organizations need to be able to effectively identify and manage the "people side" of their organizational efforts to ensure that solutions deliver meaningful results. Building the competency to manage change is not like installing a new system or technology. It is a transformation in how the organization operates and leads people. It requires individuals to learn new skills and take on new roles. It requires a new approach to change projects and initiatives.

The tutorial by Prosci and the Change Management Learning Center (2010) examines different two approaches for initiating the effort to build organizational change management capability and competency, such as:

I. Two paths: Evolution vs Revolution: There are two main paths an organization can take toward change management competency. The first is evolution. In this scenario, the organization builds a track record for applying change management process and tools on a number of initiatives. It may start with one major effort. Conversely, change management deployment can also take place as a revolution. Change management might be a very new concept in the organization and may have only been applied on a handful of changes. However, leadership in the organization recognizes the need for being better at change and starts a program to deploy change management throughout the organization. This is an
effort driven from the top of the organization to create a competitive advantage and improve the financial performance of change initiatives. Both of these scenarios are occurring in organizations. An evolutionary approach is more common. As change management is applied and proven to be effective over time, it gains momentum and ultimately hits a point where a shift occurs - away from simply applying change management toward building the competency. A revolutionary approach is less common and typically is associated with new leadership who has seen a change management capability program underway in a previous organization.

II. Two perspectives: Project-centric vs. Skill-centric: The approach to building change management capability can originate from a project and skill perspective. The project perspective is associated with the application of structured change management approaches on various initiatives in the organization. The focus of this approach is to attach change management to a handful of specific projects, typically involving some sequencing and planning related to which projects are the first to apply change management. The skill perspective is associated with building the personal competencies required by those involved in managing change. A skill-centric approach is often used when the originator of the effort has a human resources or training background and has influence and control over training and professional development in the organization. The focus in this approach is helping individuals throughout the organization to build their own skills and competencies for managing change. (Prosci, 2010)

2.6 MANAGEMENT OF TECHNOLOGICAL CHANGE

When we say technological change it refers to technology-driven changes, with special reference to Information and communication technology (ICT) and its tools such as computers, internet, email, e-resources, RFID, OPAC, CD-ROM, etc. used in libraries and information centers to provide better and instant services to user community with in the least possible time. The Wikipedia free Internet encyclopedia defines “information technology (IT) or information and communication(s) technology (ICT)” as the “technology required for information processing”. In particular the use of electronic computers and computer software to convert, store, protect, process, transmit, and retrieve information”.

Technological changes in libraries and information services will include the designing of a new system that is Web-based and incorporated into the parent organization, such as the municipal
council or a university. Such a system needs to be robust, secure, and capable of searching, generating reports, and allowing users to customize it according to their needs. It should consist of several subsystems and linkages, which should include a management information system designed to reflect policy, the strategic plan and the change management process, from the housekeeping systems designed to aid acquisition and processing to the seamless integrated systems intended to support users and electronic services (Wilson, 1998).

The rate of change of technology is enormous. The globalization and technological changes are main factors that are dominating society and playing important role for competitiveness. Survival of organization depends upon continuous development and up gradation of these technologies in a systematic manner to achieve common goals. “The management of technology focuses upon creating competitive advantage for firms by funding effective means to fulfill the wants and needs of customers in the marketplace. Although this involves creating or acquiring technical capabilities, competitive advantages accrue to a firm only when the capabilities are deployed in new products or process. Successful technological change can take place in different ways; first, when old solutions are applied to new problems second, when new solutions are found to existing problems; and/or third, a combination of both. Technical breakthroughs sometimes present a firm with opportunities to produce a new product that fulfils an untapped customer want or to produce a product that is superior to the one currently being used by customers. Alternately, technological changes may allow a firm to redesign its process to be more efficient or more responsive to is customers. Similarly, untapped customer needs often become the basis for directing technological change efforts - both product and process - in an organization.”(Kaptan, Dhote and Telang, 2003)

In today’s technology-driven society technological advances have influenced library and information centers to a great extent in the way they operate and provide services to its users. It is the impact of technology which has given momentum to e-governance, e-commerce, e-learning, multimedia, video conferencing and so on. Therefore in the present scenario managing technological change has assumed a lot of significance. Technological advances and constantly changing attitude of users towards acquiring information are the driving force behind the concept of change management. As change must be aimed at ensuring organizational survival, whether the economy is strengthening or weakening, the consequences of change being uncertain, proper management of these technological changes become even more vital. Library is an inseparable & integral part of the community. It must adapt itself to meet the requirements of the community. It means the library
should change its organizational structure, form and content of its services to meet the needs of the user community. Otherwise it will not survive as a public institution & new organizations will displace it. The library should prove itself as worthy & strong support base for the advancement of democratic society. “Change in information services is rapid, unpredictable and dislocational, unconnected with past practice... Today’s ICT-based change in particular affects all aspects of organizational life. If its impact is to be maximized, it has to be governed by ideas which will take advantage of all the skills, talents and opinions available. Change will have to be viewed as intrinsic and the system will have to support creativity and entrepreneurism.” (Pugh, 2007)

Ratwani and Yusuf (2002) emphasized that the “management skills are required to manage the library financially, personally, technologically by applying management techniques and skills, i.e. supervisory, counseling, auditing, planning, decision making, motivating etc. in general with particular reference to digital libraries.” Hence, the management skills are essentially needed for all the library professionals, to manage the various sections and the library as a whole.

“The accelerating pace of technological change is transforming both the nature and the role of university research library. In the past few decades, advances in information technology have driven revolutionary changes in the ways we work, learn and communicate. Progress in the development of microprocessors, networking, massive data storage, imaging and software has created new infrastructures for business, academic research, health care and social interaction and new opportunities for economic development.” (Sinha, 2005).

In this era of competencies ability to manage technology-driven change and implementing it successfully in information based organizations, is essential to provide up to date services and information to users in their respective fields. In libraries & other knowledge-based organizations the present information explosion & the consequent knowledge revolution has unleashed a gigantic wave of change. The changes that libraries & information services are facing today are unpredictable & unquantifiable. The technological climate worldwide has created an atmosphere of uncertainty in which it is difficult to anticipate the future. Thus in libraries & information centers or any other organization it is not just a matter of managing change but a question of properly organizing change from the perspective of the top leadership looking down into the organization so as to cope with any uncertainty that comes across. Kumar (2002) says Flexibility and Adaptability are key features required in information service structures as it is obvious that ICT related change
will be a continuing issue, and it is likely that services will wish to create new specialist roles to cope with emerging technologies.

2.7 POSSIBLE STRATEGIES/MODELS/APPROACHES TO CHANGE

There are numerous theories, strategies and models of change suggested by various authors for implementing change process. Agricultural libraries may investigate or approach any of these to implement change process.

2.7.1 Prosci’s ADKAR model for change

Prosci believes that for change to work in an organization, individuals must change and understand change. For this it develops ADKAR Model for managing people side of change.

It is an individual change management model. It outlines the five building blocks of successful change, whether that change occurs at home, in the community or at work. The name “ADKAR” is an acronym based on the five building blocks:

- **A** Awareness of the need for change
- **D** Desire to participate and support the change
- **K** Knowledge on how to change
- **A** Ability to implement required skills and behaviors
- **R** Reinforcement to sustain the change

![Prosci’s ADKAR Model](http://www.change-management.com/tutorial-adkar-overview-mod4.htm)
ADKAR Model states how one person moves through the change process individually. To move out of the current state, an individual needs Awareness of the need for change and Desire to participate and support the change. Successfully moving through the transition state requires Knowledge on how to change and the Ability to implement the required skills and behaviors. In the future state, that Ability is utilized and Reinforcement is required to sustain the change.

Prosci’s ADKAR model or Model of individual change is especially design for managing individual change. The image below shows the connection between the change management tools developed in the organizational change management process and the phases of individual change described by the ADKAR model. This picture is the essence of effective change management and is the core of Prosci’s change management methodology.

![Change Management Tools & ADKAR Phases of Change](http://www.change-management.com/change-management-process.htm)

**Figure 2.2 Change Management Tools & ADKAR Phases of Change**

**Source**: http://www.change-management.com/change-management-process.htm

The ADKAR model can be used to:

- diagnose employee resistance to change
- help employees transition through the change process
- create a successful action plan for personal and professional advancement during change
- develop a change management plan for your employees

2.7.2 Kurt Lewin’s Three stage model of change

Kurt Lewin’s had a profound influence on the theory and practice of change in organization. Most theories of organizational change originated from the landmark work of this social psychologist. Lewin (1947) instituted a three-stage model of change which explained how to initiate, manage and stabilize the change process. The three stages of change, according to this model are:

Unfreezing - Changing - Freezing

![Kurt Lewin Change Model](http://rapidbi.learningprofessionals.co.uk/kurt-lewin-three-step change-theory/)

**Figure 1.3 Kurt Lewin Change Model**

**Unfreezing:** This stage involves preparing the organisation for change. The main focus is on creating the motivation to change. Change is more likely to successful when those involved are prepared for what is to happen. Therefore, individuals are encouraged to replace old behaviours and attitudes with those desired by the management. In unfreezing state organisation begins to encourage employees to address change, inform them of the process. This state thus helps in creating conditions for the change to be implemented.

**Changing:** This stage involves planning and implementing the change. Once a change has been initiated it is important not to lose momentum. As change involves learning, this stage entails providing employees with new information, new behavioural models or new way of looking at things. The main purpose is to help employees learn new concepts or points of view. Role models,
mentors, experts, training etc. are various mechanisms deployed to facilitate the change. Gradually, the employee behaviour begins to change, causing a change in organisational attitudes, corporate values and management practices. Thus, the changing stage requires organizing and mobilizing the resources required to bring about the change.

**Refreezing:** This stage involves embedding the new ways of working into the organisation. The main focus is on consolidating the organisation in its new mode of operation. Change is stabilised during refreezing by helping the employees integrate the changed behaviour or attitude into their normal way of doing things.

### 2.7.3 RACI model of change

It is simple tool that can be used identifying roles and responsibilities during an organisational change process.

![Typical RACI / RASCI chart](http://www.12manage.com/methods_raci.html)

**Figure 2.4 RACI Model**

**Source:** http://www.12manage.com/methods_raci.html
The RACI diagram helps to map activities to roles and defines how roles contribute to main activity. Therefore they can be used to describe what should be done and by whom during a change process.

**Responsible (R):** People who are expected to actively participate in the change process.

**Accountable (A):** Person to whom R is accountable and who is ultimately responsible for the results.

**Consulted (C):** People who have, a particular expertise, which can be utilized for making specific decisions. This also includes people who must be consulted for some reasons before a final decision is taken.

**Informed (I):** People who are affected by change and therefore, must be kept informed but need not to be consulted.

### 2.7.4 The Change Model

The Change Model (Change Formula or Change Equation) given by Beckhard and Harris (1987) is attributed to David Gleicher.

It is simple yet powerful tool that gives a clear representation of the possibilities and conditions to change an organisation. Beckhard and Harris suggested that a change will occur only when three factors i.e. Dissatisfaction with status quo (D), Vision of the proposed change (V) and the first step towards change (F) added together are greater than the Cost or Resistance to Change (R). These three components must be present to overcome the resistance to change in an organisation. This Change Model Formula is as follows:

\[ C = D \times V \times F > R \]

C= Change  
D= Dissatisfaction with status quo  
V= Vision of the proposed change  
F= First step towards change  
R= Resistance to Change

To meet the affected change all the factors of the change formula must be managed.
2.7.5 Posci’s Change Management Maturity Model

This model is based on Benchmarking Research and Interactions with companies going through change. It has five levels or stages, from no change management to organisational competency. Each level involves more attention and management of the people side of change. A common methodology is built on situational awareness and customization, allows the entire organisation to move towards Level 4 (Organisational Standard) and Level 5 (Organisational Competency) while retaining the flexibility for individual groups and departments.

**Prosci Change Management Maturity Model**

<table>
<thead>
<tr>
<th>Level</th>
<th>Focus</th>
<th>Description</th>
<th>Key Attributes</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Organizational Competency</td>
<td>Change management competency is evident in all levels of the organization and is part of the organization's intellectual property and competitive edge</td>
<td>Continuous process improvement in place</td>
<td>Highest profitability and responsiveness</td>
</tr>
<tr>
<td>4</td>
<td>Organizational Standards</td>
<td>Organization-wide standards and methods are broadly deployed for managing and leading change</td>
<td>Selection of common approach</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Multiple Projects</td>
<td>Comprehensive approach for managing change is being applied in multiple projects</td>
<td>Examples of best practices evident</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Isolated Projects</td>
<td>Some elements of change management are being applied in isolated projects</td>
<td>Many different tactics used inconsistently</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Adhoc or Absent</td>
<td>Little or no change management applied</td>
<td>People-dependent without any formal practices or plans</td>
<td>Highest rate of project failure, turnover and productivity loss</td>
</tr>
</tbody>
</table>

*Figure 2.5 Change Management Maturity Model*

2.7.6 LaMarsh and Associates' Managed Change™ Model

The Managed Change™ Model developed by LaMarsh and Associates (L&A) is targeted at developing and implementing winning solutions by helping clients systematically:

1. Identify the people who will have to change;
2. Identify the potential reasons they might resist the change; and
3. Develop action plans designed to minimize or eliminate this resistance.

![The Managed Change™ Model](http://www.lamarsh.com/approach/)

**Identify the Change**: The Managed Change™ process begins with the Identification of Change. This step is to clarify and validate the stages of change from the perspective of key target groups. Define and understand the current and desired states from a broad perspective, and create the key messages that align with the statement of work and the known issues that will affect the project. It assist organization to articulate the business case for change in a manner that everyone will
understand, fleshing out the desired outcome of the change project, and successfully accomplishing the significant events along the way.

**Prepare the Change:** The second step is to gather additional information on the critical variables that will determine success or failure, including the culture and history of change initiatives within the organization, and the levels of expected resistance. This step also requires defining and clarifying the roles of the key people charged with project deployment, including the change sponsor, change agent and targets of change. It gives sponsors, change agents and targets the understanding, skills, trainings and assessment tools they need to effectively implement change and to quickly accomplish project goals.

**Plan the Change:** The third step is to plan the change by using the data and analysis from the previous steps to understand the degree of risk and build customized Communication, Learning and Reward plans across all target groups. These three components form an integrated change management strategy that mitigates risk, builds ownership and addresses the changes required in an organization’s people and culture to ensure long-term success.

**Implement the Change:** The project team must overcome organizational resistance by implementing those Communications, Learning and Rewards programs. These three programs will demonstrate that information and knowledge is being shared freely so that those affected by the change can make "informed decisions" about why accepting and embracing the change is good for them as individuals. Developing a communication system ensures that each person involved in the change understands each element from his or her point of view. The learning system is designed to provide the right training for the right people at the right time. Rewards and reinforcements are set up to encourage behavior toward the desired state and ensure alignment of performance measurements with the desired state of the change project.

**Sustain the Change:** Once the programs are in place and the change is accepted by targets, it is critical to set up a process and accountability to ensure the change is sustained over time. This is accomplished by determining what was neglected or where there are vulnerabilities to slippage and establishing key metrics. Lastly, this is also the step to chronicle the entire project so that lessons learned can help teams through subsequent changes. The resulting project book is an enduring record in case the change does slip and new change agents have to be assigned to shore up or reinstall the changes. (LaMarsh, 2006)
2.8 RESISTANCE TO CHANGE

Change and resistance are the two sides of the same coin. Like change, ‘resistance to change’ is also an all-pervasive and permanent reality. Resistance is human being’s natural reaction to any such change that demands modifications and adjustments at workplace with in an organization or in his surroundings. Resistance is the negative reaction or approach by employees towards uncertain fears of technology, gaining new knowledge and learning new skills to handle technological changes. It affects their entire surroundings and routine procedures, of which they were very used to and familiar. ‘Adaptability to change’ and ‘resistance to change’ varies from organization to organization and individual to individual. The employees who serve as change agents play an important part in the acceptance or rejection of change. Resistance to change can be minimized to a great extent through communication, negotiation, incentives, training and participation.

Today libraries are also in the grip of rapid growth in technologies, global competition and changing information environment. As such, they also need to be flexible and should adapt and implement technologies for the purpose of networking and resource sharing with in the institution or around the world. It is necessary for easy availability of information and faster communication. These changes are essential for future survival and to foster changing information needs of the society. Resistance encountered needs to be addressed properly by the library managers as staff’s acceptability and cooperation is essential for successful implementation and management of technological change. Weiner (2003) opines that libraries are affected by discontinuous change caused by the type and rapidity of technological innovations. By examining the theories of structuration, diffusion of innovation and contingency, change in libraries can be better understood, thus easing its adoption and assimilation. There is a need to reconceptualise libraries. Librarians and library staff needs to recognize these changes and develop new competencies, skills and mindsets to cope with these changes and overcoming resistance. Therefore change requires a thorough planning from library administration and participation and involvement from staff’s side.

2.8.1 Affects of Resistance

Change is the sign of future growth and survival where as resistance to change is the greatest barrier in implementing change process successfully. Resistance is the first reaction to change which puts progress on a backseat. In the absence of change, organizations move towards obsolescence. They are no longer in the mainstream. For the survival of any organization change is the necessary
condition. Therefore resistance should be overcome positively in order to sustain development further.

2.8.2 Causes of Resistance

Resistance can be at both organizational as well as individual level. It varies from organization to organization and individual to individual. Skoldberg (1994) stated that people tend to resist change for six reasons: fear, vested interests, lack of trust or misunderstanding, differences in assessment of the situation, limited resources and interorganizational agreements.

According to Kotter and Schlesinger, there are four reasons that certain people are resisting change:

- **Parochial self-interest**: Some people are concerned with the implication of the change for themselves and how it may affect their own interests, rather than considering the effects for the success of the business.
- **Misunderstanding**: Communication problems; inadequate information.
- **Low tolerance to change**: Certain people are very keen on security and stability in their work.
- **Different assessments of the situation**: Some employees may disagree on the reasons for the change and on the advantages and disadvantages of the change process.

2.8.2.1 Resistance at organizational level: Changes are resisted mainly due to following reasons at organization level:

- Non-involvement of the employees in designing the change.
- Non-preparation of the individuals to live up to the changed situation.
- Non-availability of infrastructure.
- Lack of provision of incentives and benefits of change.
- Lack of positive motivation by the management.
- Non-participation of employees and workers in implementing change due to lack of trust in the management.
- Lack of interaction by the management.
2.8.2.2 Resistance at individual level: Changes are resisted mainly on the following grounds at individual level by the employees/staff:

- Lack of information/orientation
- Fear of the unknown or uncertain outcomes of the change
- Indifferent attitude towards change
- Lack of interest
- Lack of skills to handle change
- Lack of training
- Fears of losing the jobs
- Unwillingness to learn new skills, methods and procedures
- Fear of competition
- Fear of failure
- Inability to match the speed of change

Robbins (2001) identifies five reasons why individuals resist change: habit, security, economic factors, and fear of the unknown and selective information processing. In addition, he identifies six major sources of organizational resistance: structural inertia, limited focus of change, group inertia, threat to expertise, threat to established power relationships and threat to established resource allocations. Stueart and Moran (2002) emphasized that the organization as a whole must explore the core of any kind of resistance to change, validate its existence and then try to minimize its impact through understanding and problem solving. Libraries exist for the benefit of the mind, but they have practical problems coping with the acquisition, storage, and handling of the documents and records with which they deal. Any change in technology that would have a significant effect on the methods available for these procedures could have important consequences for library service. (Buckland, 1992) Library staff/employees also face the challenges and pressures of change and resist changes generally because of the above discussed reasons.

2.8.3 Approaches to Overcome Resistance

Resistance to change can be lessened by adopting best change management strategy as per library environments. All the investments in five M’s i.e. Man, Machine, Material Methods and Money will go into veins, if an effective change management strategy is not prepared, understood, and implemented properly. A manager has to choose strategy best suited to his organization to
implement change effectively and efficiently. This way he can make maximum use of Five M’s of his organization.

In order to implement change, the library needs to develop a strategic plan. Its vision and values should be evaluated and redesigned based on critical success factors (CSFs) (Smye, 1994). CSFs for libraries include customer-oriented services and the innovation of new technology.

**Six (6) Change Approaches model**: Kotter and Schlesinger (1979) set out the Six (6) Change Approaches model to prevent, decrease or minimize resistance to change in organizations. (See Table 2.1)

### Table 2.2 Methods of dealing with resistance to change

<table>
<thead>
<tr>
<th>Approach</th>
<th>Commonly used in situations</th>
<th>Advantages:</th>
<th>Drawbacks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education + communication</td>
<td>Where there is a lack of information or inaccurate information and analysis.</td>
<td>Once persuaded, people will often help with the implementation of the change.</td>
<td>Can be very time consuming if lots of people are involved.</td>
</tr>
<tr>
<td>Participation + involvement</td>
<td>Where the initiators do not have all the information they need to design the change, and where others have considerable power to resist.</td>
<td>People who participate will be committed to implementing change, and any relevant information they have will be integrated into the change plan.</td>
<td>Can be very time consuming if participators design an inappropriate change.</td>
</tr>
<tr>
<td>Facilitation + support</td>
<td>Where people are resisting because of adjustment problems.</td>
<td>No other approach works as well with adjustment problems.</td>
<td>Can be time consuming, expensive, and still fail.</td>
</tr>
<tr>
<td>Negotiation + agreement</td>
<td>Where someone or some group will clearly lose out in a change, and where that group has considerable power to resist.</td>
<td>Sometimes it is a relatively easy way to avoid major resistance.</td>
<td>Can be too expensive in many cases if it alerts others to negotiate for compliance.</td>
</tr>
<tr>
<td>Manipulation + co-optation</td>
<td>Where other tactics will not work or are too expensive.</td>
<td>It can be a relatively quick and inexpensive solution to resistance problems.</td>
<td>Can lead to future problems if people feel manipulated.</td>
</tr>
<tr>
<td>Explicit + implicit coercion</td>
<td>Where speed is essential and the change initiators possess considerable power.</td>
<td>It is speedy and can overcome any kind of resistance.</td>
<td>Can be risky if it leaves people mad at the initiators.</td>
</tr>
</tbody>
</table>

*Source: http://www.scribd.com/doc/22824751/Choosing-Strategy-for-Change*
**Education and Communication** - This approach is one of the best ways to overcome resistance to change where there is a lack of information or inaccurate information and analysis. This educates employees about the change effort beforehand by communication or orientation. This reduces doubts and rumors concerning the effects of change in the organization and increase employees trust in the management and change process.

**Participation and Involvement** - This approach is likely to lower resistance, when the management is not in a position to design and introduce the change and where others have considerable power to resist. When employees are involved in the change effort they are less likely to offer resistance to decisions for change which they have participated in making.

**Facilitation and Support** – This approach is useful when people are resisting change due to adjustment/modification problems. It is concerned with the provision of offering counseling, guidance and training during the change process to deal with fear and anxiety during a transition period to cope with change.

**Negotiation and Agreement** - The approach of negotiation and agreement as a tactic is appropriate when those resisting change are in a position of power. Managers can lessen resistance by negotiating something in return and offering lucrative incentives to change resistors.

**Manipulation and Co-option** - Co-optation is a form of both manipulation and participation. It is an effective manipulation technique to co-opt with change resistors. Co-option involves the patronizing gesture in bringing a person into a change management planning group for the sake of appearances rather than their substantive contribution. It seeks to buy off the potential workers and leaders who resist change by giving them a key role in the change decision.

**Explicit and Implicit Coercion** - Coercion approach is used where speed is essential managers can explicitly or implicitly force employees into accepting change by making threats that resisting to change can lead to losing jobs, firing, transferring or loss of promotions.

In brief, Kotter and Schlesinger have suggested that management can use a range of these approaches to introduce change successfully. Often, a combination of these approaches can be employed to overcome resistance.
Greiner (1967) has mentioned the following factors to check resistance at organizational level.

a) Organizational change is a continuous dynamic philosophy, which cannot be circumscribed by a master blue print to be prepared by the top manager or the change agent.

b) Change is for everyone. It is wrong to assume that change is related to those lower echelons in organizational hierarchy who are less productive and less intelligent.

c) Successful change efforts are related to both unilateral as well as delegated approaches to change.

d) Reasons connected with implementing change should dispense with parochial outlook. Instead, they should develop broader outlook to design a change model that may be beneficial to people working at all levels of organization (Goel, 2003).

Klatt, Murdock, and Schuster (1978) and his associates say that the manager involved in any type of change goes through four steps:

(i) “Recognises that a change is necessary or desirable;
(ii) Determines the ideal change;
(iii) Decides how to implement the change;
(iv) Introduces the most practical form of the ideal change”.

Further, they suggest that each of these steps can produce an undesirable reaction or a particular resistance from the employee:

(i) “To the very idea of a change
(ii) To the intended change.
(iii) To the method of implementing the change.
(iv) To the changed state itself”.

The effective manager will keep these four areas of possible resistance in mind in trying to avoid resistance, before it develops any further. When the change is under consideration, it is appropriate for the management to determine what its goals and objectives are, in bringing about change.
Forced Field Analysis, developed by Lewin (1951) provides another way to look at resistance to change. This involves analyzing the two types of forces, driving forces and restraining forces.

The Driving Forces are all of the factors, pressures and issues that exist in support of the change. Such as:

- Positive attitude
- Maintained balanced diet
- Achievement of long-term goals
- Good physical condition
- Disciplines condition routine
- Support of family and friends

Restraining forces are the forces which come in the way of attaining the desired goals. These are all of the factors, pressures and issues that can restrict or prevent a successful completion of change process. Such as:

- Job interference
- Lack of a qualified coach
- Never completed a marathon
- History of past injury
- No inclement weather experience
- Budget issues

The Force Field Diagram (see figure 2.7) involves analyzing of driving forces and restraining forces that influence any proposed change and then assessing how best overcome resistance. Lewin viewed that an issue is held in balance by the interaction of these two opposing sets of forces. A dynamic balance ("Equilibrium") of forces works in opposite directions. In order for any change to occur, the driving forces must exceed the restraining forces, thus shifting the equilibrium.
The diagram helps its user to picture the "war" between forces around a given issue. Usually, a planned change issue is described at the top. Below this, there are two columns. The driving forces are listed in the left column, and the restraining forces in the right-hand column. Arrows are drawn towards the middle. Longer arrows indicate stronger forces.

**Steps in a force field analysis (Lewin, 2010)**

I. Describe the current situation.
II. Describe the desired situation.
III. Identify where the current situation will go if no action is taken.
IV. List all the forces driving change toward the desired situation.
V. List all the forces resisting change toward the desired situation.
VI. Discuss and interrogate all of the forces: are they valid? Can they be changed? Which are the critical ones?
VII. Allocate a score to each of the forces using a numerical scale e.g. 1 is extremely weak and 10 is extremely strong.

**Figure 2.7 Force Field Diagram**

*Source:* http://www.valuebasedmanagement.net/methods_lewin_force_field_analysis.html
VIII. Chart the forces. List the driving forces on the left. And list the restraining forces on the right.

IX. Determine whether change is viable and progress can occur.

X. Discuss how the change can be affected by decreasing the strength of the restraining forces or by increasing the strength of driving forces.

Remember that increasing the driving forces or decreasing the restraining forces may increase or decrease other forces or even create new ones as suggested by Lewin.

**SWOT Analysis:** SWOT is an abbreviation for **Strengths, Weaknesses, Opportunities and Threats**. It is a powerful tool for exploring the internal and external environment of any organization. It always varies from organization to organization. It analyzes and evaluates the competitive position of an organization. Strengths and weaknesses can be classified as internal factors and opportunities and threats can be classified as external factors. (Figure 2.8). It is also an important tool for pre analyzing overall position of libraries and information centers. This way library manager can easily assess the situation he has to deal in future to implement proposed changes and resist changes to a great extent.

![SWOT Analysis Diagram](http://hrmadvice.com/hrmadvice/useful-hr-tools/hr-swot-examples.html)
The biggest advantage of SWOT analysis is that it is simple and only costs time to do and the disadvantage is that a typical SWOT analysis is a usually a simple checklist and not critically presented. The best SWOT analysis will be more than a simple checklist. It will consider the degree of strength and weakness versus its competitors to determine how good that strength really is. A company may have a strong research and development team but a competitor’s could be even stronger. A good SWOT should also look the size of an opportunity or threat and show how these inter-relate with its strengths and weaknesses. If a company is thinking about compiling lists it may not be focused sufficiently on how to achieve its objectives. Taking a list approach can also result in items not being prioritized. For example, a long list of weaknesses may appear to be ‘cancelled out’ by a longer list of strengths, regardless of how significant those weaknesses. (http://www.businessteacher.org.uk/business-operations/swot-analysis/). A library can also identify and evaluate its strengths, weaknesses, opportunities and threats by applying SWOT Matrix and thereby minimizing the resistance and leading change successfully. A SWOT matrix is very useful in strategic planning of dealing change and resistance.

**SWOT Matrix**

<table>
<thead>
<tr>
<th></th>
<th>Strengths (S)</th>
<th>Weaknesses (W)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opportunities (O)</td>
<td>S-O</td>
<td>W-O</td>
</tr>
<tr>
<td>Threats (T)</td>
<td>S-T</td>
<td>W-T</td>
</tr>
</tbody>
</table>

SWOT analysis can be followed by cost benefit analysis (CBA) to predetermine the financial competitiveness of library to deploy change management. It helps in assessing various funds and finances library has to carry out proposed changes while dealing with the all strengths and weaknesses analyzed beforehand through SWOT analysis. CBA is one of a set of formal tools of efficiency assessment. It evaluates the overall situation of any organization quantitatively. It simply adds up the value of the benefits of a course of action, and subtracts the costs associated with it. (Hakkert & Wesemann, 2005).

### 2.9 LIBRARY MANAGEMENT SOFTWARES/SYSTEMS

Technological innovations ranging from printing press to microcomputers have influenced the wide spectrum of library operations, extending from acquisition to delivery of resources in various formats. So, it has become essential for libraries to automate its operations and information
storage and retrieval to facilitate and enhance faster delivery of services in a networked environment. Library Management Softwares/Systems are information storage and retrieval software packages used in libraries for automating house keeping operations as well as to provide some computer-based information services in libraries. There are various software packages available in the market, especially designed to support library housekeeping operations such as acquisitions, cataloguing, circulation control, serials control, etc. Some of the most widely used software packages in libraries are mentioned below.

2.9.1 SOUL

The story of SOUL (Software for University Libraries) started with the development of ILMS (Integrated Library Management Software) by INFLIBNET in collaboration with DESIDOC. Two versions of ILMS (DOS and UNIX) were developed for university libraries in India. But with the introduction of GUI-based system and other revolutionary changes in the field of computer software, INFLIBNET decided to develop a state-of-the-art, user-friendly, Window-based system that will contain all the features/facilities available with other LMSs in the market. As a result INFLIBNET came out with a LMS called ‘SOUL’. The package was first demonstrated in February 1999 during CALIBER-99 at Nagpur. SOUL uses RDBMS on Windows NT operating system as backend to store and retrieve data. The SOUL has six modules: Acquisition; Cataloguing; Circulation; Serials Control; OPAC and Administration. The modules have further been divided into sub-modules to take care of various functions normally handled by the university libraries.

The features of SOUL are:

- Window-based user-friendly system
- Client-server architecture-based system allowing scalability to users
- Uses RDBMS to organise data
- Supports bibliographic standards like CCF and AACR II and ISO 2709 for export & import facility
- Provides facility to create, view & print records in regional languages
- Supports LAN & WAN environment
- Multi-user software with no with extensive help messages at limitation for simultaneous access affordable cost
2.9.2 CDS/ISIS

CDS/ISIS (Computerized Documentation System/Integrated Set of Information System) is advanced non-numerical information storage and retrieval software developed by a team of experts under UNESCO/PGI programme since 1985.

The mini-micro CDS/ISIS is menu driven generalized information storage and retrieval system designed specifically for the computerized management of structured non numeric text oriented database. It is able to manipulate an unlimited number of databases each of which may consist of completely different data elements. It is entirely different software package used by all over the world. (Vasanth, Mudhol, 2000).

CDS/ISIS is a very versatile and user friendly library software developed by UNESCO. It comes with a built-in Pascal programming language (Aggarwal, 2003).

2.9.3 WINISIS

The development of the Windows version of CDS/ISIS is known as WINISIS. This version of CDS/ISIS for Windows includes all the features of the MS-DOS version and its capabilities are complemented by a number of external programs, such as ImpExp2709 or the XML utilities. It is designed as well as for current MS-DOS users who wish to migrate to the Windows environment, than for new users that will be able to create and manage their own databases.

WINISIS is one of today’s available software based on the CDS/ISIS technology. CDS/ISIS for Windows (Winisis) is 100% compatible with all Windows Operating Systems. However for users of Windows NT/2000/XP, troubleshooting section called "readme" (file installed by the Winisis installation program) is given for consultation. (Winnubst, 2004)

2.9.4 ALICE

This LMS developed by Softlink International, Australia, is a global software package and is marketed worldwide through a number of agencies based in America, Australia, Britain, Iceland, India, Malaysia, New Zealand and Singapore. This software is marketed under the name of Embla in
Iceland, Alice elsewhere in Europe, OASIS in South East Asia and Australia and Annie in America and other parts of the world. Recently Softlink International decided to call the software Alice for Windows all over the world to maintain consistency in nomenclature. The main features of Alice are as follows:

- It has four distinct versions – Public library version, Special library version, Academic library version and School library version
- The package is modular and modules are grouped into one of the three sets:
  - Standard Set: Includes Management; Reports and Utilities; Circulation; OPAC
  - Advanced Set: In addition to Standard Set it includes Acquisition; Periodicals; Journal Indexing; Multimedia; Web Inquiry
  - Special Set: In addition to Standard and Advanced set it includes Reservation; Interlibrary loan; Patron self checking; Rapid retrospective conversion; Multilingual features; Self circulation; Union catalogue
- The LMS is backed by a number of support services which include onsite training programmes, continued R&D, feedback system through user groups, free newsletters, etc.
- Besides traditional library materials, it can be used to manage slides, audio and video cassettes, paper clippings, maps, charts, electronic documents and www sites.
- Location of documents in library could also be seen with the help of the library map.
- It is possible to maintain consistency in recording of items through the use of authority files. Alice has a capacity of holding 99 lakhs records.
- It supports a total of eleven search criteria to search the database from any machine (UNIX/MAC/ Apple, etc.) through Internet or Intranet.
- It helps to generate customized reports in addition to 800 preformatted reports available with Standard Set.
- It supports barcode technology and has in built communication function. As special features, the LMS provides data protection functions, rapid retro-conversion facility and online tutorial and help system.(www.eGyanKosh.ac.in)

2.9.5 LIBSYS:

LIBSYS is a fully integrated multi-user LMS based on client-server model and supports open system architecture, web-based access and GUI. This indigenous software package is designed and developed by LibSys Corporation, New Delhi. LIBSYS has seven basic modules – Acquisition;
Cataloguing; Circulation; Serials; OPAC; Web-OPAC and Article Indexing. The leading features of different LIBSYS products such as LIBSYS 4.0, LSPremia, LS-Digital, LSmart and LSEase are enumerated below:

- Based on client-server model and TCP/IP for communication and networking
- Provides ANSI Z39.50 compliant web access for making the server accessible through Internet/Intranet
- Supports web-OPAC for accessing bibliographic databases through Internet/Intranet
- Supports standard bibliographic formats like MARC 21, UNIMARC, CCF, etc.
- Includes images and multimedia interfaces with LIBSYS search engine
- Supports barcode technology for membership card production and circulation
- Offers SDI, CAS, fine calculation, e-mail reminders, etc. and utilities
- Provides flexibility in choosing operating platforms (UNIX, Windows NT, Novell NetWare) and backend RDBMS (SQL server, Oracle)
- Supports Web-OPAC through PERL/CGI access mechanism
- Offers a range of products suitable for different types of libraries e.g. LSEase is an affordable solution for small and medium sized libraries.
- Provides RFID technology (in cooperation with TAGSYS – the largest smart card solution provider) for inventory management and for smart card technology integration for identification of individuals
- LSPremia provides full UNICODE support and management of multi-site libraries

It offers digital resource management system through LS-Digital suite (It supports resource structure definition, scanning, PDF conversion, multimedia database management and metadata based searching and retrieval)

2.9.6 LIBRIS

Libris is a library facility planning software, with powerful capabilities. One can start by choosing a model that is close to the size library and make changes as per local circumstances. It includes a website with recent information on facility planning topics, a database of recently constructed California public libraries, an area for users to communicate with each other, user help documentation and a trial version of the Libris Design database. The Libris Design database is a Microsoft Access database which can be used to create library building programs and furniture and
equipment cost estimates, plan renovations, and produce budgets for library building projects. Users tailor generic library models into building programs for their own specific projects. Version 7.0 of Libris Design is now available. Libris is compatible with Ms-Access 2007. (librisdesign.org)

**2.10 IMPACT OF TECHNOLOGICAL CHANGES ON LIBRARY PROFESSIONALS AND THEIR ROLE IN CHANGING SCENARIO**

The constant developments in technology have led to the creation of networks, online databases, online journals, e-resources, CD-ROM, RFID, OPAC, multimedia and so on. In this changing scenario library professionals are required to deal with all aspects of ICT and its tools. In one of the articles published in “Librarian: A Technocrat” published by Tamilnadu Library Association (2005), Librarian is regarded as a ‘Technocrat’ which means a technical expert, especially one in management or administrative position. He is a member of a highly skilled elite group. He must possess special knowledge or ability to perform skillfully. It has categorically defined technocrat as “one who advocates technology”. It further states, “Librarian” is a profession where as “Technology” is a tool.

In this age of information technology, interdisciplinary subjects, continuous modernization/improvement of techniques and changing needs of library users are growing constantly. To manage all these in the library, the library professionals must be able to perform various roles like Documentation Officer, Librarian, Information Scientist, System Analyst and Information Manager. (Kannappanavar and Kumbargoudar, 2004). Goel(1996) opines that every library grows in terms of reading materials, equipment, space, staff, readers etc. in course of time. Also, there is a change in the specialized needs and interests of the readers, the kinds of services being expected and the speed at which the reading material and the information are being produced and circulated. All these have contributed to a change in the nature of the libraries, which becoming more and more complex and require rethinking, replanning and reorganization. The larger the library, the more complex would be its organization and the consequential management problems. In order to meet all these pressures and to organize and manage a modern library in a manner that it comes up to the expectations of the users and continues to be effective, efficient and meaningful, it needs a competent manager. The competent manager here, are the Library Professionals.

Today, libraries of all types are challenged to provide greater information access and improved levels of service, while coping with the pace of technological change and ever increasing
budget pressure. Access to library digital information is expected all the time, from anywhere. This is forcing a shift in role from repository to gateway, with users expecting online libraries that can provide round the clock service. As a result, connectivity and availability are critical service elements. The main role of the librarian in the information age is to promote access to appropriate and accurate information to serve the needs of users. (Sinha, 2005).

The variety of Librarian’s usual activities is formulating policies, aims and objectives. This involves planning, determining the organizational framework, making major decisions, supervising the middle level management and seeing that they carry out the duties and responsibilities delegated to them. It is the responsible work of the librarians to balance properly and co-ordinate all the subordinate workers and to look after the operations of the library and to evaluate them. (Kannappanavar and Kumbargoudar, 2004).

**2.11 TECHNOLOGICAL CHANGES IN AGRICULTURAL LIBRARIES**

The agricultural sector faces a series of challenges related to production, marketing and safety. Agricultural scientists & farmers need reliable and timely information about best practices of production, processing, marketing, input and output prices and financial markets. Technology thrust should lay greater emphasis on the transfer of agricultural information from the research institutes to its actual users. To promote an effective working relationship between research workers who generate new agricultural knowledge and the information industry, libraries of agricultural institutions act as ‘middleman’ to deliver required knowledge.

In the context of libraries & information services in agricultural institutions, change is greater in extent than even before. Change is happening everywhere. The survival of libraries depends on how successfully library leaders adapt and manage these changes. It is therefore, essential that libraries of select agricultural institutions play a crucial role in providing information to agricultural scientists working in various educational & research institutions and to the farmers and rural community for sustainability & upliftment of agricultural production. Technology thrust should lay greater emphasis on the transfer of agricultural information from the research institutes to its actual users.

Agricultural libraries play an important role in promoting an effective working relationship between research workers who generate new agricultural knowledge and the actual users such as agricultural scientists and farmers who are the real beneficiaries of this information. Libraries of
agricultural institutions act as ‘middlemen’ to deliver required knowledge in a right way to right person at the right time and right place.

Agricultural libraries need to be technologically competitive to provide relevant information to its users in their respective fields within the least possible time. It requires significant changes in the way libraries operate and provide services to its users.

Each library will have to determine its own path and decide what are its priorities and how it will position itself according to the needs of its customers and the institutional profile in which it operates libraries may elect to be at the cutting edge in their adoption of new technology; or to incrementally adopt products and services as the opportunity arises. (Sinha, 2005).

Borayian (2004) is of view that librarians in agricultural universities are overburdened with administrative, organizational and managerial functions. Major administrative, organizational and managerial functions are the leadership, human relations, builder of morale and motivation. Linking to work with people, planning, organizing, directing, supervising, coordinating, evaluating etc. in personnel administration, resources organization and management.

To cater the needs of research scholars, faculty, agricultural scientists, farmers and others, libraries of agricultural universities/institution must go through the process of technological change. It requires computerization of libraries with modern ICT equipments such as internet, E-mail, access to digital information, on-line access of scholarly journals, databases, OPAC etc. For this purpose library and information managers needs to formulate policies and strategies to adopt new technologies by keeping users on the top priority as well as enhancing ICT skills.

2.11.1 Technology Initiatives in Agricultural Information Transfer

The Ministry of Agriculture and National Informatics Centre (NIC) also emphasized informatics for Agricultural development in the national conference on "Informatics for Sustainable Agricultural Development (ISDA-95). To provide relevant agricultural information in rural areas, helping farmers to improve their labor productivity, increase their yields, and realize a better price for their produce various follow up actions were taken up:
- AGRISNET: An infrastructure network up to block level agricultural offices facilitating agricultural extension services and agribusiness activities to usher in rural prosperity
- AGMARKNET: With a road map to network 7000 Agricultural produce wholesale markets and 32000 rural markets
- ARISNET: Agricultural Research Information System Network
- SeedNET: Seed Informatics Network
- CoopNet: To network 93000 Agricultural Primary Credit Societies (PACS) and Agricultural Cooperative Marketing Societies to usher in ICT enabled services and rural transformation
- HORTNET: Horticultural Informatics Network
- FERTNET: Fertilisers (Chemical, Bio and Organic Manure) Informatics Network facilitating "Integrating Nutrient Management" at farm level
- VISTARNET: Agricultural Extension Information System Network
- PPIN: Plant Protection Informatics Network
- APHNET: Animal production and Health Informatics Network networking about 42000 Animal Primary Health Centres
- FISHNET: Fisheries Informatics Network
- LISNET: Land Information System network linking all institutions involved in land and water management for agricultural productivity and production systems, which has now evolved as "Agricultural Resources Information System" project during the Tenth Plan being implemented through NIC.
- AFPINET: Agricultural and Food Processing Industries Informatics Network
- ARINET: Agricultural and Rural Industries Information System Network to strengthen Small and Micro Enterprises (SMEs)
- NDMNET: Natural Disaster Management Knowledge Network

2.11.2 Agricultural information systems

ICARNET: The Indian Council of Agricultural Research libraries network Consortium is developed in order to deploy the e-Content, e-Knowledgebase, e-Governance (MIS), e-Services etc. The “ICAR-Net” created under the NATP is now functional, accessible and upgradeable but needs to be further strengthened and enhanced in capacity (where required) with deployment of a strong
security system. In addition, continuous and on-going efforts at human capacity development for effective use of the system along with proper maintenance are essential. The success and utility of the new ‘ICAR-Net’ will depend on central unified support by the ERNET including bandwidth capacity support and need-based enhancement

**CeRA** (Consortium of e-Resources in Agriculture): CeRA is a consortium of e-journals being funded by NAIP, ICAR and it provides access to 123 libraries of Agriculture under NARS. Under CeRA journals are made available over the network for the use of scientific community. The IARI Central Library is the focal point of the CeRA and also houses the CeRA office.

**Objectives of CeRA**

- To develop the existing R & D information resource base of ICAR institutes/universities, etc., comparable to that existing in world's leading institutions/organizations
- To subscribe e-journals and create an e-access culture among scientists/teachers in ICAR institutes/agricultural universities
- To develop a Science Citation Index (SCI) Facility at IARI for evaluation of scientific publications
- To assess the impact of CeRA on the level of research publications measured through SCI

**JCCC** (J-Gate Custom Content for Consortia): It is a Content database collected from journals being subscribed by all 123 libraries individually under NARS. This database is customized product of M/S Informatics, Bangalore which covers the contents of only electronic periodicals. It also provides link to approximately 4000+ open access journals since year 2000.

**J-Gate:** It is an electronic gateway to global literature, launched in 2001 by Informatics (India) Ltd. J-Gate is offered in 7 different subject groups. Out of which one group is ‘Agricultural & Biological Sciences’. (http://j-gate.informindia.co.in/subgroups.htm

- Open J-Gate: It is powered by J-Gate is a free database of open access journals, launched in February 2006, hosted by Informatics (India) Ltd.
UGC-Infonet: This E-Journal Consortium was launched by UGC on the concluding day of UGC’s Golden Jubilee Celebrations by the Dr. A.P. J. Abdul Kalam at Vigyan Bhavan on 28th December, 2003. This programme is wholly funded by INFLIBNET centre, Ahmedabad.

NISAGENET (National Information System on Agricultural Education Network): On the recommendations of National Statistical Commission (NSC) and the Department of Secondary & Higher Education of the Ministry of Human Resource Development, Government of India a national information system on agricultural education was prepared for various policy and planning purposes in the country by Indian Council of Agricultural Research (ICAR) under its AP Cess Fund Scheme. For implementation of the NSC recommendations and the data requirement of the Ministry of HRD, the organisational Structure Network of NISAGENET was as follows:

- The Coordinating Unit at IASRI, New Delhi
- The Lead Center of the project at IASRI, New Delhi
- NISAGENET Units at each participating organization engaged in providing higher agricultural education in India. This include 42 organisations as mentioned below:

  34 - State Agricultural Universities in India
  5 - Deemed Universities of ICAR
  2 - Central Universities involved in Agricultural Education
  1 - Central Agricultural University

The major activities and the technical programme of the project were as follows:

- Collection and compilation of data on agricultural education
- Designing, Development and Implementation of NISAGENET software on the Internet
- Publications of annual statistical bulletins on agricultural education
- Supply of statistical data to Ministry of HRD as per their requirements.

Agrikhoj Search Engine: Agrikhoj search engine has been designed to search information about Agricultural Education in India. This search engine allows one to search documents for specified keywords specific to agricultural education research and hence retrieving a list of references that match those criteria. Agrikhoj search engine uses regularly updated indexes to operate quickly and
efficiently. The mission statement of Agrikhoj is to 'Organize the India’s agricultural education related information and make it universally accessible and useful'. Its scope is limited to NISAGENET.

**Home page of Agrikhoj**

The user enters a specific keyword in the search space for which he/she wants to view the information. The keyword could be anything like related to equipment’s name, discipline’s name or name of a person for which one wants to search or have some detailed information.

After pressing the Search button, a list of documents where the keyword is found will be displayed. It basically helps users find web pages on a given subject.

**e-Sagu:** To bridge the information gap between the agricultural expert and the farmer, International Institute of Information Technology (IIIT), Hyderabad has built the eSagu ("Sagu" means cultivation in Telugu language) system, which is an IT-based personalized agricultural extension system to improve agricultural productivity by disseminating fresh expert agricultural advice to the farmers, both in a timely and personalized manner. In e-Sagu, the agricultural experts generate the expert advice based on the information about the crop situation received in the form of both text and digital photographs. In Kharif 2004, a prototype was developed and implemented with 1051 farms. In the prototype, a team of agricultural experts stayed at IIIT, Hyderabad (India) and delivered 20,000 pieces of agricultural expert advice to 1051 cotton farms of three villages (Oorugonda, Gudeppad and Oglapur) in Atmakur Mandal of Warangal district in Andhra Pradesh state, India, by looking at digital photographs and other farm information supplied by some educated and experienced farmers (coordinators) in these villages. The pilot project was implemented successfully. ([Ratnam, Reddy, and Reddy, 2006](#))
e-Choupal: The ITC company is setting up a network of Internet-connected kiosks, known as e-Choupals, through which farmers can receive all the information, products and services they need to enhance their farming productivity and receive a fair price for their harvest. Through the choupal, ITC sources the farmer’s produce directly, reducing its procurement and transaction costs. Currently ITC has set up 4300 e-Choupals covering six states and 25,000 villages. By 2010, the e-Choupal network plans to cover over 100,000 villages, representing one sixth of rural India, and create more than 10 million e-farmers. (Annamalai, and Rao, 2003).

e-Arik: The objective of the e-Arik (e-Agriculture) is to provide agricultural extension services to the tribal farmers through ICTs. It also aims to develop farmer-specific and cost-effective agricultural knowledge dissemination system to the tribal farmers. It is a joint venture of Central Agricultural University (CAU) Arunachal Pradesh and Department of Scientific and Industrial Research (DSIR) and the project started in 2007. (www.eearik.in)

FAO (Food and Agriculture Organization): The overall objective of FAO of the United Nations is to improve access and exchange information in the areas of Agriculture, Science and Technology, while strongly emphasizing capacity building. FAO’s Library and Documentation System Division in Rome (Italy) is involved in the information systems like

- **AGRIS (Agricultural Information System):** The AGRIS was established in 1975 by Food and Agriculture Organisation (FAO) and its members. FAO’s members have agreed on the need to adapt AGRIS to suit their requirements better and to keep pace with changes in the way in which agricultural information is managed digitally. (http://aims.fao.org/community/group/agris-2010). AGRIS is a co-operative worldwide information system on current agricultural literature. It aims at improving the flow of information and services to users through co-operative action involving all countries and their specialized documentation centers in order to achieve a better coverage of the newly produced agricultural literature, avoiding gaps as well as duplication of efforts and increasing the variety and efficiency of services. It is in operation since 1975. It pools bibliographic information from national and regional participating centers through duly filled-in data sheets. The data includes monographic material; meetings and projects reports; theses; surveys; etc. relevant to agricultural research and development. AGRIS publishes monthly AGRIINDEX both in hardcopy; as well as, magnetic tape form.
- **CARIS**: The Current Agricultural Research Information system (CARIS) is a Co-operating information system on current research in developing countries. It aims at improving the collection and dissemination of information on agricultural research currently being carried out in developing countries. From 1978 onwards data processing and database updating were decentralized to regional and national level CARIS centers.

- **AGLINET** (Agricultural Libraries Network): The AGRIS network is also a co-operative system for the exchange of services and information among the main agricultural libraries. The primary aims of AGLINET are to promote mutual and national exploitation of agricultural library resources for world’s agricultural development through systematic collaborations among agricultural libraries for the efficient provision of inter-library loan services, photo-reproduction, and exchange of bibliographic information and data on the participating libraries’ holdings. The network consists of a chain of major agricultural libraries in each region or country of the world supported by the international center. It had voluntarily formed within the framework of the International Association of Agricultural Librarians and Documentalists (IAALD).

**CD-Rom Databases**: The databases like CABS, FSTA, VETDOC, AGRICOLA, ARIC of ICAR are also available to access agricultural information resources electronically.

**NICNET**: National Informatics Centre (NIC) was set up by Government of India (GOI) in 1977 to promote information culture in the government departments and develop computer based information management system. It provides the state-of-the-art IT solutions to information management, information dissemination, and decision support requirements of the Central as well as state Governments, the Corporate Sector and the Cooperative Sector. It has taken many initiatives to design and develop “informatics for sustainable agricultural development”, in collaboration with the Ministry of Agriculture, since the National Conference on Informatics for Sustainable Agricultural Development (ISDA-95), held in May, 1995.

NICNET is NIC’s satellite based nationwide Computer Communication Network. It is the gateway for Internet resources, so as to facilitate economic, social, scientific and technological activities, and also for “macro-economic adjustment programme” of the Government. GOI has decided to launch a Central Sector Scheme titled, “Strengthening / Promoting Agricultural Informatics &
Communications” of which AGRISNET and AGMARKNENT are two main components. The objectives of these are to provide improved services to the farming community through use of ICT.

- **AGRISNET:** The Information Technology Plan (1998) of National Informatics Centre submitted to the Ministry of Agriculture envisaged “Agricultural Informatics and Communication” over NICNET (AGRISNET) for decision support on sustainable agricultural development programmes in the country, and also “Indian Agriculture Online”. This Plan is under different phases of implementation in the Ministry of Agriculture. It is sponsored by Department of Agriculture and Co-operation. It is an e-government programme for fostering agriculture growth, poverty reduction and sustainable resource use in India at grass root level.

- **Agricultural Marketing Information System Network (AGMARK-NET)** was established by linking all Wholesale markets, located throughout the country over NICNET. It links all important Agricultural Produce Market Committees (APMCS), State Agricultural Marketing Boards\Directorates and Directorate of Marketing and Inspection (DMI) regional offices located throughout the country for effective information exchange on Market prices related to agricultural produce. Through this web based information system, farmers now have choice to sell their produce in the nearest market at remunerative prices. As part of this project, 735 Agricultural Produce Wholesale Markets (APWMs), 75 state agricultural marketing boards\directorates and DMI Regional office have been networked during 2000-02 and an additional 2000 markets have been embarked upon during the tenth plan. The major components of AGMARKNET are establishment of computing facilities and networking, Development of human resources, information transmission, development of database and portal on market information NIC has tied up with Bharat Sanchar Nigam Ltd. (BSNL) to provide internet facilities at the AGMARKNET nodes. The Directorate of Marketing and Inspection (DMI), headed by the Agricultural Marketing Advisor has formulated a Central Sector Scheme in this regard and sponsored to NIC for implementation using NICNET facilities available throughout the country. (http://agmarknet.nic.in/)

**ICRISAT library database:** ICRISAT is a non-profit, nonpolitical organization that does innovative agricultural research with a wide array of partners across the globe for sustainable agricultural development.
Agricultural Research Information System (ARIS) of ICAR: ARIS Cell was established in 1997 under the aegis of ICAR with the aim to provide state-of-the-art Computational and Communication facilities in the Institute. ARIS Cell has been instrumental in establishment and management of Local Area Network (LAN) connecting 300 plus nodes for providing internet & e-mail connectivity to the scientists, other officers and students in the Institute. The major activities of ARIS Cell include Implementation of four modules namely:

- Agricultural Research Personnel Information System (ARPIS)
- Agricultural Research Financial Information System (ARFIS)
- Agricultural Research Management Information System (ARMIS)
- Agricultural Research Library Information System (ARLIS)

ARPIS is currently being implemented using PERMISnet software developed by IASRI. In this, the Bio-data of all categories of staff is being maintained on line. Necessary support is being provided to implement ARFIS, ARMIS, & ARLIS. National Information System for Agricultural Education Network (NISAGENET) is also being implemented in this Cell.

Agricultural Extension Information System Network – VISTARNET

The Research, Education, Extension, and training are considered as four pillars of Sustainable Agriculture. Generation and Transfer of Technology have become very crucial the world over. As a step towards making technology reach the Small Holders (Resource-Poor-Farmers), efforts are being made to establish “VISTARNET – NICNET based Agricultural Extension Information System Network,” in India, linking extension functionaries at Central, State, and District level has been taken up. The required funds for implementing VISTARNET will be provided through the National Agricultural Technology Project (NATP). As a part of VISTARNET, Informatics Development for the Directorate of Extension has been taken up by NIC

Agricultural Gateway of India (AG Info Gateway): The Agricultural Gateway to India is a website designed to satisfy the information needs for agriculture in India. The target users include scientists, researchers, extension personnel, students, farmers, policy-makers, media, consumer groups, and agribusiness professionals. This site is designed by Dr. N. Sandhya Shenoy, Principal Scientist, NAARM in Hyderabad, India, in collaboration with The AIM Lab. This project was funded by ICAR. The site is updated and managed by her and maintained at National Academy of
Agricultural Research Management (NAARM).

This site also provides information on the Krishi Vigyan Kendras (KVK), Agriculture Technology Information Centres (ATIC) and Regional Agricultural Research Stations, Colleges and Research Institutes (RARS&I) in India.

Agri Watch: The project by Indian Agribusines Systems Pvt. Ltd. (IASL) 2001 provide valuable analyses to the trade participants to enhance their decision taking abilities in trade and extend e-commerce in agricultural products. Agriwatch brings to you daily online reports from various agriculture markets in India (http://www.agriwatch.com)

NTAP/NAIP: National Agricultural Technology Project (NATP) led by the ICAR aimed to implement a shared understanding of the Government of India and the World Bank on technology-led-pro-poor growth, and facilitated the public sector reform process for accelerating the flow of agricultural technologies. The NAIP (National Agriculture Innovation Project) is to facilitate accelerated and sustainable transformation of Indian agriculture in support of poverty alleviation and income generation by collaborative development and application of agricultural innovation by the public research organizations in partnership with the farmer’s groups, the private sector, the civil society organizations and other stakeholders.

Agricultural Technology Information Centre (ATIC): ATIC is a Single window technology delivery system introduced by Indian Council of Agricultural Research (ICAR) which was promoted all over the country at every SAU, under National Agricultural Technology Project (NATP). Farmers, rural entrepreneurs, extension workers and citizens interested in agriculture are the targeted beneficiaries of ATIC. As a single window support system link itself with the various divisions and research and extension units of the University in order to serve the intermediary users and end users (farmer) in decision making and problem solving. Information on new varieties and agro-techniques developed by the University are disseminated through ATIC.

NAARM (National Academy of Agricultural Research Management): NAARM was established in 1976, at Rajendranagar, Hyderabad, Andhra Pradesh, to fulfill the important need for an institution of management in agricultural research and education. NAARM is one of the constituent institutes of the Indian Council of Agricultural Research, the apex body of the country for promoting agricultural research, education and extension education.
Extension Education Services

Extension Education Services are being used as an interface between University and farmers. Technologies developed through research efforts are assessed and refined under farmers field conditions and feed back from them passed on to scientists. The services also included training programme for the field functionaries of Development Departments and farming community together with providing information support through print and electronic media. Clinical camps and Disease Diagnostic Team Visits were also arranged to address the problems of the farming community associated with different vocations. The services were carried out through numerous *Krishi Vigyan Kendras, Kisan Melas, Kisan call centers* located in different locations of a particular region.

- **KVK (Krishi Vigyan Kendras):** KVKs are actively involved in the process of technology dissemination to the farmer’s field through Front Line Demonstrations and various training programmes. These activities are increasing every year by involving more farmers under the KVK programmes. Three types of training programmes are also a mandatory activity of these KVKs i.e. Farmers Training, Vocational Training and In-service Training.

- **KISAN CALL CENTRE:** It is an impressive telecom network to effectively delivering knowledge and information to the farming community. It is a call centre based extension service for delivering knowledge and information exactly as per the requirements of the farming community. This system would also help keep a record of what is being delivered to the farmers in terms of knowledge and information. The Kisan Call Centre scheme is available all over the country. The Kisan Call Centre scheme has been functioning since from 21st January 2004. The Call Centres can be accessed by farmers all over the country on common Toll Free Number 1551.

- **KIOSKS:** Kiosks are workstations which are specifically designed for public access. They may be stand alone or networked through a larger computer system.
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