III. RESEARCH DESIGN OF THE STUDY

A research design covers all the aspects of the selected research work and serves as a blueprint for the endeavor states, Krishnaswami (1999). Therefore, the plan and procedure for the concerned research study on the topic entitled “Economics and Ergonomics of Silk Processing Activities - Impact on Meitei Women in Manipur” was streamlined to include:

A. Ethnographic Study
B. Exploratory Study
C. Psycho-socio-economic Study
D. Participatory Ergonomic Analysis
E. Action Oriented Study

A. Ethnographic Study

Ethnography is a methodological strategy used to provide descriptions of human societies, which as a methodology does not prescribe any particular method (eg, observation, interview, questionnaire), but instead prescribes the nature of the study (ie, describe people through writing). Ethnography is a specific kind of written observational science which provides an account of a particular culture, society or community. In the biological sciences, this type of study might be called a “field study” or a “case report,” both of which are used as common synonyms for “ethnography”.

Ethnographic studies are usually holistic, founded on the idea that humans are best understood in the fullest possible context, including, the place where they live, the improvements they have made to that place, how they are making a living and providing food, housing, energy and water for themselves, what their marriage customs are, what languages they speak and so on (http://en.wikipedia.org/wiki/Ethnography). One of the most common methods for collecting data in an ethnographic study is direct, first hand observation of daily participation. This can include participant observation, and interviewing, which may combine conversation with different levels of form and involve small talk to long interviews. A particular approach to transcribing interview data might be genealogical (http://dictionary.reference.com/browse/genealogical) method. Ethnographers are participant observers (http://en.wikipedia.org/wiki/Ethnography).

With these points in view an ethnographic study of Manipur, (Fig.2) the cradle of “Meiteis” and ‘Silk’ was done. Information was gathered (secondary data) from Government of India Publications and Dept. of Sericulture, Govt. of Manipur (2004-05). Directorate of Sericulture, Manipur (2000-2002) proclaims Manipur with its nine valleys as a unique State
in the world where all the four varieties of silk viz, Mulberry, Eri, Muga and Tasar are produced.

Fig 2: Map of Manipur

The ethnographic study revealed the silk production status of the State as given in Table.3. The following additional reasons and the data presented in the Table motivated inclusion of these places in the agenda for the investigatory study.

- **Silk rearing (especially mulberry), reeling and weaving are done only in the valley districts of Manipur.**
- **Silk production and processing is a signature for Imphal**
- **Availability of required sample size**
- **Tracer studies on economics and ergonomics of silk related activities in Imphal is a felt lacuna**
- **Ease in approachability and communication**
Table 3: Status of Silk Production in Manipur State*

<table>
<thead>
<tr>
<th>Details</th>
<th>Population (n)</th>
<th>% contribution by Imphal</th>
<th>Raw material used</th>
<th>Type of loom</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total in Manipur</td>
<td>Imphal</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Weavers</strong></td>
<td>339632 (9 districts)</td>
<td>91820</td>
<td>27.0</td>
<td>Cotton, Wool Silk, Blends</td>
</tr>
<tr>
<td><strong>Loom</strong></td>
<td>276755</td>
<td>68273</td>
<td>24.6</td>
<td>Cotton, Wool Silk, Blends</td>
</tr>
<tr>
<td><strong>Cloth Production</strong></td>
<td>86,40,814</td>
<td>44,26,402</td>
<td>51.0</td>
<td>Cotton, Wool Silk, Blended</td>
</tr>
</tbody>
</table>

*Gupta (2010)

Among the nine districts, contribution of Imphal was comparatively higher. Evidently these aspects forced selection of the ‘Switzerland of India’ – ‘Manipur’ for the longitudinal study comprising of an exploratory study and action – oriented study preceded by an investigatory study.

1. **Investigatory Study:** An investigatory study is a type of field survey where the required information from the concerned sector is obtained by investigating details about the particular sample using specific methods. According to Krishnaswami (1999) survey involves collection of data directly from the population or sample at a particular time. Survey is a ‘fact-finding’ study enabling gathering of evidences relating to certain social problems and social phenomena. It is a method of research involving collection of data directly from a population or a sample there of at a particular time (Verma, 1989). Hence this part of the study involved:

a. **Selection of Method:** To find out the required details on the State of Manipur and the status of silk processing activities carried out there, dependence was vested on secondary data. A secondary source is one that summarizes information from primary sources. Secondary sources of research include review papers and theoretical articles that briefly describe studies and results, as well as Government and non-government publications.

b. **Selection of Locale and Sample:** As the silk processing industry includes labour, involving distinct yet different activities, the selection of locale within Manipur was restricted to mainly two districts which cherish all the three activities namely sericulture, reeling and weaving. As is evident from the Table (3) and Fig.3 Imphal East and West districts satisfied...
the required criteria. Hence these two districts were formally selected for conducting the study adopting judgement sampling. A judgement sample is one which is selected according to someone’s personal judgement and includes only those items of the universe in the sample which he/she considers as most typical of the universe (Saravanavel, 1997).

Fig 3: The Imphal Periscope – East and West Districts

Sample is a part of or portion of the population chosen for the study (Lenin, 1994). As it represents the whole population, observation of the sample, enables one to make certain inferences about the population (Sadhu and Singh, 1992). Though Manipur boasts of silk processing activities as traditional, livelihood avenues for the women folk, the investigatory study revealed except for weaving, the other two (sericulture and reeling) were dying industries. Visit to the selected area, exposed that a new Project - Japan Overseas Economic Cooperation Fund (OECF) has lent Manipur $32.77 in the first phase of a project to revitalize its silk industry (http://the manipurpage.tripod.com/ economy/manisilk). To have shown interest in rejuvenating these dying industries and had implemented a project to train and motivate sericulturists groups currently called Field Operating Units (Fou) infused renewed energy to rope in the existing sericulturists into the research fold, which enabled identifying the additional benefits the inhabitants of the area accrued from involving in sericultural activities.

(i) **Sericulture**: It was evident that Japan OECF had motivated 169 and 25 units in Imphal east and west respectively. From among these 38 farms (25 farms from East and 13 from West) were selected for the study adopting convenience sampling (as only these many units were functional in the real sense). When population elements are selected for inclusion in the sample based on the ease of access, it is called convenience sampling (Kothari, 1999).
Further investigation revealed the existence of a mere 12 samples (women) who sustained the traditional skill of sericulture in the Khurkhul Village, famous for sericulture and who were not covered under the umbrella of the Japan Project. These 12 samples were also selected (purposive sample) along with the 38 Fou samples and the total number of sample sericulturists selected for the study was decided as 50. Wilkinson and Bhandarkar (1992) had pointed out that the basic assumption behind purposive sampling is that with the exercise of good judgement and appropriate strategy one can handpick the units to be included in the study and thus develop samples that are satisfactory in relation to one’s research needs. Fig.4 depicts the selection criteria, along with the reasons cited for selecting these samples.

**Reasons**

- *Khurkhul village in Imphal west is a traditional place famous for sericulture from olden days.*
- *The Japan project called Japan International Cooperation Agency (JICA) had initiated setting up of sericulture units in both Imphal East and West.*
- *Among those formed through the Project intervention, Imphal East ranks the top in sericulture units.*

**(ii) Reeling:** The process of unwinding the filament from the cocoon is called reeling (Gupta, et. al., 2005). As reeling processes generally are done using different devices, the methods adopted formed the selection criteria. To this effect all the 50 samples (*all those practicing*) continuing with the traditional avenue of reeling strewn across the two selected districts were purposefully chosen for the study. Cohen and Manion (2001) state that in purposive sampling, the researcher handpicks the cases to be included in the sample on the basis of his/her judgment of their typicality, thus, building up a sample that is satisfactory to the researcher’s specific needs. Fig.5 illustrates the selection criteria along with the reasons for selecting these samples.
Reasons

- **Thangmeiband in Imphal West is famous for silk reeling.**
- **Khurkiul has its traditional style of reeling known as ‘Khere’.**
- **During the survey period silk reeling was found to be higher in Imphal districts.**
- **Only 50 people were practicing reeling during study period.**

(iii) **Weaving:** Weaving is the art of interlacing one element in and out of another (Gillow and Sentance, 1999). From time immemorial handloom industry has been playing a vital role in the State economy and weaving has shown an umbilical linkage with Meitei women.

The survey revealed only 418 samples to be undertaking silk weaving during the study period. Though all were categorically chosen for the sample (adopting purposive sampling), only 400 were formally selected, as the rest had not reported well. Purposive sampling is also called “**deliberate**” or “**judgement sampling**”, where the researcher deliberately selects certain units for study from the universe (Gupta, 2003). Fig. 6 portrays the selection criteria along with the reasons for selecting these weaver samples.

Reasons

- **Imphal in Manipur enjoys a distinct place amongst the Handloom zones in India.**
- **During the study period, only silk was woven in these areas.**
- **Weavers famous for their skill in weaving and intricate designing, actually hailed from Wangkhei, Bamon Kampu, Kongba (Wangkhei), Khongman (Thongju), Thangmeiband, Singjamei Kongpal (khurai) – places very famous for silk weaving.**
- **Predominance of famous silk weaving sectors (as the samples comprised of women weaving silk alone were chosen).**
- **Sample available – 418, Sample chosen – 400.**

Fig. 6 Selection of Sample Weavers

Hence a multistage purposive cum judgement sampling procedure was adopted for selection of the 500 samples representing all stages of silk processing as depicted in Fig. 7.
Details pertaining to the objectives of the study were elicited by designing an exploratory study as explained below.

B. Exploratory Research Design: An exploratory research design was chosen as it describes, explores, records, analyses and interprets conditions that exist (Kothari, 1990). The modus-operandi of the three selected groups of workers (samples) was thus found out with an exploratory study which included:

1. Homestead Survey – Study of the Worker
2. Work Study – Analysis of the Work and the Work Environment
3. Ergonomic Analysis – Portray of Work, Worker and Work Environment

1. Homestead Survey: According to Hanman (1986) a homestead refers to the home, adjoining land owned and occupied by the dwelling units and the space used for the cultivation of trees and vegetables and utilized space if any. Hence this part of the study was scheduled on the following lines:

   a. Mode of Data Collection: The samples selected as explained earlier were categorized based on those engaged in pre-cocoon and post cocoon activities (Fig.7). Thus the 500 samples comprising 50 sericulturists, 50 reebers and 400 weavers identified through the investigatory study satisfied the sample for the exploratory study.

   Gathering of pertinent information regarding the selected samples included both collection of data from primary and secondary sources. In Deddy’s (1987) opinion data originally collected for an investigation are known as primary data and refers to information obtained first hand by the researcher on the variable of interest for the specific purpose of the study (Sekaran, 2006). While the ethnographic study depended (entirely) on secondary data, the exploratory study articulated using both the sources. In those cases where the secondary data could not provide an adequate basis for analysis, primary data are also generally used. In such cases both primary as well as secondary data, which are not originally collected but rather obtained from published or unpublished sources (Gupta, 2003) may be employed states, Saravanavel, (1997). Unit of enquiry for the present study was the families engaged in the three vocations and the key informants were the women workers.

b. Gathering Information: The interview is a most widely used method of gathering information in the field. No other approach enables the investigator to glean so much information and yet remain so flexible states, Misra, (2001). Interviewing is an effective method to learn from people what they believe, how they think, and how that affects their life. The method chosen for conduct of the study was use of semi-structured interview. There
are two different forms of interviews: fully-structured and semi-structured. Fully-structured interviews are interviews where the schedule is structured and the questions are set in store. Semi-structured interviews also begin with a streamlined set of questions, but have the flexibility to add additional questions based on the interviewees’ responses (http://www.geo.mtu.edu). Thus for the present study semi-structured interview was adopted.

c. Selection of Tool: To facilitate the process the necessary tool – an interview schedule - was drafted. According to Chaudhury (1991), a schedule refers to a set of statements and/or questions to be answered by the respondent in a face to face interview and filled in by the interviewer while helping to collect data on a required theme in a systematic manner (Ghose, 1995). The schedule framed for the study invited responses to the demographic (social and personal factors of the samples) and economic variables of the concerned sample. Responses relating to their personal factors like age, financial status, education, occupation etc and social factors like general family background, religion, size of the family, type of family, occupation of the head of the family, profile of the head of the family, etc were elicited. Details pertaining to earnings, family income, and savings were also covered using the schedule. The schedule also helped suck out information about management of the personal resources like time, energy and community facilities. A sample of the schedule is presented under Appendix I.

d. Conduct of the Study: The samples were approached during their leisure, the details were collected as per the schedule, analysed and the findings are presented under Chapter IV.

2. Work Study: Work study refers to the systematic critical assessment of efficiency required to do the job and varies from one job to another job (Ramasamay, 1999). It is the generalized name used to describe a complete set of techniques through which work can be simplified, standardised and measured (Dalela and Saurabh, 1999). With these in view, the activities encompassing the three domains of silk processing namely sericulture, reeling and weaving were analyzed. The study included:

a. Selection of Locale and Sample: The sample selected for the homestead survey, satisfied for the work study too as they were primarily selected only to analyze their work pattern. Evidently 50 sericulturists, 50 reelers (12 from traditional and 38 Fous) and 400 weavers making up a total of 500 samples formed the core group selected and studied.

The locale, naturally was the individual work environments of the concerned sample-farm and sericulture units for those involved in pre cocoon activities, reeling area (for reelers) and the loom selected and used (for weavers) respectively. As this part of the study mainly
focused on deriving information on their vocation, further investigation vested on the following lines

b. Work Profile: This part of the study aimed at deriving information on pertinent concepts that included:

   i. **Job Description**
   
   ii. **Operational Analysis**
   
   iii. **Productivity Analysis**
   
   iv. **Human Performance Analysis**

i. **Job Description:** The present study with the help of a structured schedule (Appendix I) derived details on the break up of activities engulfed in the activities of sericulture, reeling and weaving (reasons for choosing and motivating factors, their nature and methods adopted). This not only exposed the multitasking concepts of the jobs but also helped in identifying the resource-quest (time, space and other amenities) of the respective tasks.

ii. **Operational Analysis:** This aspect of the study helped to do an indepth study of the individual activities that were incorporated into the corpus of each activity which enabled sequencing too. Hence this part of the study included the following, the details of which are explained under Chapter IV.

   - **Job content of sericulture**
   
   - **Task analysis of Reeling**
   
   - **Job analysis of weaving**

iii. **Productivity Analysis:** Details pertaining to the production details of the concerned samples belonging to the three different stages of silk processing were collected using the same interview schedule. Outcomes realized by sericulturists, reelers and weavers in their respective avenues of activity contributing to monetary benefits were also analyzed.

iv. **Human Performance Analysis:** This design analysed individual differences generally on the basis of physiological, psychological and physical performances. In all the three types of analysis the performance of the samples in their respective work environments was considered. Details on the complexity of the tasks performed, sequence of activities, tools used, precision required, training undergone, efforts put in, posture adopted, fatiguing conditions, and the like were elicited using an interview schedule. Interview schedule is used for collecting data by interviewing the informant report Sadhu and Singh, (1992), which contain standard questions that are asked by the interviewer and blank tables which are to be filled up after getting information from the respondents.
The tool thus drafted and presented under Appendix II was pretested on five samples belonging to each category of jobs and necessary modifications were effected.

c. Selection of Method for the Work Profile: Face to face interview along with observation was the method selected for conduct of the study. Interview is one of the chief means of collecting data in social science research and is defined as a systematic conversation initiated for a specific purpose and focused on certain planned content areas as it involves questioning or discussing issues with people (Blaxter, et al., 1999). It is not a simple two-way conversation between an investigator and an informant (Thanulingom, 2000). Observation on the other hand is the basic method of obtaining information about the world around. An observation becomes scientific, if it is planned and recorded systematically and is subject to checks and controls on validity and reliability. The observation method involves researcher in watching, recording and analyzing events of interests.

d. Conduct of the Study: The schedules were administered on the sample when they were actively engaged in the tasks, enabling observation of the samples while at work and also scan their work environments. Details were collected as per the schedules, consolidated and are presented under Chapter IV.

3. Ergonomic Analysis: According to Jayakumar (2009), ergonomics is applied to adapt such systems so as to provide maximum job satisfaction and comfort and minimum physiological and mental load to the worker. So ergonomic analysis of activities involved all the three components - the work, worker and work environment - and studied the impact of the work and work environment on the worker on the following scores:

a. Work: This aspect of the study delineates on the physical activities classified under the domain of occupation and domestic work. An occupation is solely for income, while pursuing another preferred career track. It is an activity that serves as one’s regular source of livelihood; a vocation (http://wikipedia.org/wiki/occupation). Domestic work on the other hand is the main daily activity of the homemaker and includes cleaning, cooking and looking after children (http://en.wikipedia.org/wiki/homemakers). However, both type of work, warrant physical activity. Physical activity is defined as any bodily movement produced by the contraction of selected muscles that increases energy expenditure above base level activities.

Details pertaining to the component activities of the three avenues – sericulture, reeling and weaving - (time spent on different activities, precision required and work schedule) were deduced. Data pertaining to multitasking, namely the samples’ involvement in household chores and income earning avenues, fatigue and tasks contributing to fatigue was
also elicited. Analysis of these activities helped to identify different types of efforts involved in performance of the same. The schedules presented in Appendix I and II aided in finding out each detail.

b. Worker Profile: Personal details of the samples as workers in terms of their age of entry, years of experience in the respective fields and information, pertaining to their input concerning the three domains of activity namely cognitive (knowledge, mental skills analysis and trouble shooting) affective (feelings/attitudes towards the jobs, reasoning abilities etc.) and psychomotor concepts (manual physical effort put in, skills revealed, productivity and synthesis) were gathered using the same schedule. This enabled finding out the samples’ involvement in the activities over and above baseline activities.

c. Work Environment: Work environment means the milieu around a person. It is all about things and living things that are around them where the worker is working (http://www.blurlet.com) and are the conditions which can affect the worker’s well being and efficiency towards work.

This part of the ergonomic analysis facilitated channelizing the methodology of the study to find out details on the work environment in terms of space used, quality of space used with respect to lighting, ventilation, temperature, humidity, housekeeping and the like, through the following analysis.

i. Work Place Design and Lay out Analysis: The same sample in their respective work environments were studied to identify the problem arenas, difficulties faced, exposure to environmental parameters, seasonal difficulties, movements made, equipment/ tools used, occupational stresses, job related pains endured, discomforts perceived and the like in relation to the work place design and work place lay out. The responses encouraged further analysis to study their status of health and well being.

d. Impact of Work and Work Environment on the Worker: In order to comprehend the general health status and incidence of occupation – induced pain, a structured, published checklist (Medical History Checklist: Symptoms Survey for Work Related Musculo-Skeletal Disorders (WMSDS) adopted by Canadian Centre for Occupational Health and Safety, (2003), was chosen as the tool. The method adopted was collection of primary data (by administering the checklist) and observation. Checklist method of appraisal involves a series of questions related to the individual behaviours (Raghavan and Sivakumar, 2010). Observation is one of the most important and extensively used method in social science research and a classified method of scientific enquiry (Moser and Kalton, 1986). Indeed, it is
a primary research instrument for gathering data in a more natural way and is a perfect method of investigation (Patnaick, 2001).

The checklist presented in Appendix III was administered on all the selected samples (sericulturists, reelers and weavers) and the responses tabulated and analysed.

e. Assessment of Risk Factors: Summating the issues (obtained from the above studies) helped highlight environmental, demographic and health related risk factors of the samples studied and it made evident that the weavers were the most affected lot (health-wise) due to the vocation taken up. The findings are presented under Chapter IV. The factors portrayed by the above studies warranted examining the forth coming components.

C. Psycho-socio-economic Study: While the previous types of studies, dealt with the cognitive, affective and psychomotor issues of the samples, this aspect of the study related to identifying the socio-economic issues of the samples on the following lines.

1. Quality of Life (QL) Status of the Selected Sample: Measurement of social well being is the central objective of any indicator. To measure the extent of QL, one needs to have clear indicators. Since it is understandable that the socio-economic profile of a cross-section of the society represents its QL, the procedure was directed to include evaluation of the socio-economic profile of the selected sample based on:

   a. Determinants of Levels of Living
   b. Satisfaction of Social Indicators
   c. Economic Status

   a. Determinants of Levels of Living: The status of the sample for satisfaction of the indicators put forth by Ganguli and Gupta (1976), was studied. The various aspects of the levels of living included indicators as classified under primary and secondary components. The findings obtained through the interview and observation were analysed for satisfaction under the two classifications. The factors included were the following:

<table>
<thead>
<tr>
<th>Parameters studied</th>
<th>Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Primary indicators</strong></td>
<td></td>
</tr>
<tr>
<td>Nutrition</td>
<td>Meal pattern and daily intake of calories, proteins and iron and vitamins</td>
</tr>
<tr>
<td>Housing</td>
<td>Physical conditions – nature, type and problem faced</td>
</tr>
<tr>
<td>Health</td>
<td>General status and specific problems</td>
</tr>
<tr>
<td>Education</td>
<td>Literacy level</td>
</tr>
<tr>
<td><strong>Secondary components</strong></td>
<td></td>
</tr>
<tr>
<td>Leisure / recreation</td>
<td>Individual experiences</td>
</tr>
<tr>
<td>Environment</td>
<td>Ambient and household environment</td>
</tr>
</tbody>
</table>
The same area and sample was chosen for the study. The details pertaining to housing, mean family income, meal pattern, daily nutritional intake, essential infrastructure, savings, decision making patterns, benefits accrued from government programmes/schemes, attitude and mind set of the samples etc. were requested and observed. The same tool was used (Appendix I), but the information obtained was delineated further and the real status of living standard of the selected sample found. Literacy, occupation and nutritional status are the three indicators employed for identifying the levels of living of the samples. As data on literacy and occupational status was already drawn, nutritional status was found out. In order to find the nutritional status, a 24 hour recall method of food intake for three consecutive days was requested from the sample. From the data obtained the nutrient intake of the selected sample was determined. According to Morrison and Hork (1999), the method of dietary assessment in which the individual is asked to remember everything eaten during the 24 hours is 24 hour food recall survey. This requires an individual list of specific foods consumed within the 24 hours which is then analysed by the pursor (or) professional gathering information (Mahan and Stump 2008). From the data the nutritive intake of the samples was calculated using the Nutritive Value of Indian Foods (Gopalan et. al., 2000). The outcomes that emerged pertaining to satisfaction of these indicators are presented under Chapter IV.

b. Satisfaction of Social Indicators: The World Development Report (2007) is one among the publications of the World Bank. They give an insight into the major issues that are considered for determining the socio-economic status. The extent of satisfaction observed for the salient indicators namely literacy, family size, infrastructure – access to fuel, electricity, safe water, transportation, health and nutrition in favour of the concerned sample was analyzed. The existing status is presented under Chapter IV.

c. Economic Status: The economic status of the samples was studied for:

- **Categorization of samples on their monthly income level:** Income level of the sample was computed based on the classification given by Taxation Enquiry Committee (1991), Government of India and HUDCO (1999).

- **Classification of Socio-Economic Status (SES):** It was done using the guidelines suggested by Kuppuswamy (1976), which is the method followed even now by health personnel.

- **Percentage contribution of samples for family income.**

- **Percapita income of the family** in respect of National and State level statistics.
The status quo of all the samples on these scores (socio-economic level) was found out and the findings are presented under Chapter IV.

D. Participatory Ergonomic Analysis

According to International Ergonomics Association, Ergonomics is the scientific discipline concerned with the understanding of interactions among humans and other elements of a system, and the profession that applies theory, principles, data and methods to design in order to optimize human well-being and overall systems performance (http://en.wikipedia.org/wiki/Ergonomics).

These facts enthused observing the samples in their work milieu. As the findings of the medical history checklist proved, ‘Weavers’ to be the most affected group ergonomically stated, weavers alone were selected for the participatory ergonomic analysis. To that extent 42 samples (14 from each group using the three type of looms) were chosen adopting purposive sampling. In purposive sampling the same sample is selected with a definite purpose in view and the choice of sampling units depend entirely on the discretion and the judgement of the investigator (Gupta, 1993). Homogeneity, uniform years of experience, age, willingness to cooperate and absence of other physical ailments (BP, diabetes) were the factors considered for choice of the sample.

The participatory ergonomic programme drafted for the concerned sample included administering the following and collecting details while they were weaving.

1. **Body Discomfort Rating Scale** (Corlett and Bishop, 1976)
3. **Ergonomic Index Checklist** (Choobineh, et al., 2004 – Appendix IV).

While the first and second concentrated on the samples’ bodily movements, incidence of pain and discomforts and the like, the third analyzed the comfort, health and performance of the worker in their working environment (studying all the three components, work, worker and working environment). The findings of all the three methods adopted are presented under Results and Discussion.

E. **Action Oriented Study:** The findings of the studies conducted to analyze the economic and ergonomic status of the samples, revealed both the economic and ergonomic status of the samples as not satisfactory. Therefore, it was decided to include an action study in the agenda of the methodology which can help augment their status considerably and also mitigate a few
problem areas. With this in view, the final part of the study was channelised to include the following:

1. **Socio-Economic Intervention**
2. **Ergonomic Intervention**

1. **Socio-Economic Intervention:** An intervention is an orchestrated attempt by one, or often many people, to get someone to seek professional help with serious problems (http://en.wikipedia.org/intervention). To improve the plight of the selected sample, various strategies were planned and implemented. Simple, easily adoptable measures for socialization, income generation, seeking supporting services, and the like through mentoring, lobbying, and networking were taught to the samples (all the 500 samples).

   A panoramic view of the activities implemented aiming at enhancing the socio-economic benefits of the selected sample are presented under Chapter IV.

2. **Ergonomic Intervention**

   Ergonomic analysis of the samples for RULA, Body discomfort, and Ergonomic Index proved that the weavers using the loin loom to be the most affected. As the results projected to the fact that this particular loom (loin loom) has not been ergonomically designed, kindled an interest in the investigator to effect modifications in the loin loom to make it more productive. A model loom was thus designed and tested for satisfaction in performance and ergonomic concepts. Feedback was received, documented, and presented under Results and Discussion. A diagrammatic representation of the improvised model of the loin loom, an animation module, and a prototype of the designed loom are presented under Chapter IV. A real-time model (loom) was fabricated and tested by experienced sample for performance characteristics and factors considered for improvisation. The feedback received on the effectiveness of the loom is presented under Chapter IV. A conceptual framework of the design of the study is presented under Fig. 7.

   It is hoped that the study would pave way for enhancing both the economic and ergonomic status of the concerned sample as the investigator had resorted to a participatory research appraisal method.
Fig 7: Conceptual Framework of the Study