Print ISSN: 0975-5861
Online ISSN: 2249-4588

Global Journal of Researches In Engineering

DISCOVERING THOUGHTS AND INVENTING FUTURE

7 Revolutions in engineering World

December 2011

Pinnacles

- Integrated Rfid Model
- A Heuristic Method
- Biodegradable Injectable
- Fabricated Oil Screw

Volume 11
issue 7
version 1.0

ENG

Global Journal of Research in Engineering: J
General Engineering

Global Journal of Research in Engineering: J
General Engineering
Volume 11 Issue 7 (Ver. 1.0)

Global Association of Research

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USA Toll Free: +001-888-839-7392
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Global Journal of researches in engineering
General engineering
Volume 11 Issue 7 Version 1.0 December 2011
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4596 & Print ISSN: 0975-5861

Integrated Rfid Model for Optimal Selection of Drilling Projects

By Maki K. Rashid
University Muscat, Sultanate of Oman

Abstract - This work presents a model resolving data shortage problems when facing investment decisions in selecting drilling projects based on availability of equipments and drilling facilities. This is accomplished by enabling an environment for automatic information exchange using the technology of Radio Frequency Identification (RFID) integrated with assessments for projects net profit values. Incorporating the information technology tools facilitates the components selection and improves information retrieval efficiency for such missions especially during projects evaluation and drilling operation phase. Also, a fuzzy model is presented and convoyed with an optimization technique to take into consideration the risk of possible variation in oil prices and production cost. All these components are integrated by using information system design tools.

Keywords : *Fuzzy Logic, Intelligent Systems,RFID,Project Management*

GJRE- J Classification : *FOR Code: 091304*

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Key Words : Fuzzy Logic, Intelligent Systems,RFID, Project Management

I. Introduction

The industrial obligation of Oil & Gas organizations to oil supply market produced highly competitive companies with a growing trend towards more renovation successively to attain higher output and easier entrance to worldwide marketplaces. One of the elements in adding more value to a company is by accomplishing faster than others. It is the essence of the innovation process, and, important for many business leaders in today's industries. Appreciating the added value that technology can carry to an organization is fundamental to justify financial investment and ultimately the successful adoption of any emerging technology. Without innovation a company will soon get hit by its competitors. The innovation in Oil & Gas is often linked with process improvements.

In the current business environment, process improvements are often supported by technology or IT-infrastructure [1]. To be innovative one does not need to invent a new technology but can use existing technology by various profitable ways. As new technologies are constantly being developed, this provides opportunities for companies to increase efficiency of their processes.

In this work innovative know-how like Radio Frequency Identification (RFID) technology is utilized in the selection of drilling projects set based on equipments availability to maximize net profit value. Such methodology is based on assigning resources only to those alternatives within a given constraint that ensure greater outcomes.

The implementation of Radio Frequency Identification (RFID) in project selection requires techniques for integrating data that relate field requirements to the concept of tracing and pursuing the available drilling string components and other facilities to optimize the selection process of drilling projects. Drilling expenditure includes all costs that are associated with drilling and equipping a well, including surface equipments. This work discusses methods for deploying tactics using RFID technology by deploying a systematic integration of drilling cost with project selection process and field drilling activities. The work proposes an optimization technique for selecting oil well drilling projects integrated with RFID technology by linking available drilling equipments to the assigned geologically detected locations to maximize economic value and assure equipments records for assessment during drilling operations.

II. RFID And Information Assembly

One of the key elements of project management is the reliable gathering of information. Radio frequency identification (RFID) technique covers the remote gathering of information stored on a tag using wireless communications [2]. Such information is arranged in a database for future communication in a network system. In general the RFID system comprises responder (tag), transmitter and antenna or coil. The incorporation of a computer memory chip on the tag posses a limited information storage capacity depending on available memory size. The identification device that combines the transmitter and coil is named reader. The information is read by generating an electromagnetic wave having the capability of reading information seized on a tag fastened to a device or equipment or might have a writing talent of such information. Decentralized information is the key target of the RFID tools by making the data obtainable wherever the device or equipment exist using data handling software as shown in Fig.1. In the implementation of the RFID technology the aspects of cost, surrounding medium, codes and standards, RFID system preference, database management, system integration and safety should all be taken into consideration. Even though the data are mostly communicated between data bases but one of the main advantages of RFID is its talent reading through harsh surroundings in a reasonable short time as required in

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few applications using techniques overcoming wireless communication deficiencies. Over the last years, improvements in RFID technologies, such as increased data storage capabilities, reduced tag prices, and improved robustness of tags, have made RFID-based applications increasingly appealing to a wide range of industries.

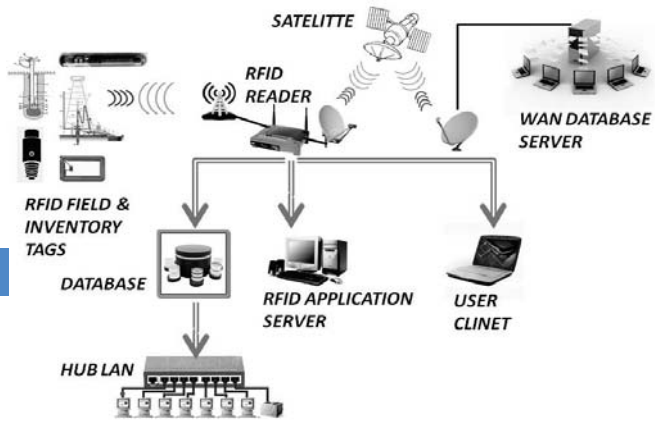

Fig. 1 Integration of the RFID Field and Inventory Tags with Projects Database

The drill string components in oil well drilling are exposed to severe loads and heavy wear under ruthless circumstances. It is well known that considerable costs might be associated with the failure of drill pipe during drilling operations. Therefore, a substantial economic advantage can be gained through predictive and preventive maintenance, maximizing operations efficiency, and, a better logistics strategy. The use of RFID technology with database management will improve efficiency and help to find automatically the most suitable piece of the drill string that is necessary for a specific operation by selecting the right components from racks of similar looking pipes. Using attached or embedded RFID tags allows operators, drilling companies, and drilling equipment leasing companies to map out equipment sites [3] and record environmental and operation severity that experienced as shown in the layout of Fig.1. This is done by keeping an electronic record for previous working environments like how long the tools have been used, including temperature, chemicals, pressure and depth of drilling. Such tracking integrated with codes and standards can help tool users to keep away from disasters, such as a tragic drill string failure or breakage underground, or injuries to drilling workers. Also, this technique generates a database to ensure the availability of the proper drilling components to guarantee the efficient use of these components in drilling projects within the required time frame to maximize profit.

The operation conditions for the tagged drill string components, i.e. drilling pipes, tools and surface equipments, require RFID tags including antenna and perhaps sensors that are designed to withstand the harsh conditions in oil and gas operations environments to allow both onshore and offshore asset tracking during down hole and subsea drilling operations. The RFID tags are needed to meet and exceed extreme acidity, pressures, and, temperatures typical experienced in oil and gas exploration environments in order to generate a reliable track using database management for the drilling components.

RFID tags can also help in achieving high degree of inventory accuracy represented by the degree of consistency between physical and logical inventory. The RFID tag and the automated process for data acquisition should minimize data entry delays and errors, increasing the accuracy and reliability of the information and the ability to plug and play with the existing enterprise resource planning (ERP) systems used by the operators. By using the RFID the human intervention in inventory management can be almost entirely eliminated and accurate levels of inventory are maintained. Furthermore, with RFID it is likely to determine the exact place of the material in the supply chain in real time. Latest advancements in technology have enabled the usage of RFID with tracking devices like GPS to give an accurate pinpoint the location of where inventory is located through the communication with the corresponding databases in the case of masked objects.

III. Optimization Strategy For Projects Selection

The traditional available means for selecting a set of oil well drilling projects to maximize profit are not ingrained computer integrated tools. In this work a database management system enhanced by RFID technology is proposed to help clients to choose the optimum available set of equipments to perform well drilling operations. The implemented optimization model takes into consideration the equipment availability, capacities, and, economic value that satisfies the work goals. This can be achieved by recovering and analyzing the available handy information from database saving considerable amount of time and satisfy the economic gain from the resources. The most favorable blend and sequence of recommending projects to achieve the organization overall targets are primarily initiated by determining the existing available equipments. Drilling equipments are the most valuable and most costly resource in this work. Their accessibility is limited and its allocation is an intricate matter. The problem of assigning equipments of various capacities for different drilling projects is discussed in [4]. The work based on classifying equipments according to their capacities in terms of drilling depth and technological complexity. Cash flow associated with owned or leased equipments are linked to their availability periods of time

and hooked up to an economic assess to evaluate the project worth.

The net present value (NPV) is an important indicator used in capital budgeting to analyze the profitability of an investment. Therefore, the net present values (NPV's) of the drilling activities and the associated NPV for the RFID investments for all considered projects are introduced in the objective function as an economic worth indicator for the assigned projects. Accordingly, the objective function can be formulated as:

$$\sum_{k=1}^{C}\sum_{j=1}^{m}\sum_{i=1}^{p}\{npv_{i,j}^{D} + npv_{i,j}^{RFID}\}\ \epsilon_{i,j,k} \qquad (1)$$

npv^{D} = Net present value of drilling activities.

$npv_{i,j}^{D}$ = Net present value of the RFIDimplementation.

$npv_{i,j}^{RFID}$ = Net present value of drilling project *i* starting in month *j*

$npv_{i,j}^{RFID}$ = Net present value of the RFID implementation of project *i* starting in month *j*

$\epsilon_{i,j,k}$ = A binary decision variable in the model has a value of (0 or 1), used for assignment consideration of drilling equipment of class *k* for the project *i* starting in month *j* as defined by Glinz and Berumen, 2009. Equipment class *k* involves both the depth at which it may be drilled and its technological complexity.

In this model, optimum values for decision binary variables $\epsilon_{i,j,k}$ are sought, targeting maximum economic value for all possible projects combinations (1→ p), considering different possible mixtures of equipment class assignations (1→ c) for projects having a blend of different month starts (1→ m).

Assuming $q_{i,W}$ is the equipment requirement of project (i) during month (W) and ECA_c is the available equipment of class (c), then, the monthly constraints on equipment of class (c) at month (W) can be written as:

$$\sum_{i}^{\text{All Projects of Equipments Class c}} q_{i,W}\ \epsilon_{i,1,c} + \sum_{i}^{\text{All Projects of Equipments Class c}} q_{i,W}\ \epsilon_{i,2,c} + \ldots + \sum_{i}^{\text{All Projects of Equipments Class c}} q_{i,W}\ \epsilon_{i,W,c} \leq ECA_c \qquad (2)$$

The other constrains for the multiple choice can be written as:

$$\sum_{k}^{\text{Equipment of class c}} \sum_{j=1}^{m} \sum_{i}^{\text{All Projects of Equipments Class c}} \epsilon_{i,j,k} = \begin{cases} 0 \\ 1 \end{cases} \qquad (3)$$

IV. Drilling Cost Estimation

The NPV for drilling (npv^{D}) entail drilling cost assessment. Time efficient drilling of an oil well is a matter of expertise and know-how, procedural activities, quality, and, safety restrictions that are all connected to the course of action. Drilling objectives are frequently at discrepancy and depend on interrelated factors that might vary with respect to occasion, place, and personnel. It is a subject of significant market uncertainty. Drilling paces are often controlled by aspects that are not managed competently and lacking data documentation. In many circumstances, the origins of abnormality are multifaceted, occur simultaneously, and being short of effective solutions. Formerly there are diverse methods have been offered to evaluate drilling cost and complexity. Comprehending the drilling process requires isolation of various factors disturbing drilling and to measure their interaction with other factors [5]. There are many factors and events pointing in the direction of time and cost for drilling a well. Factors can be classified as either apparent or not visible. The quantifiable issues incorporate the corporal characteristics, geology, and drill constraints of the well, while the unseen factors, such as operator experience and wellbore quality, can be represented by surrogate variables. Issues such as well planning and execution, group harmonization, leadership, and project management talents will also bang drilling achievement. However, there is no way to identify all the characteristics of drilling that might be important, but many characteristics of the process can be observed, and in practice it is necessary to consider only a set of factors that adequately represent drilling conditions [6].

The Joint Association Survey (JAS) and, the Mechanical Risk Index (MRI) are accepted techniques used for drilling cost and complexity assessments that founded in 1954 and 1980 respectively. The JAS estimates drilling cost using survey data and quadratic regression models constructed from four descriptor variables (API 2002). The risk index of MRI utilizes six principal variables and fourteen qualitative pointers to differentiate wellbore complexity [7]. MRI is not of our concern in this work and the drilling cost (*Y*) [6] is:

$$\ln Y = \alpha_0 + \sum_{i=1}^{5}\alpha_i X_i + \sum_{i<j}\alpha_{ij} X_i X_j \qquad (4)$$

Where Y = total well cost, X_1 = TD = total depth (ft), X_2 = TD^2 = total depth squared (ft^2), X_3 = WT = well type, X_4 = WC = well class, and X_5 = DIR= well direction. The X_1 and X_2 variables are numeric, while the X_3, X_4 and X_5 variables are categorical, defined in terms of indicator variables (e.g., X_4= WC = {0,exploratory well; 1, development well}). The coefficient α_i(i = 0,1,…,5) and α_{ij}(i, j =1,…,5, i < j) are evaluated for each geographic region and only statistically significant variables are maintained in the final model.

V. Fuzzy Model As Risk Factor

The Fuzzy concept is intrinsic in many problems of knowledge interpretation, and multifaceted assessment processes often cope with universal concepts and linguistic expressions, which are normally vague in nature. In this work the fuzzy relation that links NPV for drilling project (npv^D) to market oil prices and oil production cost is launched by set up a modifier or multiplier to NPV which can be considered as a risk factor [8]. An NPV multiplier is introduced in fuzzy model as a function of two variables. First is the normalized oil prices (NOP) characterized by present oil market price divided by average oil price. Second is the normalized oil production cost (NPC) which stands for oil well production cost divided by the average oil production cost. Average and history of oil prices is discussed in [9 & 10]. Models for the average production costs that correspond to the addition of all engineering costs related to the discovery, development, and production from oil field divided by the amount of oil that is anticipated to be picked up from the field over its life span as provided by [11]. Algorithm based on fuzzy modeling is utilized to extract rules that relate the NPV modifier as output to the inputs represented by the normalized oil prices and the normalized oil production cost. For inputs five linguistic values are used, namely L=''Low'', M/L=''Medium to low'', M=''Medium'', M/H=''Medium to High'' and H=''High''. For output the five linguistic values are: R="Reduce", RL="Reduce Little", Mid="Middle", EI="Enlarge Little", E="Enlarge". The algorithm considers each input and output variables to be equally divided by symmetric membership functions of triangular type, and the algorithm uses the t-norm max to select the degree to which two fuzzy sets match. The output of each fuzzy inference system is derived using the standard Zadeh–Mamdani's min–max gravity reasoning method [12]. The rules in the fuzzy model have the following form:

$$R^{(i)}: \text{IF } x_1 \text{ is } A_1^{(i)} \text{ and } x_2 \text{ is } A_2^{(i)} \ldots \text{ and } x_m \text{ is } A_m^{(i)} \text{ THEN } z \text{ is } B^{(i)} \quad (5)$$

Where, $R^{(i)}$ is the ith rule, x_j are the antecedent variables, and z is the consequent variable. For the inputs, x_j will be the normalized oil prices (NOP) and, the normalized oil production cost (NPC) obtained from the price and cost models respectively, and z will be the NPV modifier. Symbols $A_j^{(i)}$ represent the fuzzy sets, and, $B^{(i)}$ are the rules conclusion of the fuzzy system. The inference operation and the defuzzification formula of the fuzzy algorithm are described in various literatures, [12] and [13]. A number of calculations and fine-tuning are pursued using previous data to obtain the final membership functions and the rule-base for the NPV modifier as given in table 1and Fig.2.

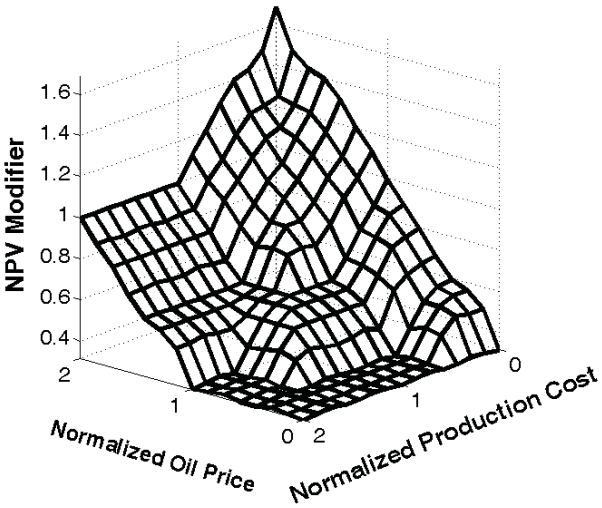

Fig.2 : shows the NPV modifier surface as related to the normalized oil prices and normalized oil production cost.

Table 1: The rule base for (npv^D) modifier

NPC\NOP	H	M/H	M	M/L	L
H	**M**	**RL**	**R**	**R**	**R**
M/H	**M**	**RL**	**R**	**R**	**R**
M	**M**	**RL**	**RL**	**R**	**R**
M/L	**EL**	**M**	**RL**	**R**	**R**
L	**E**	**EL**	**M**	**RL**	**R**

VI. The Net Profit Values For Drilling Project And Rfid Implementation

By combining the well deliverability and all other necessary operating expenses the net present value of a well can be assessed [9, 10, 11 and, 14] for (N) number of months with discount rate (i), and

$$\mathbf{npv^D} = \mathbf{NPV\ Modifier} * \sum_{t=0}^{N} \frac{(Revenue\ -Operating\ \ and\ \ drilling\ \ expenses\ )}{(1+i)^t} \quad (6)$$

The NPV for the RFID implementation requires evaluation for the hardware costs (C_H) including the cost of readers, antennas, host computers, network equipment and tags. Software costs (C_S) include the cost of creation or upgrade of middleware and other applications. Finally service costs (C_V) include the cost of installation, integration of various components, training, support, maintenance, and business process reengineering. On the other hand, RFID benefits are broken down into three parts: cost reduction (CR), minimize inventory inaccuracy (IV), and error prevention (EP) [15]. The cost reduction could be the result from a labor cost reduction, inventory cost reduction, process automation, and efficiency improvements. The sources of the inventory inaccuracy can be from theft, misplacement, obsolescence, transaction errors, and others. Error prevention includes information distortion through equipment availability or allocation for different projects and improper equipment specifications for different drilling tasks causing additional losses. Then, the NPV for RFID implementation is:

$$npv^{RFID} = -(C_H + C_S + C_V) + \sum_{t=0}^{N} \frac{(\mathrm{CR})_t + (\mathrm{IV})_t + (\mathrm{EP})_t}{(1+i)^t} \quad (7)$$

VII. Rfid Management Medium For Projects Selection And Optimization

Maximizing the performance of RFID technology in oilfields requires the use of an intelligent technique integrated with a transportable and fixed wireless communications network that enables a dispersed information system as in Fig.3. Such systems enhance the decision making process by remote selection of oil and gas field data and set a preference to optimize results. In this work ORACLE is used as an information system design tool for data design and correlation as in Fig.4. Oracle is the most common program in database management.

The RFID chips can be prepared and shaped to be attached to various field products. Moving field products into inventory, shifted to different sites, examined, or dispatched, a related RFID as information capturing tool can trace the RFID ID numbers and connect these ID numerals to specific actions executed on that part. The captured information is stored and handled by a set of relational databases. Specifically, four databases are designed for managing the selection process namely drilling project information, cost information, component management, and, field information. These different spots of data storage offer the essential information to force the work progress train to exercise different applications. Updating or retrieving data from database in ORACLE requires interface software to organize the data transaction from database in processing unit. The interface software has identified a set of industry policies and rulings that direct suitable stream of data flow processed by different schemes

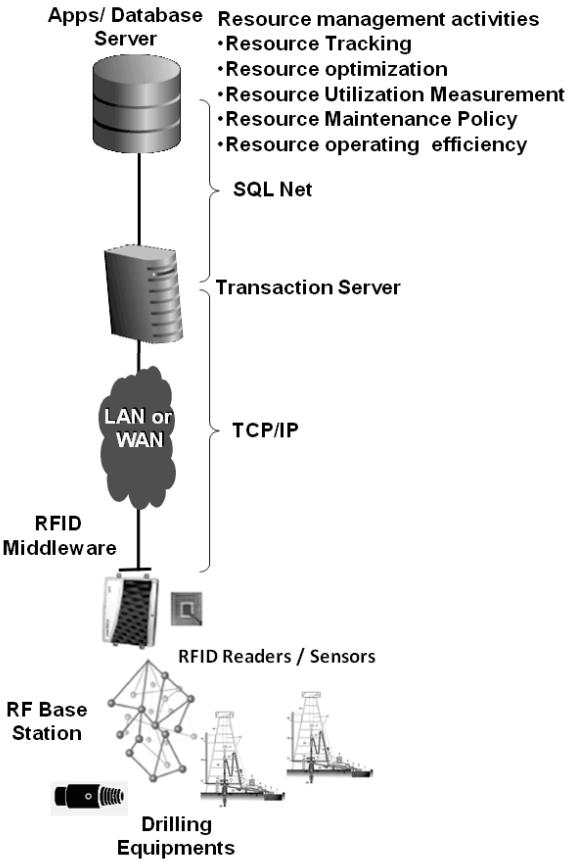

Fig.3 Integration mechanism of RFID with drilling management activities

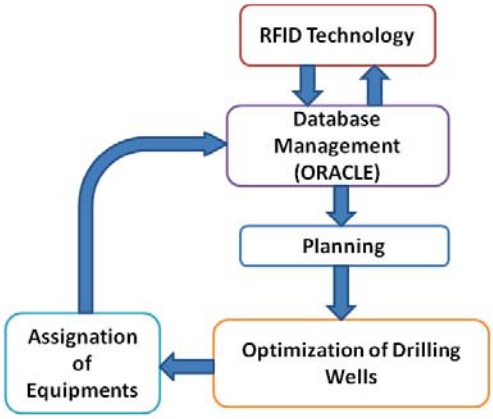

Fig.4 Integration flow chart to the database management activities with RFID

VIII. Decision-Making Calculations

Choosing which drilling projects must be selected from a pool of candidate projects can be a demanding mission. The complexity comes up in addition to the information integration is by restricting the availability of equipments and facilities. Also specifying competing goals of cost minimization and maximizing the net present value of the selected projects. The selection is ended more complex because certain factors, such as costs, and, prices are uncertain. The calculation flow chart for the decision-making process incorporating these parameters is shown in Fig.5. Showing final calculations will not add new concepts or draw general conclusions that can be used in future work. Each set of projects have their own characteristics and have to be investigated independently but the methodology of evaluation remains unchanged as specified in the flowchart of Fig.5.

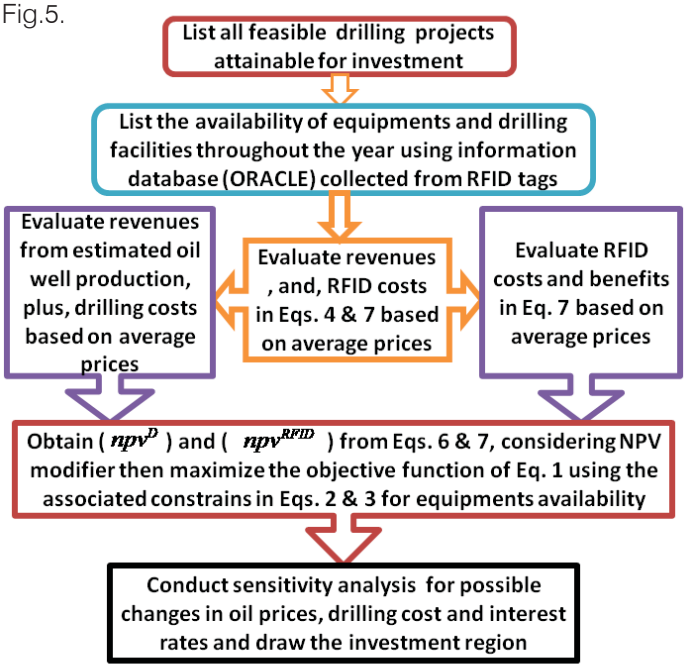

Fig. 5 Flow chart for optimum selection of projects set

IX. Conclusion

By encoding project money assessments and required drilling facilities in an integrated optimization mock-up, a more well-organized distribution of reserves can be accomplished. It is particularly significant under the condition of limited financial resources, facilities, and, insufficient information. Automation reduces the identification and selection time, and decreases manual errors for drilling equipments. The process discussed in this work enables development of an integrated selection process for drilling projects enhanced by the RFID technology. A considerable amount of time for retrieving information is saved since it involves searching and validating from multiple fields and documents. The optimal method of selecting the most profitable oil well drilling projects under limited available resources has been presented using mathematical modeling. Problem formulation lets managers and decision makers to openly include risk elements, such as variations in costs, prices, and, tradeoffs that must be made in funding drilling projects Unification of information system design with operation research and RFID technology in oil well drilling offered opportunities in better resource management activities in term of tracking, optimization, utilization, maintenance, and, operation efficiency.

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Global Journal of researches in engineering
General engineering
Volume 11 Issue 7 Version 1.0 December 2011
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4596 & Print ISSN: 0975-5861

A Heuristic Method for Short Term Load Forecasting Using Historical Data

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Abstract - Load forecasting plays an important role in power system planning and operation. In the present complex power system network under deregulated regime, power generating companies must be able to forecast their system demand and the corresponding price in order to make appropriate market decisions. Therefore, load forecasting, specially the short-term load forecasting (STLF) plays an important role for energy efficient and reliable operation of a power system. It provides input data for many operational functions of power systems such as unit commitment, economic dispatch, and optimal power flow and security assessment. This paper proposes a new and simple technique to calculate short term load forecasting using historical data and applied it to the Damodar Valley Corporation (DVC) grid operating under Eastern Grid (ERLDC-Eastern Regional Load Despatch Centre), India. This gives load forecasts half an hour in advance. The forecast error i.e. difference between calculated forecast load and real time load is a measure of the accuracy of the system, is found to be lower than other existing techniques like Holt's Method, Chow's Adaptive Control Method, Brown's One-Parameter Adaptive Method.

Keywords : *HM-Holt's Method, CACM-Chow's Adaptive Control Method, BOPAM-Brown's One-Parameter Adaptive Method, RTL-Real time load Mean Absolute Percentage Error (MAPE), Short Term Load Forecasting (STLF).*

GJRE- J Classification : *FOR Code: 090607*

Strictly as per the compliance and regulations of:

A Heuristic Method for Short Term Load Forecasting Using Historical Data

D.V.Rajan [α], C.Saravanan[β], S.S.Thakur[Ω]

Abstract- Load forecasting plays an important role in power system planning and operation. In the present complex power system network under deregulated regime, power generating companies must be able to forecast their system demand and the corresponding price in order to make appropriate market decisions. Therefore, load forecasting, specially the short-term load forecasting (STLF) plays an important role for energy efficient and reliable operation of a power system. It provides input data for many operational functions of power systems such as unit commitment, economic dispatch, and optimal power flow and security assessment. This paper proposes a new and simple technique to calculate short term load forecasting using historical data and applied it to the Damodar Valley Corporation (DVC) grid operating under Eastern Grid (ERLDC-Eastern Regional Load Despatch Centre), India. This gives load forecasts half an hour in advance. The forecast error i.e. difference between calculated forecast load and real time load is a measure of the accuracy of the system, is found to be lower than other existing techniques like Holt's Method, Chow's Adaptive Control Method, Brown's One-Parameter Adaptive Method.

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I. Introduction

In the present day, there are many issues and challenges in the deregulated electric power industry worldwide. The Indian power sector is undergoing structural metamorphosis and the various power generations, transmission and distribution companies are getting ready to take their rightful place in this sector to offer efficient service for which load forecasting is an effective tool.

Load forecasts with lead times from a few hours to seven days are essential in certain scheduling functions such as unit commitment and interchange evaluation. A wide variety of modeling techniques for STLF have been suggested in the literature in ref. 1-6.

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Conventional load forecasting methods like regression method in ref. 7 and time series modeling in ref. 8 have not considered the influence of all kinds of random disturbances into account. Artificial neural networks (ANN) in ref. 9-10 and fuzzy neural networks in ref. 11 are also applied to STLF which provide forecast models with enhanced learning capabilities.

The short term load forecast plays an important role in economic operation and reliability of power systems. The main objective of the STLF is to advise the dispatcher in making a decision for economic dispatching. Therefore with an accurate model, it could also benefit dispatch systems to:

- supply load consistently
- estimate fuel allocation
- determine operational constraints
- determine equipment limitations

The second objective of the STLF is security assessment and system updation. STLF system requires offline historical data to do predictions. The data helps to run the model in advance, therefore allows dispatcher to provide corrective counter measure to the system.

In the proposed technique, historical load data obtained from DVC from the year 2010 to 2011 was used. The inputs used for the proposed method are, load at the particular time in the previous year, and two readings at half hour intervals of the same year along with the load of the half hour intervals in the present year. A mean absolute percentage error of 0.05% was achieved over the period of data which was tested on 1 week data. This represents on average a high degree of accuracy in the load forecast.

II. Load Forecasting Tools & Methodology

Load forecasting is one of the most important inputs for prediction of electricity prices. The vital initiative behind prediction involves increasing number of models that estimate future values of an indicator based on its past values.

Load forecasting can be done for different durations i.e. long term forecasts with lead time of more than one year, medium term forecasts with the lead time of one week to one year, short term forecasts with lead

time of 1 to 168 hours and very short-term load forecasting with lead time shorter than a day.

STLF is a dynamic nonlinear input/output mapping function of many variables such as weather conditions, temperature etc. Auto regressive models and moving average mapping are well known examples that come under linear autoregressive models.

The various tools available for load forecasting are

- Artificial Neural network.(ANN)
- Fuzzy logic (FL)
- Autoregressive model
- Similar day approach
- Time series
- Expert system
- Support vector machine

Out of these methods, ANN and FL are the popular and commonly used mathematical tools in ref. 12-15 for load forecasting applications.

The traditional Approaches in ref. 16 like Holt's Method, Chow's Adaptive Control Method, Brown's One-Parameter Adaptive Method have been applied on the historical load data of DVC for month of February 2011.

A historical data method has been used in this work to develop a model to make predictions of the load half an hour in advance, based on the relationship of processed data of previous year and data available for the current year. In this paper, the proposed short term load forecast using historical data (STLFHD) method has been tested on DVC load data in which the forecast has been made based on load data at a particular time of the previous year in steps of half hour and one hour and corresponding load data of the current year.

An assumption has been made that the environment factor of power production system is same on the present day and the same day in the last year. Also, the two real time loads in thirty minutes difference is included in the calculation to make the forecast value more accurate.

The equations devised for load forecasting using historical data are as given below:

$$L^{\sim}_{t_{1/2}} = |(L^{p}_{t-1/2} - L^{c}_{t-1/2})/2| \qquad \text{Eqn (1)}$$

$$L^{\sim}_{t_1} = |(L^{p}_{t-1} - L^{c}_{t-1})/2| \qquad \text{Eqn (2)}$$

$$L^{c}_{t} = L^{p}_{t} + (L^{\sim}_{t\frac{1}{2}} + L^{\sim}_{t_1}) \qquad \text{Eqn (3)}$$

Where,

L^{c}_{t}= Forecast load of current year at required time.

L^{p}_{t}=load of the previous year at the same time at which forecast is being done in current year.

$L^{p}_{t-1/2}$=load of the previous year half hour before the current forecast time.

L^{p}_{t-1}=load of the previous year one hour before the current forecast time.

$L^{c}_{t-1/2}$=load of the current year half hour before the current forecast time.

L^{c}_{t-1}=load of the current year one hour before the current forecast time.

$L^{\sim}_{t\frac{1}{2}}$=Absolute average value of difference of half hour values.

$L^{\sim}_{t_1}$=Absolute average value of difference of hour values.

The mean absolute percentage error (MAPE) which indicates the efficiency of the devised model for predicting the load in advance and studying the performance of the system and it does not accentuate large error. Equation (4) illustrates the MAPE formula.

$$\text{MAPE} = \frac{1}{N}\sum_{i=1}^{N}\left[\left|\frac{L^{C}_{t} - L^{p}_{t}}{L^{C}_{t}}\right|\right] \qquad \text{.....eqn (4)}$$

Where L^{c}_{t}= Forecast load of current year at required time.

L^{p}_{t}=load of the previous year at the same time and N represents the total number of data (time samples=48).

Mean Absolute Deviation (MAD) is the final accuracy measurement. This error measurement is the average of the absolute value of the error without regard to whether the error was an over estimate or underestimate.

$$MAD = \frac{1}{N}\sum_{i=1}^{N}[|\,[L^{a}_{t} - L^{f}_{t}]|] \qquad \text{Eqn (5)}$$

Where L^{a}_{t} = actual load at particular time instant and L^{f}_{t}= forecast load at that time.

III. Results & Discussion

The proposed technique was tested on historical data from the period 2010 to 2011. The data of first week February 2011 has been considered here for discussion and plotted graphs show for better understanding. Table 1 shows morning peak and Table 2 shows evening peak of Load data & load forecast data respectively. Where FL represents Forecast Load and HD represents Historical data

Table 1: Load data (HD) & Load forecast (FL) for the given duration (morning peak)

Time	Year 2011	01.02.11 Load (MW)	05.02.11 Load (MW)	07.02.11 Load (MW)
600	FL	1487	1837	2049.5

	HD	1488	1838	2045
630	**FL**	**1498.5**	**1836.5**	**2047.5**
	HD	1502	1836	2046
700	**FL**	**1507.5**	**1837**	**2053.5**
	HD	1509	1838	2052
730	**FL**	**1498**	**1849.5**	**2051**
	HD	**1494**	1851	2053
800	**FL**	**1517**	**1875.5**	**2055**
	HD	1512	1875	2053
830	**FL**	**1508.5**	**1894.5**	**2028.5**
	HD	1508	1894	2029
900	**FL**	**1503.5**	**1892**	**1993**
	HD	1504	1891	1994
930	**FL**	**1498**	**1896.5**	**1898**
	HD	1499	1894	1895
1000	**FL**	**1489.5**	**1883**	**1866.5**
	HD	1489	1885	1871

Table 2 : Load data (HD) & Load forecast (FL) for the given duration (evening peak)

Time	Year 2011	02.02.11 Load (MW)	04.02.11 Load (MW)	06.02.11 Load (MW)
1800	**FL**	**1504**	**1744**	**1961**
	HD	1505	1746	1964
1830	**FL**	**1515.5**	**1754**	**1968.5**
	HD	1516	1759	1967
1900	**FL**	**1503**	**1750.5**	**1977.5**
	HD	1501	1743	1976
1930	**FL**	**1506**	**1749**	**1978**
	HD	1508	1748	1978
2000	**FL**	**1504.5**	**1761**	**1986**
	HD	1503	1764	1988
2030	**FL**	**1489.5**	**1805.5**	**1982**
	HD	1489	1806	1981
2100	**FL**	**1511.5**	**1864**	**1994**
	HD	1513	1869	1997
2130	**FL**	**1502.5**	**1876.5**	**1992**
	HD	1495	1871	1993
2200	**FL**	**1499**	**1867**	**1994.5**
	HD	1497	1870	1993

The mean absolute percentage error (MAPE) and Mean Absolute Deviation (MAD) results are shown in table 3 & 4.

It has been observed that error depends on several factors such as the homogeneity in data, the choice of model, the network parameters, and finally the type of solution. From the result shown in table 1 & table 2 the following three graphs developed. It is observed that the forecasted values are in good agreement with exact values and the calculated error, shown in table 3 and 4, is very small.

Also, the results obtained clearly demonstrate that the proposed method is simple, fast, reliable, accurate, and effective for short term load forecasting and that this method can perform good prediction with least error.

Table 3 : MAPE (%) values for different Load Forecasting Methods

Date	HM	CACM	BOPAM	STLFHD (Proposed Method)
01.02.11	0.853771	0.085133	0.649826	0.088758
02.02.11	1.823455	0.09901	0.721414	0.0955
03.02.11	2.181319	0.381517	1.265112	0.054279
04.02.11	1.635235	0.135338	0.824362	0.208704
05.02.11	1.687037	0.661841	1.644067	0.134027
06.02.11	0.682334	0.224032	0.664018	0.16012
07.02.11	1.143343	0.3451	0.906755	0.18286

Table 4 : MAD values for different Load Forecasting Methods

Date	HM	CACM	BOPAM	Proposed Method STLFHD
01.02.11	0.673998	0.120297	0.404542	0.08681
02.02.11	1.122309	0.178835	0.516869	0.09902
03.02.11	1.588924	0.847906	1.126689	0.045264
04.02.11	1.522361	0.260466	1.014949	0.284057
05.02.11	1.18465	1.633852	1.571948	0.171404
06.02.11	0.543446	0.44989	0.71449	0.144841
07.02.11	1.306622	0.728371	1.189224	0.215153

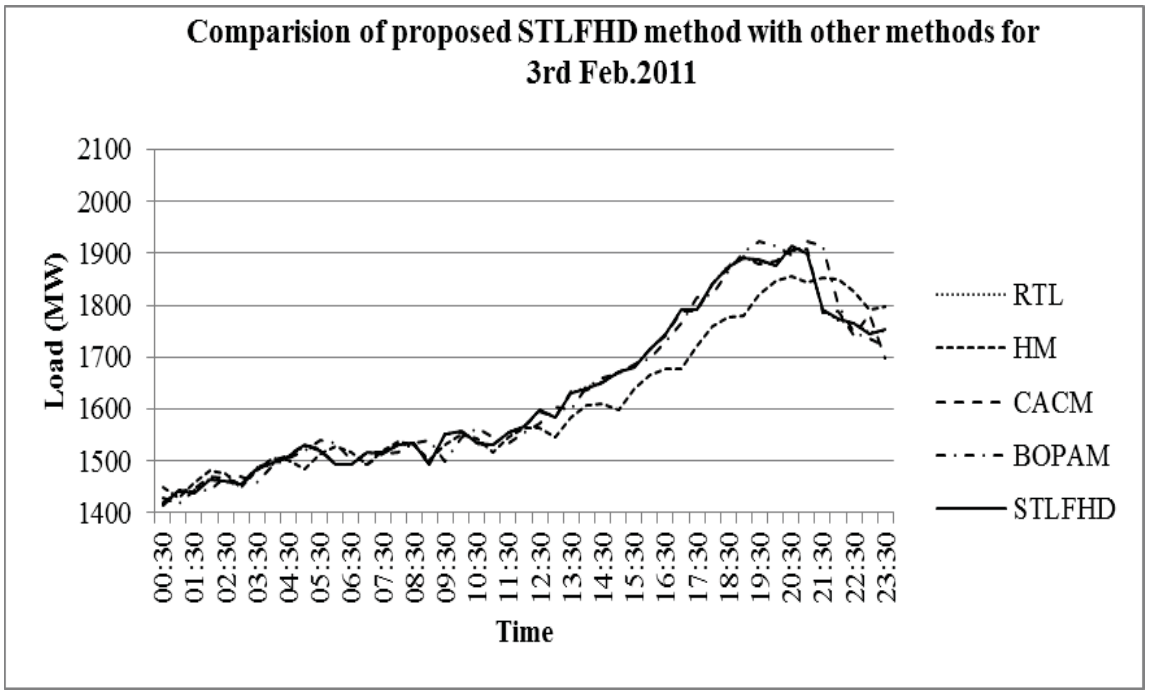

Figure 1: Comparison of proposed STLFHD method of forecasting with other methods for 3rd Feb.2011.

Figure 1

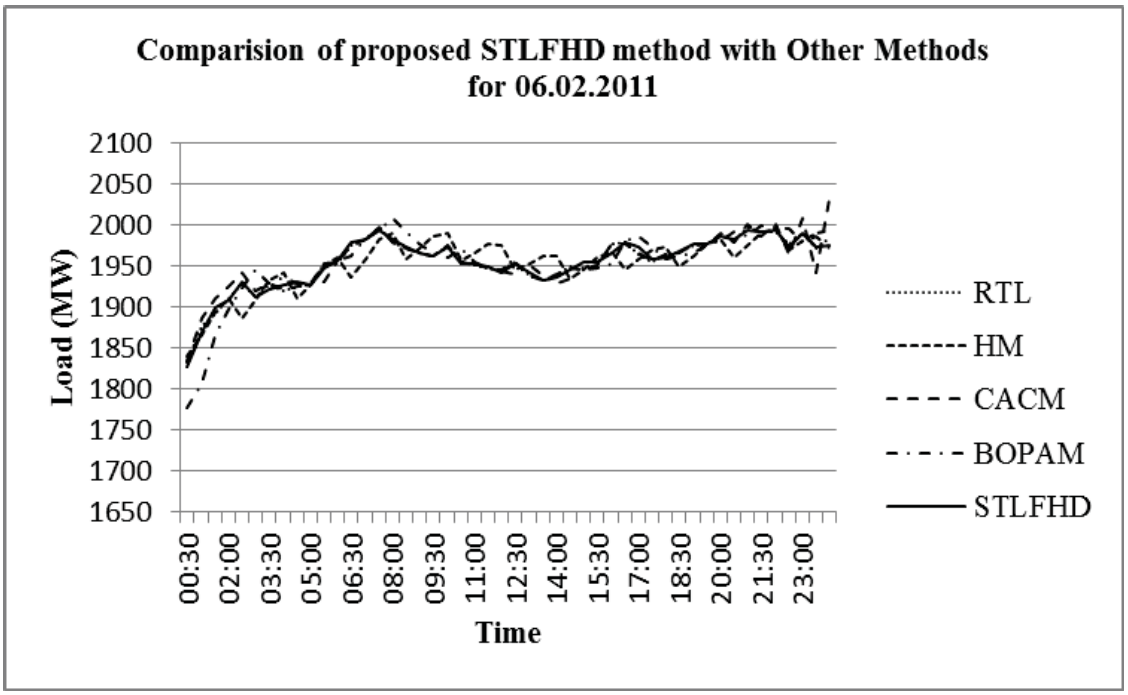

Figure 2 : Comparison of proposed STLFHD method of forecasting with other methods for 6th Feb.2011.

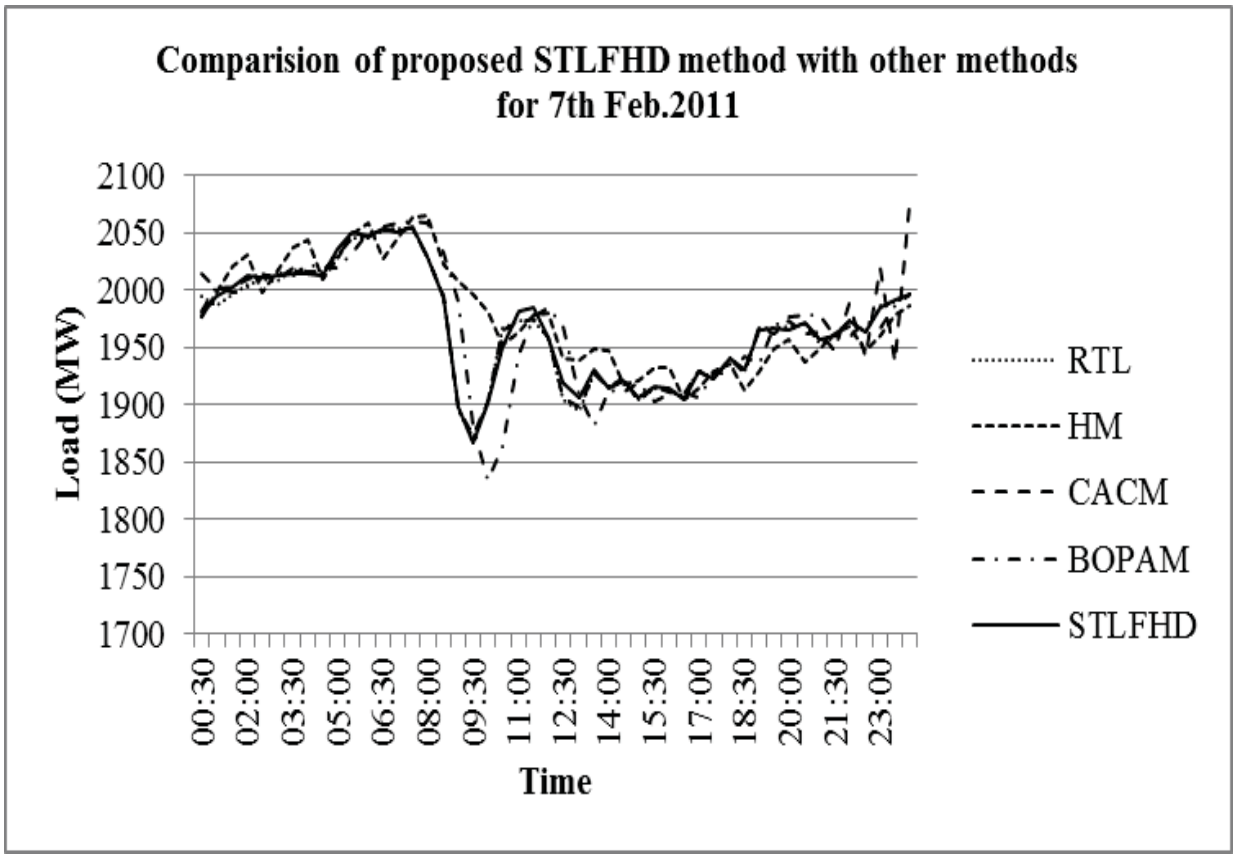

Fig.3: Comparison of proposed STLFHD method of forecasting with other methods for 7th Feb.2011

IV. Conclusion

The results obtained in this work confirm the applicability as well as the efficiency of the proposed method in short-term load forecasting for the DVC grid load pattern located in eastern part of India. The method applied was able to determine the nonlinear relationship that exists between the historical load data supplied and on that basis, to make a prediction of what the load would be in the next half an hour.

The forecasting reliability of the proposed method was evaluated by computing the mean absolute error between the real time load and forecasted load. The results have shown that the prediction is more accurate with least error. Finally, we concluded this technique is simple and fast and could be an important tool for short term load forecasting for inter connected grid systems.

V. Acknowledgement

The authors acknowledge Damodar Valley Corporation for their constant support and cooperation in providing real time data to bring this work in this form.

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Global Journal of researches in engineering
General engineering
Volume 11 Issue 7 Version 1.0 December 2011
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4596 & Print ISSN: 0975-5861

Formulation and Control of Biodegradable Injectable in Situ Gelling System of Levonorgestrel

By Pegah Dadras , Rasoul Dinarvand , Seyed Mostafa Khezri
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Abstract - The aim of this study was to develop a new polymeric gel that used as a contraceptive system.Polymeric gel has been studied extensively for drug delivery systems. In this article, thermal-sensitive poly (DL-lactic acid)-poly (ethylene glycol) - poly (DL-lactic acid) (PLA-PEG-PLA) hydrogel was used as an implantable contraceptive system.Aqueous solution of this copolymer fromed a free flowing so at room temperature and became a gel at body temperature. In this study, the biodegradable copolymer with molecular structure of PLA-PEG-PLA was synthesized and was investigated the sol-gel transition, hydrolytic degradation and In-vitro drug delivery from the system. In the current studyLevonorgestrel was selected as a model contraceptive drug.

Keywords : *thermal-sensitive,biodegradable,in situ,injectable,sol-gel transition*

GJRE- J Classification : *FOR Code: 090409*

Strictly as per the compliance and regulations of:

Formulation and Control of Biodegradable Injectable in Situ Gelling System of Levonorgestrel

Pegah Dadras[α] , Rasoul Dinarvand[β], Seyed Mostafa Khezri[Ω]

Abstract - The aim of this study was to develop a new polymeric gel that used as a contraceptive system.Polymeric gel has been studied extensively for drug delivery systems. In this article, thermal-sensitive poly (DL-lactic acid)-poly (ethylene glycol) - poly (DL-lactic acid) (PLA-PEG-PLA) hydrogel was used as an implantable contraceptive system. Aqueous solution of this copolymer fromed a free flowing sol at room temperature and became a gel at body temperature. In this study, the biodegradable copolymer with molecular structure of PLA-PEG-PLA was synthesized and was investigated the sol-gel transition, hydrolytic degradation and In-vitro drug delivery from the system. In the current study Levonorgestrel was selected as a model contraceptive drug.

Keywords : thermal- sensitive,biodegradable,in situ,injectable,sol-gel transition .

I. Introduction

Now a days, controlled release of contraceptive drugs using biodegradable polymers as drug carrier has been a very important approach for the contraception. Extensive research has been reported on inject able drug delivery systems, which are mostly based on micro spheres or specially designed shapes such as rods and films (Ruiz JM et al. 1940, Suzuki k and price JC 1985, Tsakala M 1988, Cha Y and pitt C ,1988 , koosha F et al. 1989).

A typical fabrication process of micro spheres usually uses organic solvents because biodegradable polymers such as poly (DL-or L- lactic acid), poly (glycolic acid-co-lactic acid) and poly caprolactone are not soluble in water. The organic solvents (e.g. ethylene chloride and chloroform) are known to be difficult to remove completely and the residual solvent may cause harmful side effects such as suspected animal carcinogenesis, neurotoxicity and teratogenicity (International conference on Harmonization of Technical Requirements for the Registration of pharmaceuticals for Human Use 1995). In addition, a surgical procedure is needed to implant the drug delivery matrix with a special shape and mechanical tissue irritation may be induced around the implant site (U. S. pharmacopoeia 1995).

Recently, drug delivery using an In Situ gel-forming system upon injection of formulation has been reported for its advantages, which included no surgical procedure to implant the drug release matrix and patient compliance when clinically applied (Hill – west JL et al. 1994).

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However, in the current work an aqueous solution of PLA-PEG-PLA triblock copolymer was fabricated as a new biodegradable injectable depot system (Bernatchez SF et al. 1993). The temperature induced sol-gel transition of aqueous solution gives the advantage of easy formulation at the sol state. The drug loading can be achieved by simply mixing the aqueous polymer solution with a drug. The solubility of the drug, even for a hydrophobic drug, can be enhanced by the surfactant nature of the block copolymer in water. The actual formulation can be a homogeneous solution or a suspension (A. Hatefi and B. Amsden 2002, .N.A. Kshirsagar 2000,Deepak Chitkara, et al. 2006).

The formation of gel starts from the surface of the system by thermal conduction from the body environment, resulting in preventing an initial burst release. The final degradation products of PLA-PEG-PLA triblock copolymers were of PEG, glycolic acid and lactic acid and all of them approved as nontoxic (Dinarvand R and D Emmanuelle 1993, 1994,1995)

II. Materials And Methods

a) Materials

The PLA-PEG-PLA triblock copolymer was synthesized by the method of Afshar and co-workers in Alborz Daru Pharmaceutical Co.(Iran), poly ethylene glycol (PEG) with molecular weight of 400 and 1500 was purchased from Merck Pharmaceutical Co.(Germany), lactide (Dimer lactic acid, MW=144) was obtained from Sigma(USA), the sample of Levonorgestrel (LNG) used in this study was purchased from Iran Hormone Pharmaceutical Co.(Iran), ethanol 96° was used as a gift sample from Bidestan Co.(Iran).

a) Methods

i. *Synthesis of triblock PLA-PEG-PLA copolymer*

The synthesis of this copolymer has been described in brief as follows. A ring opening polymerization of lactide (Lactic acid dimmer, MW=144) and PEG (MW=1500) followed by a coupling reaction was used to produce a triblock poly (lactic acid)-poly (ethylene glycol)-poly (lactic acid).

For synthesis of this copolymer, a small metallic reactor whit capacity of 50ml was used and a simethicone bath with stable temperature of 160 °C was applied. Stannous 2-ethyl hexanoate was used as

a catalyst. After complete synthesis, the triblock copolymer was purified by filteration method.

ii. *Characterization of Triblock Copolymer by ^{1}H-NMR Spectroscopy and gel permeation chromatography (GPC)*

A^{1}H-NMR spectrometer was employed to record ^{1}H-NMR spectrum of synthesized PLA-PEG-PLA and molecular weight was calculated on basis of known molecular weight of PEG (550 g/mol). A GPC (column: plGel, 300×7.8mm, refractive index detector, standard: polystyrene) was used to measure elution times using tetrahydrofuran (THF) as eluent. A calibration curve was constructed for determination of molecular weight distribution of the samples.

Molecular structure and molecular weight of this triblock copolymer respective ly have shown in scheme 1 and *Table 1.*

CH3 CH3

H (OC H CO) $_n$ – (OCH2 CH2)$_n$ – (OCCHO)$_n$ –H

Scheme 1: Molecular structure of triblock PLA-PEG-PLA copolymer

III. Determination of sol-gel transition temperature of PLA-PEG-PLA

PLA- PEG-PLA gel with concentration of 30 %(w/w) was dissolved in 15-ml vials containing distilled water. After equilibration at 4 ^{o}C for overnight, gel were applied in rheometer (Physica Apparatus) at given temperatures, ranging from 20 ^{o}C to 60 ^{o}C. Then the rheogram was recorded and Glass-Rubber Transition Temperature (Tg) of this copolymer was determined.

Fig.1 : Rheogram of triblock copolymer PLA-PEG-PLA 30 %(w/w)

IV. *Formulation*

Aqueous solutions of PLA-PEG-PLA triblock copolymer with initial polymer concentrations of 15,20,22.5,25 and 30%(w/w) were prepared at 4 ^{o}C /24h in two different vials(15 and 25ml) containing 2ml distilled water.

All solutions were in sol form at room temperature. Vials were placed them in a thermostatic shaker water bath (37 ^{o}C). Then 12 ml of 40 %(v/v) hydroalcoholic solution was added to the each vial as dissolution medium. 12ml of medium was sampled every day and it was replaced by a fresh medium. The samples were diluted and assayed spectrophotometrically at λmax =250 nm.

Different formulations were shown in Tables 2, 3 and 4.

Table 2: prepared formulation with different rates of polymer and constant amount of drug in the vials with small surface area.

Table 3: prepared formulation with different rates of polymer and constant amount of drug in the vials with big surface area.

Table 4: prepared formulation with different amounts of drug and constant rates of polymer in the vials with small surface area.

III. Results And Discussion

a) Levonorgestrel release of PLA-PEG-PLA gels

Fig. 2 : shows the drug release profile of drug loaded gel in 2 weeks from the formulations of A1-A5. Drug release patterns differ among different polymer concontractions.

Fig 3: Shows the effect of drug content in formulations with 22.5% of PLA-PEG- PLA.

Fig .4: and Fig .5 show the effect of PEG 400 as co- solvent and surface area of the vials, for formulations with 22.5% PLA-PEG-PLA, respectively.

Drug is speculated to release by a combined mechanism including drug diffusion and polymer erosion (degradation). At the early stage, drug release from the gel in a way mainly depending on the diffusion process. An increase in the daily release rate (the slope of release profile) within the second week occurred.

Fig.2 : Effect of polymeric concentration on drug release profile

Fig.3: Effect of drug content on release profile, formulatins with 22.5% PLA_PEG_PLA

Fig.4: Effect of PEG 400 as co solvent on drug release profile, formulation with 22.5% PLA_PEG_PLA

Fig.5: Effect of surface area of the vials on drug release profile, formulation with 22.5% PLA_PEG_PLA

b) Kinetics of release profile

Table 5: shows the drug release profile of drug – loaded gels, followed by higuchi kinetics.

Table 5: Regression coefficient (R2) of the best formulations based on zero order, first order and higuchi kinetics.

c) Determination of best formulations

After extensive assessment and study of drug release profile from the all of formulations, this result was obtained that A2, A3 and A4 formulations are the best, and release pattern from them is better than the other formulations.

IV. Discussion

The PLA-PEG-PLA triblock copolymer was synthesized as a carrier of contraceptive drug, Levonorgestrel. Drug– loaded gel, which was a sol turned into gel state within minutes when it was heated at 37°c.

It was shown that drug release profile of the system is increased by increasing Different factors, such as polymer / drug ratio, using of PEG 400 as a co-solvent,Surface area of the vials and drug loading. This result, indicates this system could de used as drug carrier having controlled release capability.

For extensive studies in the future, we suggest that the "in vivo" release profile is assessed and increasing the length of the chain of PLA for the synthesis of triblock copolymer can be tested for long time period of drug release.

V. Acknowledgements

The authors thank Azad University of Tehran; Pharmacy School, Alborz Daru Pharmaceutical Co.

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Table 1: Theoretical calculations of MW PLA-PEG-PLA Copolymer by ^{1}H-NMR spectrum and results obtained by GPC analysis.

	^{1}H-NMR	GPC
	Mean±SD	
MW of PLA-PEG-PLA	6050±0.68	6150±0.22

(*n*=3)

Table 2: prepared formulation with different rates of polymer and constant amount of drug in the vials with small surface area.

Name	PLA-PEG-PLA%	Drug (mg)
A_1	15	2
A_2	20	2
A_3	22.5	2
A_4	25	2
A_5	30	2

Table 3: prepared formulation with different rates of polymer and constant amount of drug in the vials with big surface area.

Name	PLA-PEG-PLA%	Drug (mg)
B_1	20	2
B_2	22.5	2
B_3	25	2

Table 4 : prepared formulation with different amounts of drug and constant rates of polymer in the vials with small surface area.

Formulation name			Drug (mg)
PLA-PEG- PLA25%	PLA-PEG-PLA22.5%	PLA-PEG-PLA20%	
E_1	D_1	C_1	1
E_2 (A_4)	D_2 (A_3)	C_2 (A_2)	2
E_3	D_3	C_3	3
E_4	D_4	C_4	4

Table 5: Regression coefficient (R^2) of the best formulations based on zero order, first order and higuchi kinetics.

Formulation	R^2(RegressionCoefficient)		
	Zero Order	First Order	Higuchi
A_2	0.9463	0.7824	0.9941
A_3	0.9620	0.7998	0.9892
A_4	0.9720	0.8133	0.9819

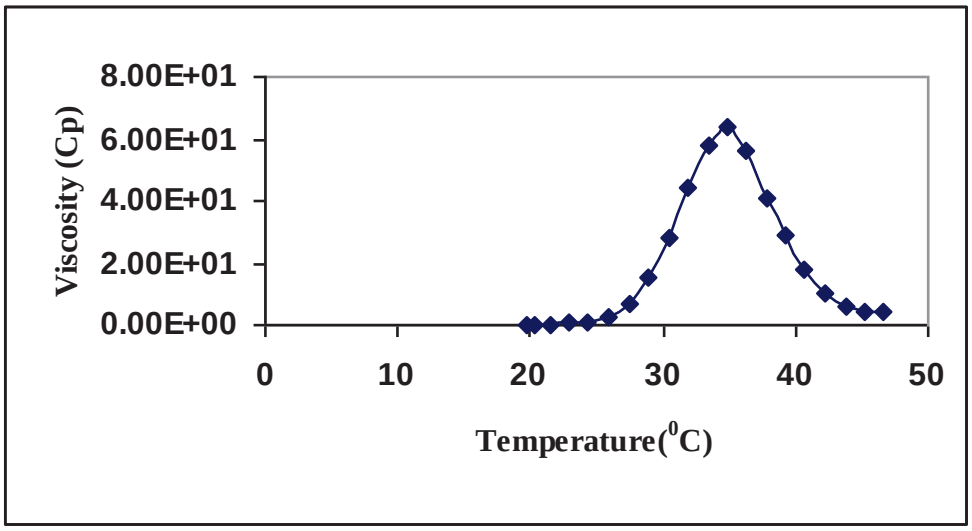

Fig.1 : Rheogram of triblock copolymer PLA-PEG-PLA 30 %(w/w)

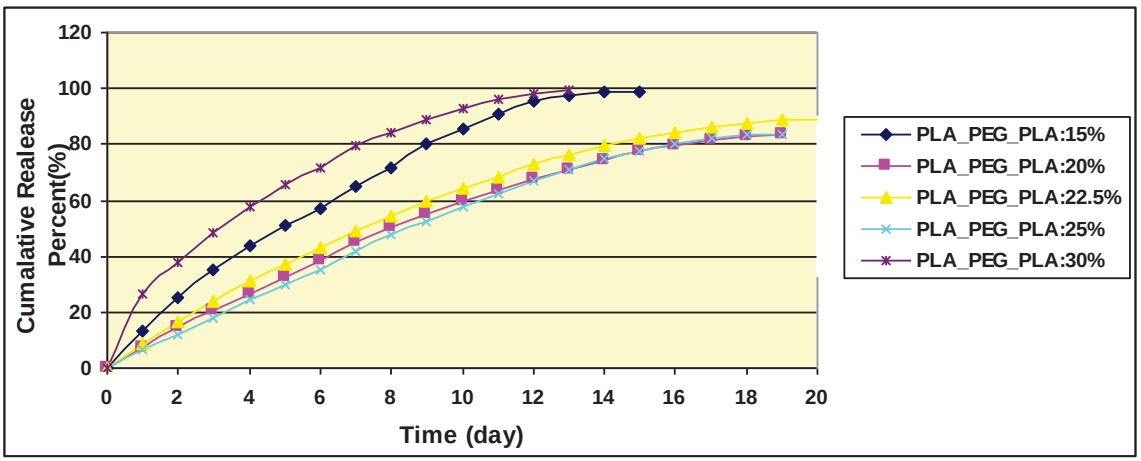

Fig.2 : Effect of polymeric concentration on drug release profile

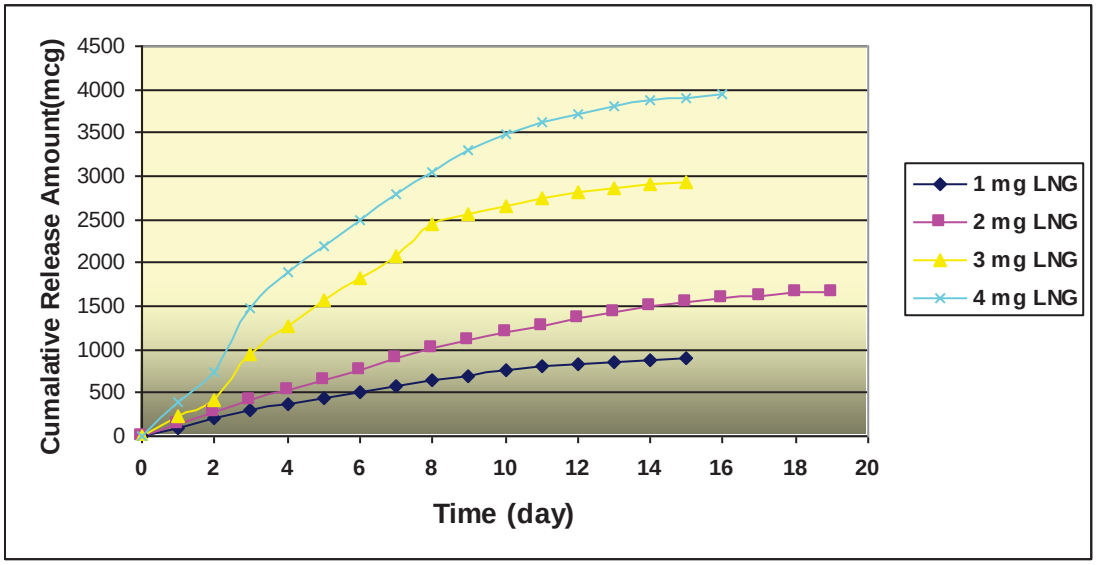

Fig.3: Effect of drug content on release profile, formulatins with 22.5% PLA_PEG_PLA

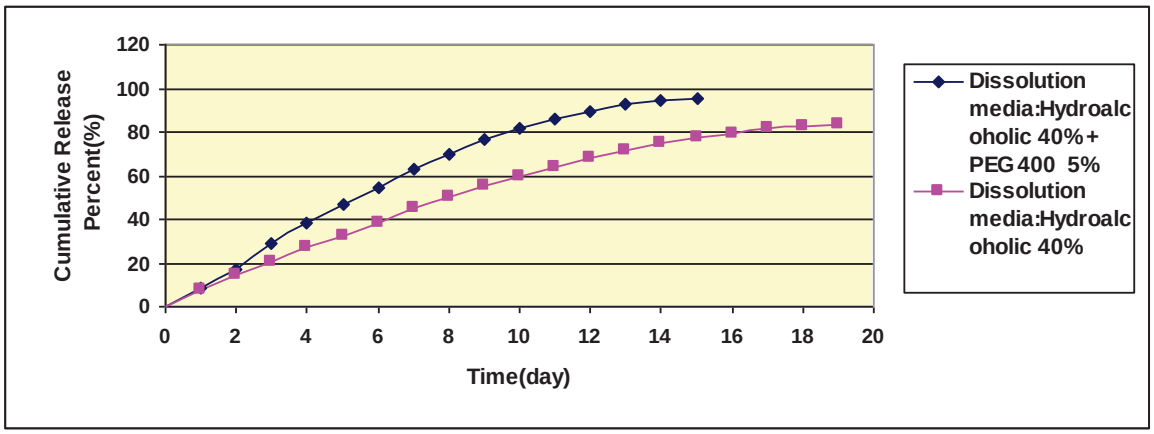

Fig.4: Effect of PEG 400 as co solvent on drug release profile, formulation with 22.5% PLA_PEG_PLA

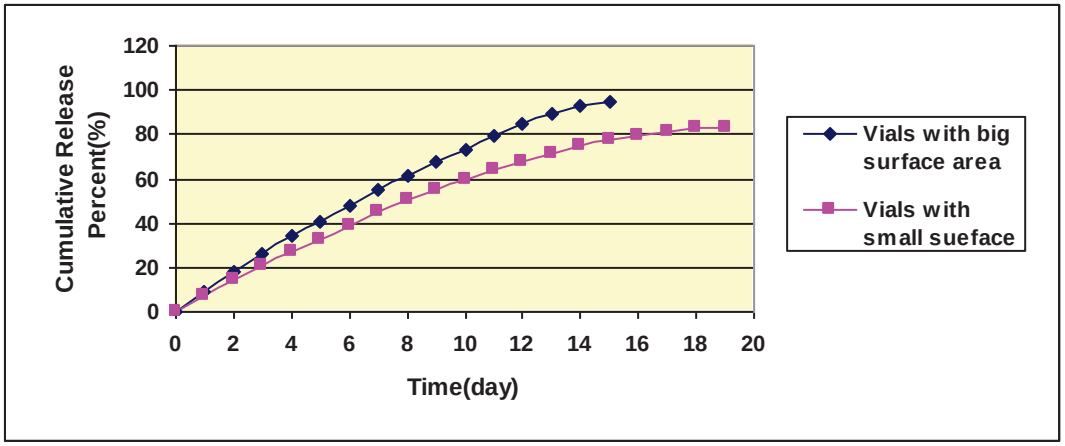

Fig.5: Effect of surface area of the vials on drug release profile, formulation with 22.5% PLA_PEG_PLA

Global Journal of researches in engineering
General engineering
Volume 11 Issue 7 Version 1.0 December 2011
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4596 & Print ISSN: 0975-5861

Evaluation of a Locally Fabricated Oil Screw Expelling Machine

By Ojomo A.O., Ologunagba F.O . , Alagha S.A
Department of Agricultural Engineering Technology, Rufus Giwa Polytechnic

Abstract - An oil screw expelling machine previously developed at the Department of Agricultural Engineering Technology, Rufus Giwa Polytechnic, Owo was evaluated. The economic analysis and effect of machine speed on the performance parameters namely: machine feed rate, output capacity, mass of cake produced, efficiency and oil yield were investigated. The test results revealed that increase in machine speed resulted in increase in the feed rate, output capacity and the mass of cake produced. At machine speed of 800rpm, the feed rate was 88kg/h, the output capacity was N72kg/h and the mass of cake produced was 2.5kg. At machine speed of 650rpm, the machine efficiency was 68% and mass of oil yield was 1.9kg. Further increase in the machine speed resulted in the decline of the machine parameters. The economic analysis of the machine suggested that the startup capital is minimal and return over investment very high.

Keywords : *Oil, screw, expelling machine, performance, parameters, economic analysis*

GJRE- J Classification : *FOR Code: 099902*

Strictly as per the compliance and regulations of:

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Ojomo A.O. [α], Ologunagba F.O [β]. , Alagha S.A. [Ω]

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Keywords : Oil, screw, expelling machine, performance, parameters, economic analysis

I. Introduction

Groundnut (Arachis hypogaea Linnaeus), also Known as peanut or earthnut, is a member of Papilionaceae, the largest and important of the three divisions of leguminosae (shankarappa et al, 2003). Nature to South America, it originated between Southern Bolivia and Northern Argentina from where it spread throughout the world as Spanish explorers discovered its versatility. It was brought to West Africa from Brazil in the 16th century (Alonge and Adegbulugbe, 2005). It thrives well under a wide range of environmental conditions. The oil content of the kernels is between 45% and 55% depending on the variety (Woodroof, 1983; Young, 1982).

Groundnut has been identified as one of the leguminous species with the greatest potential for both food and industrial purposes in the tropical region of Africa (Milner, 1973). It can be processed in different ways to many products such as groundnut flour, groundnut milk, groundnut butter, sandwiches, paints, varnish, lubricating oil, soap, insecticide, furniture polish, leather dressings and many others. However, the concern of this paper is the processing of groundnut into groundnut oil and Figure1 shows a typical processing flow chart.

Processing or extracting or expressing oil from groundnut involves a wide range of traditional, mechanical, chemical and mechano-chemical methods (Ewaoda et al, 2008). The traditional method involves roasting and crushing the groundnuts into fine particles, after which the crushed mass is mixed with water and boiled so as to allow the oil to float. The oil is then skimmed off and dried by heating (Ajao et al, 2010). This method is time consuming, labour intensive, low output and low efficiency with lots of drudgery. The mechanical methods involve the use of screw and hydraulic presses (Asiedu, 1984). The screw press is more reliable than the hydraulic press, but is slower and produces less pressure. The hydraulic press is more expensive, needs more maintenance and risk contaminating the oil with poisonous hydraulic fluid. Generally, the mechanical methods have relatively higher operating cost than the traditional methods; however, they have higher efficiencies and are usually more adaptable for small and medium scale producers (Abubakar and Yiljep 1996; Adgidzi, et al 2006; Olayanju et al, 2004; NCRI, 1995).

The chemical method or solvent method is done either by continuous solvent extraction or aqueous extraction. This method is more appropriate for large – scale processing than small- or medium-scale processing because of higher capital and operating costs. However, there is the risk of fire and explosions from the solvents coupled with the complexity of the process (Davie and Vincent, 1980; Jaswant and Shukla, 1991). The mechano-chemical extraction involves using the cake from the mechanical extraction as a solute to which solvent is introduced to further release the oil held in the cells. Though this method is the most efficient, it is very expensive and time consuming. The various modern methods of processing are predominant in developed countries while the manual processing is still the norm in many developing countries despite the drudgery and low output (Maduako et al, 2006).

In Nigeria, some imported large-scale plants are replacing the small groundnut processing units, but due to high foreign exchange rate, the cost of such

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imported machines is clearly out of reach of the poor farmers. Therefore, the mechanical processing method using the screw press has been selected for this study and this paper reports the performance evaluation of a locally built oil screw expelling machine.

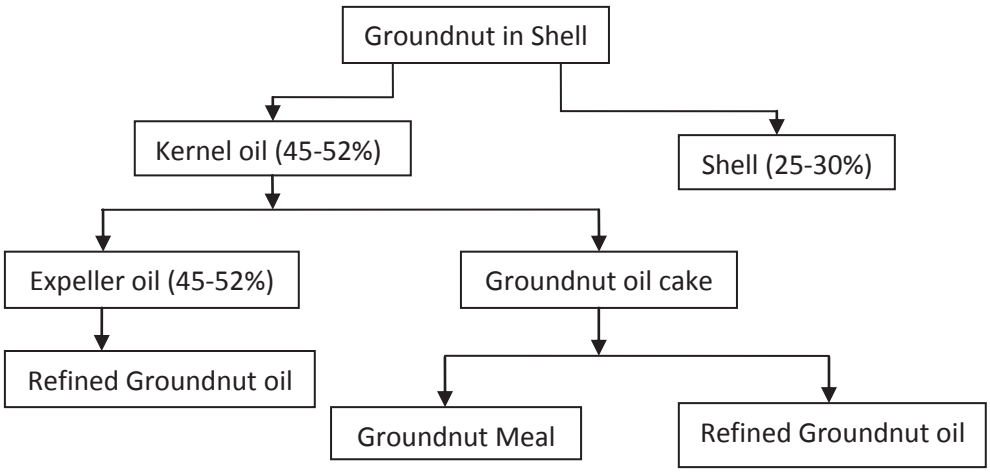

Fig.1: Flow chart for processing of groundnut into groundnut oil. (Source: NCDEX 2010)

II. Materials And Methods

a) Machine Description

The machine consists of the feeding chute (hopper), expelling unit, discharge units, frame and prime mover. The feeding chute is pyramidal in shape and made of 5mm gauge galvanized iron sheet. The expelling unit consists of a screw shaft with a perforated barrel outer casing. The screw is divided into three sections; the feeding, milling and discharge sections as it tapers. The friction and pressure produced by the screw on the barrel causes the mass to heat up, thus facilitating oil extraction as the screw grinds and presses the fine mass against the expelling chamber. The oil flows through the perforation in the casing and is collected beneath the expeller chamber while the residue (cake) is extruded from the unit through the cake discharge outlet.

The frame supports the machine and is firmly fastened together with bolts and nuts to allow easy dismantling for transportation. The prime mover is a two (2hp) electric motor of 1400rpm speed with belt and pulley arrangement.plate1 pictorial view of the oil screw expelling machine.

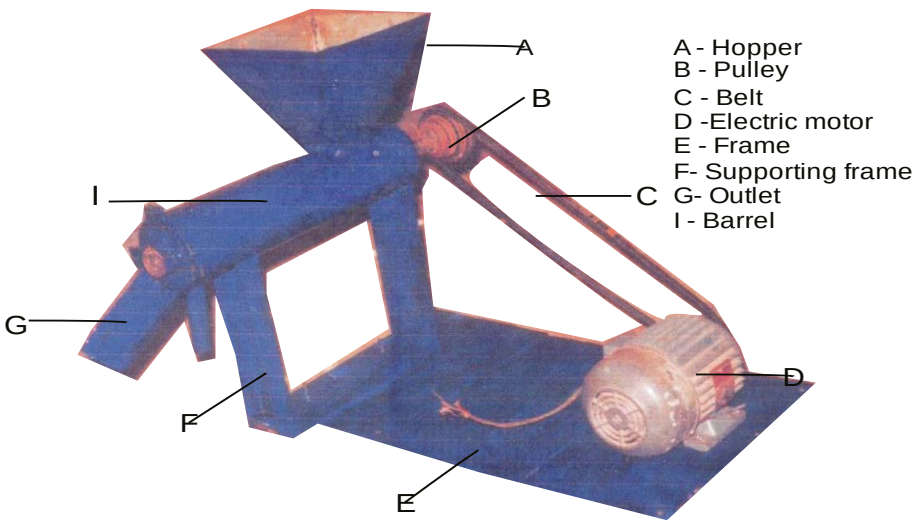

Plate1: Pictorial view of the Oil Screw Expelling Machine

b) Economic Analysis

The economic analysis of the machine was carried out as follows

i. Machine Capacity

a) Production Capacity = 48kg/hr (8 hrs per day operation) operating days per year = 300 days

b) Operating hours per year = 2400 hours

c) Production capacity per year = 115.2 tone/yr

d) Capacity Utilization = 85% of production capacity

e) Oil production per year = 97.92 tone/year

f) Power requirements per year = 0.8kwh x 2400h = 1920kwh

ii. *Cost of Production*

g) Cost of power consumed/year(#4.00/kwh)= #7680/year

h) Operators salary was assumed to be #12400 per Month for 2 workers; therefore the operators will collect #297,000/yr

i) Cost of fabrication of machine = #61,000 Electric motor inclusive.

j) Cost of raw materials = #135000/tone

k) Net sale of oil produced = #270000/tone

m) Cost of grinding and processing groundnuts/hr = #0.36/hr

n) Cost of processing groundnut/annum N0.36 x 2400hr) = #1344

0) Total cost of production (g + h + j) = Raw materials used per annum

iii. *Profitability*

q) Total sales of oil (#270000 x 97.92t/yr) = #26438400/yr

r) Raw material/year = #135000 x 97.92t/yr = # 13219200/yr

s) Cost of production/year = (g + h+ r) = #13523880/yr

t) Gross profit before taxes = (q- s) = #12914520

u) Payback period =1year

c) Experimentation

Fifty kilograms (50kg) of groundnut was purchased in the market and prepared for the test. The preparation involves cleaning the groundnut by removing dirty and other particles and washing. The cleaned groundnut was milled to form paste. Three kilogram (3kg) was prepared for each experiment and each experiment was carried out in five replicates. The speeds of the machine were varied by varying the diameter of the pulleys. The diameters of the pulleys used for the experiment were 525mm, 600mm, 675mm, 750mm and 825mm corresponding to 730, 675, 600, 525 and 450rpm respectively.

At the end of each operation, the weight of oil expelled and mass of cake were recorded in order to evaluate the effect of machine speed on the machine feed rate, output capacity, efficiency, percentage of oil recovery and the mass of cake produced. The machine performance parameters were determined by using the following equations:

$$\text{Feed Rate} = \frac{Mass\ of\ Paste}{Time\ taken/Unit\ operation}$$

$$FR = \frac{M_p}{T} \quad \text{---------- 1}$$

$$\text{Output Capacity} = \frac{Mass\ of\ oil\ expelled}{time\ of\ operation}$$

$$Q_c = \frac{M_{oil}}{T} \quad \text{- ------- 2}$$

$$\text{Percentage of oil recovery} = \frac{Machine\ efficiency \times 100\%}{45}$$

(Oluwole et.al, 1989)

$$P_R = \frac{\eta_{oil}}{45} \text{ x 100\% ---------- 3}$$

Where:

45 = The oil content in kg per 100kg of groundnut (Wiemer and Korthalds, 1989)

$$\text{Efficiency} = \frac{Mass\ of\ oil\ expelled}{Mass\ of\ Groundnut\ paste} \text{x 100\%}$$

$$\eta_{oil} = \frac{M_{oil}}{M_{GP}} \text{ x 100\% ---------- 4}$$

Oil yield = Mass of paste – Mass of cake

$$O_{yield} = M_p - M_c \text{ ----------5}$$

III. Results And Discussion

The performance of the locally developed oil screw expeller was evaluated at the various machine performance parameters. Figure 2 through 6 shows the results obtained from the test carried out on the machine. Generally, from Figure 2, the feed rate of the oil expeller increased with increase in the speed of the machine. The highest feed rate for the expeller was at

87kg/h at machine speed of 690rpm. Also, from Figure 3, the output capacity of the machine increased with increase in the machine speed. The highest value of output capacity of 68kg/h was achieved at machine speed of 780rpm. Figure 4 showed that the mass of cake expelled from the machine also increased with increase in the speed of the machine. At machine speed of 750rpm, 2.5kg of groundnut mash was recovered. The efficiency of the machine increased with increase in the machine speed (Figure 5). The high efficiency of the machine at high machine speed may be attributed to the high rate of movement of the screw press against the expeller wall. The highest value of 67% and 65% for actual efficiency and predicted efficiency of were observed at machine speed of 600rpm. Figure 6 showed that at machine speed of 600rpm, the maximum oil of 1.8kg was obtained from the groundnut mash and further increase in speed of machine resulted in decrease in amount of oil expelled

IV. CONCLUSION AND RECOMMENDATION

Performance test was carried out on a locally fabricated oil screw press. It was tested and found to be efficient in the expelling of groundnut oil. Generally, the performance parameters of the machine increased with increase in the machine speed. The machine is cheap, easy to operate and maintained because the parts can be locally sourced. It is recommended for small-scale farmers to process their nuts into oil which are hitherto sold as raw material at very cheap price.

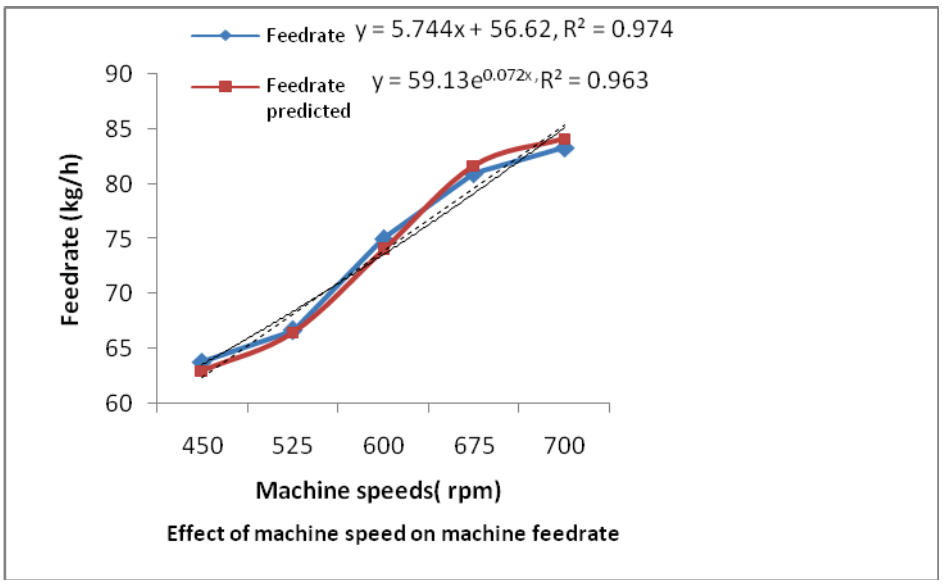

Figure 2: Effect of machine speed on machine feed rate

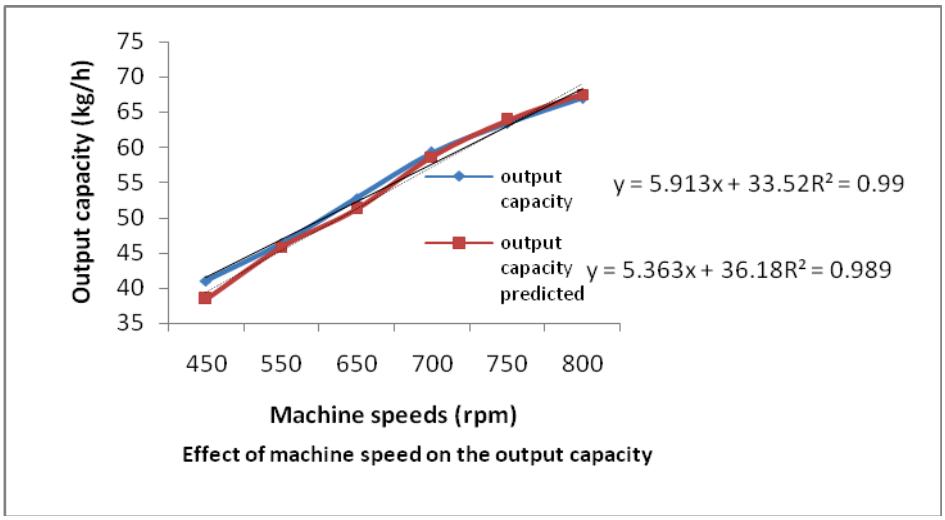

Figure 3: Effect of machine speed on the output capacity

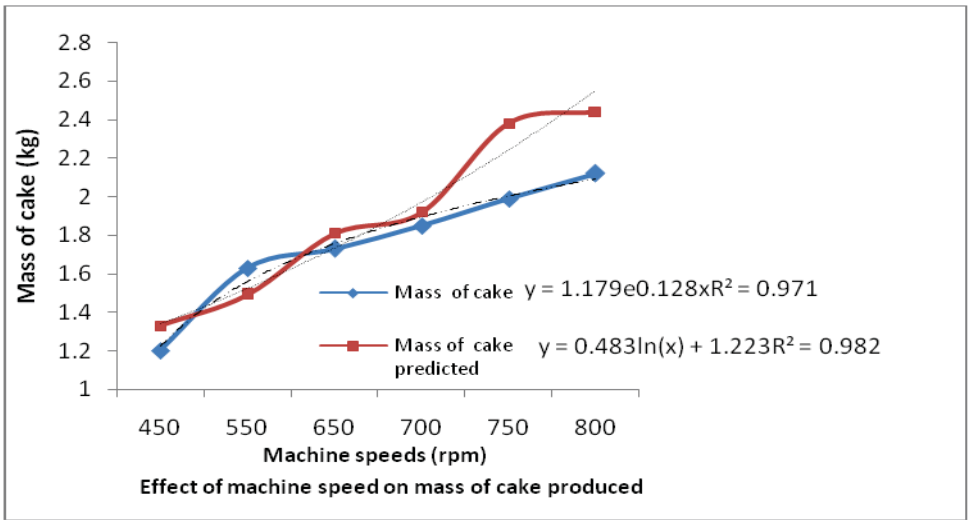

Figure 4: Effect of machine speed on mass of cake produced.

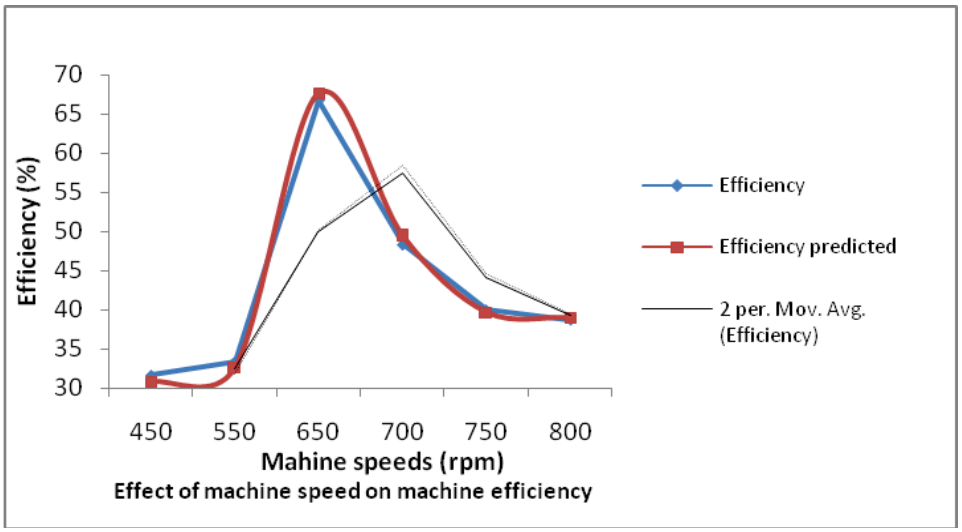

Figure 5: Effect of machine speed on machine effeciency

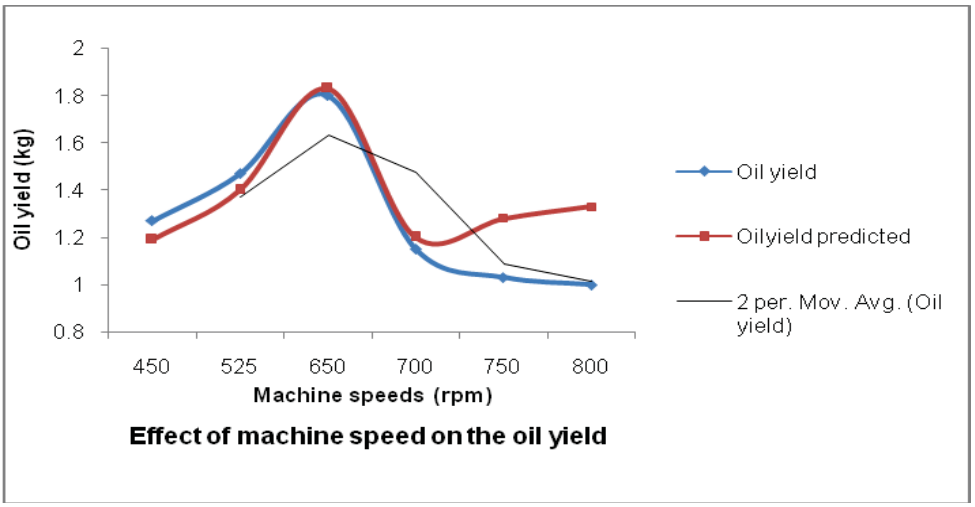

Figure 6: Effect of machine speed on the oil yield.

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Global Journal of researches in engineering
General engineering
Volume 11 Issue 7 Version 1.0 December 2011
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4596 & Print ISSN: 0975-5861

Software as a Service Model

By Dr. S.R. Suresh
DEAN – Computer Applications Bharath University, Chennai

Abstract - The prime objective of various Software development methodologies is to formulate a well defined framework to develop the intended software product. The framework should address various levels in the development cycle. The intended software product should be developed with limited slack time and with high degree of quality within various levels, without draining the resources available at hand. This paper addresses a new method to develop quality oriented software and without compromising the budget parameter. Quality is a major factor defining the demand for the product, customers look for quality at a demanding cost. So designing software at a reasonable cost with a high degree of quality will always conquer the software market. The term quality in software development sector is to design a system to address the requirements of the customer and the needs of the user. Some software fails during the implementation phase due to the lack of information from the users. In usual cases the buyer might not be the user. A clear documentation must be prepared by combining the requirements of the customer with the needs of the customer. The requirements of the customer usually address the logical and business parts of the software. But the needs for the user may vary from the color of the frame to the shortcut keys.

Keywords : *Quality, Software, Cost, Framework, SaS, Service*

GJRE- J Classification : *FOR Code: 890299*

SOFTWARE AS A SERVICE MODEL

Strictly as per the compliance and regulations of:

Software as a Service Model

Dr. S.R. Suresh

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Quality is a major factor defining the demand for the product, customers look for quality at a demanding cost. So designing software at a reasonable cost with a high degree of quality will always conquer the software market. The term quality in software development sector is to design a system to address the requirements of the customer and the needs of the user. Some software fails during the implementation phase due to the lack of information from the users. In usual cases the buyer might not be the user. A clear documentation must be prepared by combining the requirements of the customer with the needs of the customer. The requirements of the customer usually address the logical and business parts of the software. But the needs for the user may vary from the color of the frame to the shortcut keys.

Keywords: Quality, Software, Cost, Framework, SaS, Service

I. Introduction

This paper presents a method where we provide software as a service rather than product. This era has made more advancement in the area of information technology and communication systems. Statistics show about 80% of the world is connected through internet. In this modern age, we adapting to the new system of SaaS (Software as Service) technology is not an issue. SaaS provides a constant improvement in quality through various quality appraisal systems thus providing software with high degree of quality in a limited cost model. Here we address the model through which how this system can be implemented efficiently.

The core objective of designing a software system is to customize the operations of end users in achieving their core-target in minimum usage of recourses. The core target varies based on the assignment designated to the end-user. The banker who uses a banking application may use a software system to register all the transactions between clients and the bank, an application programmer uses a compiler for creating new software applications. Well performing software uses minimal recourses to reach the target with high degree of precision.

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In this paper, a new method through which we can achieve a best performing and highly reliable software through the concept of SaaS (Software as a Service) Modeling is briefed. This paper provides an insight of what a SaaS model is and the advantages of using this model in developing this kind of software. SaaS model provides a structural approach in designing a reliable software application. IEEE 610.12-1990 defines reliability as "The ability of a system or component to perform its required functions under stated conditions for a specified period of time. SaaS model provides a highly reliable system and with a longer lifespan since, the development and up gradation process is a continuous procedure through the concept of Quality through Intelligence (QTI).

II. Proposed System

Various software development framework models have been framed for designing reliable software at a competitive time and with limited recourses. The paper presents here an evolving system that has been adopted in major technological giants to enhance their service to their clients. SaaS concept was published in February 2001 by the Software & Information Industry's (SIIA) eBusiness Division.

The SaaS model provides a waypoint to design a software application through the concept of software as a service. SaaS concept is widely accepted concept and various design models are used to provide a solution for the identified service. By adapting SaaS model the system become more reliable than that of other building models.

The core concept to this architecture is the “Quality Through Intelligence”. This is a very special phase introduced in this model with gives a more advantageous background than that of the other models.

Since quality has a broad range of identification with respect to the end user, this system is very suited for creating software as service, since this provides an analyzing environment for continual quality improvement at various levels of usage.

III. Objective of SAAS Model

The primary objective of SaaS model is to design a feasible environment to develop software which meets the phrase “Give what the Customer Wants”.

Quality: To achieve this objective a new environment is designed parallel to the implementation

and Maintenance phase, "Quality through Intelligence", this phase is a specialized zone where we design a system to learn the user. Automatic feedback is generated based on usage of the end user. Various parameters are analyzed and the system generates a feedback file which is then compared with the other files generated by other users and the resulting information is used to generate useful code to improve the operational quality of the system.

Budget : Since this an automated feedback system, no specialized research and development team is required after implementation. This reduces the budget parameter to a large extent, since almost 40% of the allotted budget is spent on research and development

IV. STAGES IN SAAS MODEL

The various stages of SaaS model are market research, problem definition, implementation plan, QA feedback and testing, customer feedback and Quality through intelligence.

This model introduces a specialized phase "Quality through Intelligence". The other phases are similar to that of the conventional software development scenario with slight modification the procedural structure. The various stages and the control flow are presented in Fig1.

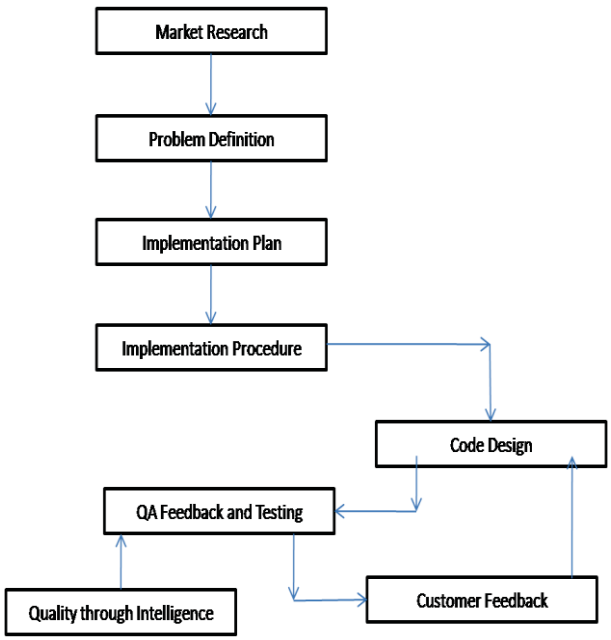


Fig 1: Schematic diagram of SaaS Model

a) Market Research

It is a very important component of business strategy. Market research involves preparing a list of services that are being utilized by various organizations and the depth of service provided is estimated through various management tools. Services involve accounting service, logistic service, HR service, etc.. The depth of service is the degree to which the user is able to utilize the service and decide upon its output. Tabulation is prepared based upon the service's degree of intensity. Benchmarking is also done with leading service providers of similar service. Upon deriving to a service criterion the system moves to the next stage of problem definition.

b) Problem Definition

This is the stage where the system starts getting into shape. After analyzing various possibilities in the previous stage of market research, the problem is put forth for a proper and structural definition. The identified service through the market research is studied and analyzed the following components are defined.

1) Functionality: What the service does
2) People: Trained human resource required for designing the service.
3) Systems: higher and lower level system goals, interfaces
4) Components – various parts and purposes involved in formulating the service.

After structurally formulating the problem for the defined components, the system moves on to the phase of implementation plan.

c) Implementation Plan

Fig 2 : Time line of SaaS model

The time line and the hierarchy of the various stages of SaaS model is depicted in Fig.2. A road map for achieving the desired goal is laid prior to the actual implementation procedure. The road map shows the various milestones and resource utilization as per the requirement specified in the problem definition. Slack time between levels is also specified in the current zone.

The milestones denote the end of a particular phase and the beginning of a new phase. The arrow indicates a continuous process.

d) Implementation Procedure

Once the road map for implementation is clearly laid out based upon the timeline required for each phase, the control is transferred to the implementation procedure. This phase of the SaaS model defines how the total service system is to be integrated into one common service providing unit.

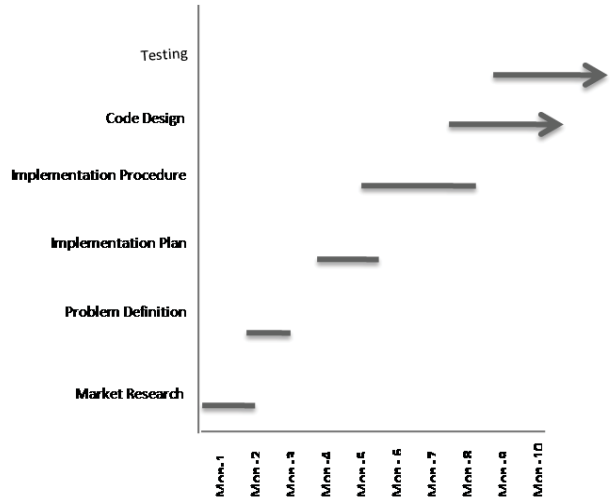
The implementation plan provides documents about the services to be provided and the resources that would be required during the implementation sequence. The implementation documents provide details about the development and integration

procedure for implementing the service. It consists of the business logic, class structures, control flows, Use Cases and other details required for the actual development of the system.

The details prepared in the implementation procedure document are utilized during the coding and testing sequences. Without proper documentation of implementation procedure further quality improvement procedures based on the inputs from the quality through intelligence will not be viable in this model. The whole system should be designed to function and learn at the same time.

e) Code Design

The coding phase encompasses the core part of designing the operational part of the system. Initially a desired language is chosen from the broad array of available programming languages. Selection of a programming language is a very essential part in designing a system. Since there is no universally superior language, each programming language has to be analyzed for its strengths and weaknesses. Selection



of the programming language has a long term implications including those of the business capability, cost and technology. Therefore selection of programming language is a management cum technological decision.

Various dimensions for selection of a programming language are capability, productivity, ramp up, extraneous factors and cost.

1) Capability: what the language can/cannot do

2) Productivity: How efficiently one can write programs using the language

3) Ramp Up: How easily can you get online

4) Extraneous factors : Factors that is outside of the programming context

5) Costs: What are the costs involved in using the language

f) QA Feedback and Testing

Parallel to the coding procedure the testing teem start their testing work by preparing the test documents for the opted service. Since error free and good quality software service always takes a lead in the highly competitive software market, it is always better to have a good testing document prepared ahead of the testing procedure. To be useful, software testing procedures must encompass all aspects of the software testing process. The steps involved in testing procedures are described in Fig. 3.

It's vitally important that the procedures define the people who will be involved in the testing process, the skill set of each team member, and their availability for the duration of the testing cycle. For the software cycle to remain on track, the software testing procedure must also delineate a carved-in-stone testing schedule including dates of important milestones.

Software testing is a critical component of the software development cycle. And software testing procedures are critical to the success of the testing phase. Software remains in a perpetual state of change which is why software testing, whether manual or automated, is so vital to a software product's success. Typically, 30 – 40% of the software engineers employed at larger software development companies work on software testing and each of these individuals needs to understand his or her role in this ongoing process.

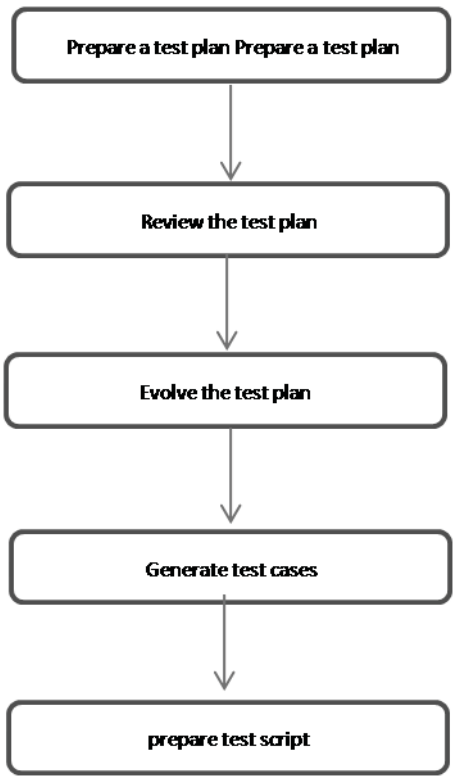


Fig 3: Testing procedure sequence

The quality assurance teem keep in track the progress of the development process with accordance to the study conducted during the market research phase. Since the quality parameter varies based on the various levels of users of the service, a clear document is prepared as to monitor that the software service meets the demands without compromising the feasibility of the system.

The following are factors are measures while testing the quality of the system.

1) **Correctness**: extent to which a program satisfies its specification and fulfills the client's objective.
2) **Reliability**: extent to which a program is supposed to perform its function with the required precision.
3) **Efficiency**: amount of computing and code required by a program to perform its function.
4) **Integrity**: extent to which access to software and data is denied to unauthorized users.
5) **Usability**: labor required to understand, operate, prepare input and interpret output of a program
6) **Maintainability**: effort required to locate and fix an error in a program.
7) **Flexibility**: effort needed to modify an operational program.
8) **Testability**: effort required to test the programs for their functionality.
9) **Portability**: effort required to run the program from one platform to other or to different hardware.
10) **Reusability**: extent to which the program or its parts can be used as building blocks or as prototypes for other programs.
11) **Interoperability**: effort required to couple one system to another

g) Customer Feedback

The goal of designing software service through SaaS model is to achieve a high degree of customer satisfaction. This can be achieved by understanding the customer's needs which can be done through customer feedback system. The feedback from the customers allows the quality assurance team to provide the development team with new solutions to be provided by the services so as to boost the market capability of the software service.

Providing customers with free trail service packages will boost the number of feedbacks, of which the quality team can verify the quality by analyzing the inputs obtained from the customers. By fine tuning the services based upon the customer inputs, we can further enchase the market share of our service software.

Customer feedbacks increases the market potential of the service, because of the useful information provided by the customers the development team know what the customer want and the service is designed to the needs of various levels of service users.

Customer feedback is obtained initially during the release of the alpha version of the software. Since the probability of getting errors is high, usually the feedback is obtained from in-house consultants or experts. Once the beta version is released after the fine tuning of the system, it is delivered to selected community of users for feedback. These stage by stage testing results in bringing more positive feedback stating about the additional features required rather than faults found in the service. After completion of testing of beta version, the final service is released for general usage of customers.

Since we design service oriented software a constant update must be kept in recent advancement in the services. This can either be obtained though customer feedback or through in-house domain experts. The service is modified based upon the inputs obtained from analyzing the customer feedback and expert opinion.

h) Quality through Intelligence

This is a phase unique to SaaS model. This is phase where we design a intelligence system which learns the operations of the system form the users end. This is similar to that of business intelligence. Based upon the customer feedbacks and overall functionality of the system a special module is designed which runs in parallel to service learning the operational mode of various functions. Based on the reports generated by the module the quality assurance team generates solution structure for the desired requirement specified by the learner module.

Various types of specifications provided by the learner module are the time reduction specification, entry reduction specification, frequently used specification and user environment specification.

1) Time Reduction Specification: this functionality learns the time taken to complete each functionality available in the service for various users and identifies the minimum time taken to complete an operation. Based upon the identification it identifies the operational mode of that particular user and reports it to the quality assurance team.

2) Entry Reduction Specification: this functionality learns the entry structure and identifies the correlation between each entry and when a similar entry is encountered it automatically completes the form with minimal entry time.

3) Frequently used: this functionality identifies frequently used functions and creates a short in the main screen to enable quick access to the user.

4) User Environment: this functionality modifies the working environment based on certain parameters like time, gender etc.. this enables the user to work with ease.

V. Conclusion

SaaS is an emerging concept which is being adopted by numerous software firms to hold their ground in this highly customer oriented market. SaaS model will definitely bring out a software system with high degree of quality without compromising the cost factor, since its lower levels of production and the specialized learning module in the Quality through Learning concentrates on delivering a customer oriented quality service.

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Global Journal of researches in engineering
General engineering
Volume 11 Issue 7 Version 1.0 December 2011
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4596 & Print ISSN: 0975-5861

"Forest Mapping by using RS and GIS Techniques"

By Muhammad Asim Rizwan
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Abstract - Forests have important and vital global ecological as well as socio-economic resources and they require a sustainable management. An attempt has been made in this research to monitor, record data as well as to have a systematic understanding of the forest map development and to map the existing forest coverage in context of cost effectiveness and time consumption. The aim of this study has, to map the existing forest, to identify unutilized land, to develop a plan to increase the existing forest coverage and carry out the related analysis. For this purpose, RS and GIS data have been compiled within the ERDAS and ArcGIS environments. The data acquired from Punjab Forest Department has been standardized and joined to spatial datasets produced to go for micro-level forest mapping, monitoring up gradation and plan development. It has been concluded that with the help of RS and GIS techniques one can perform spatial analysis and capable of highlighting issues and problems for planning, monitoring and management of forest system.

GJRE- J Classification : FOR Code: 070599, 090903, 090905

Strictly as per the compliance and regulations of:

"Forest Mapping by using RS and GIS Techniques"

Muhammad Asim Rizwan

Abstract - Forests have important and vital global ecological as well as socio-economic resources and they require a sustainable management. An attempt has been made in this research to monitor, record data as well as to have a systematic understanding of the forest map development and to map the existing forest coverage in context of cost effectiveness and time consumption. The aim of this study has, to map the existing forest, to identify unutilized land, to develop a plan to increase the existing forest coverage and carry out the related analysis. For this purpose, RS and GIS data have been compiled within the ERDAS and ArcGIS environments. The data acquired from Punjab Forest Department has been standardized and joined to spatial datasets produced to go for micro-level forest mapping, monitoring up gradation and plan development. It has been concluded that with the help of RS and GIS techniques one can perform spatial analysis and capable of highlighting issues and problems for planning, monitoring and management of forest system.

I. Introduction

Forests and forestland have important natural resource in many part of the world and provide the raw material for a wide range of wood-based industries (Susilawati, S., and Weir, M.J, 1990) [12]. Deforestation has become a global problem in many developing countries and it has a direct correlation with population density, and forest resources have caused mainly by ever-increasing populations and some development activities (Gannzzorig, M., Enkhtuvshin, B., Amarsaikhan, D., and Tuglaa, H., 1994) [6].

Forest management requires reliable inventory data and the maps indicating current state of the forest area. (Hidalgo, D.M. and Kleinn, C. 2002)[7]

Forest helps to maintain the balance of nature and provides unlimited services for all living creatures on this planet. Environment which must be healthy and friendly is essential for every living being so it has been decided globally that every country of this globe must have 25% forest cover out of its total land cover. (Land Cover Assessment and Monitoring of Pakistan by ICIMOD under UNDP, 1998)[9]. Its 4.2 million hectare area is covered by the forest, which is equivalent to 4.8% of the total area, which is very low if compared with the world (State of Forestry in Pakistan, 1999/2000) [5].

The demand of Pakistan for forest and other natural resources are very high because it is a developing country and its population is growing 2.3 % annually with relatively high industrial growth rate of 6% that contributes to the needs. The timber, fuel wood and other forest related needs are increasing. Forests also contribute 32% of total energy needs as fuel wood. 90% of rural and 60% of urban households use fuel wood and other forms of biomass as their primary source of energy (Forestry Sector Master Plan, Volume 6 Punjab, 1992) [10].

The forest cover of territories of Pakistan i.e. Sindh, Balochistan, Punjab, NWFP, Azad Kashmir and Northern areas are 0.92, 0.33, 0.69, 1.21, 0.42 and 0.66 millions hectare respectively .Rangelands comprising 28.50 million hectare includes 6.28 million hectare under Forest Departments which is 32% of the total area of Pakistan. (Statistical Hand Book of Punjab Forestry, Wild Life and Fisheries Department, 1999) [11].This study is conduct for the district of Toba Tek Singh which has area 5896.260 hectares under forest department.

RS and GIS techniques provide real time information on the status and condition of the forests. Integrating RS and GIS data with other traditional and ground truth

Information one can perform truth information through analysis and advise the forest managers for better planning (B. Enkhtuvshin, M. Ganzorig, D. Amarsaikhan, H. Tulgaa Informatics Centres)[2].

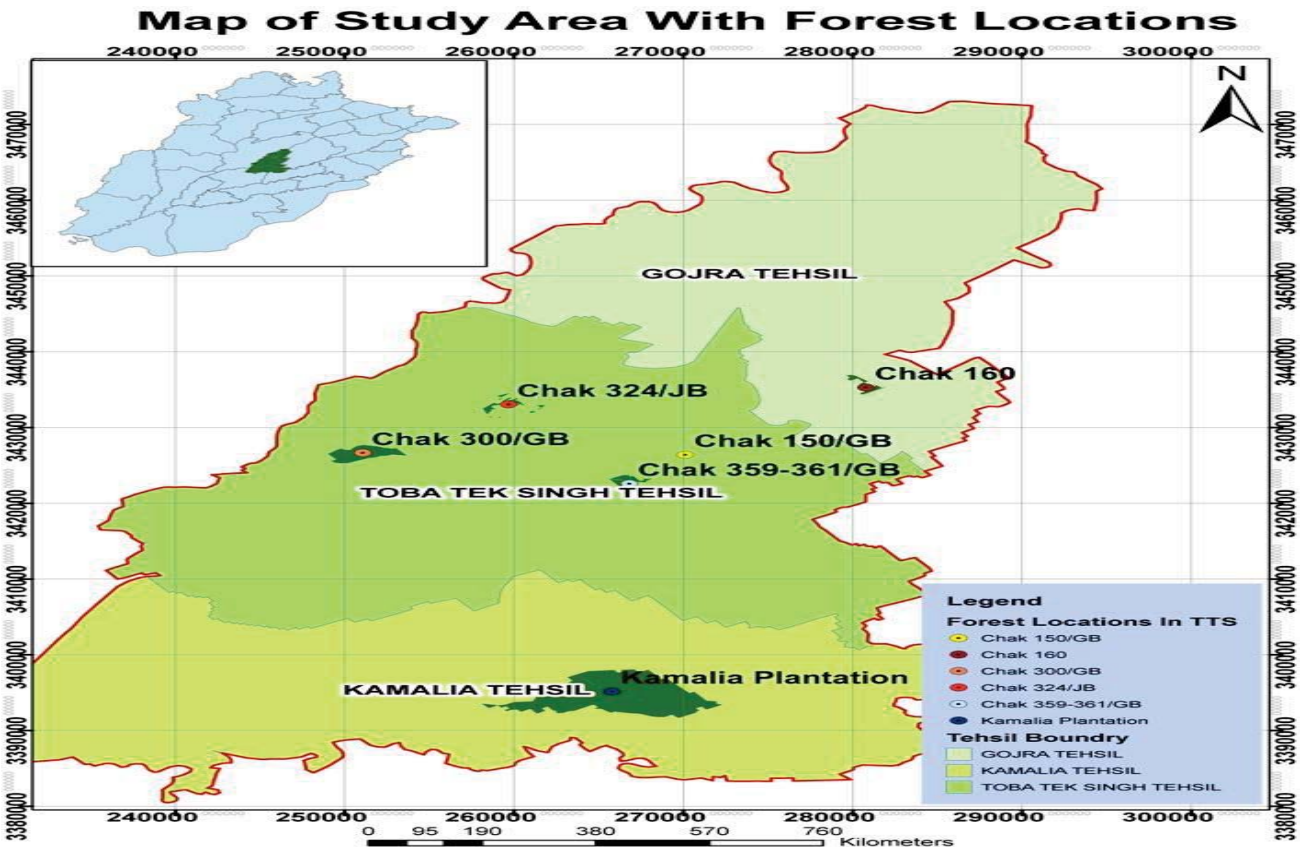
II. Study Area

Toba Tek Singh is a district in the Punjab province of Pakistan. It is located between 30°33' to 31°2' Degree north latitudes and 72°08' to 72°48' Degree longitudes. It comprises of 3 tehsils, 82 union councils and 579 villages. It has an area of 325900 hectare and 5896.260 hectare is under forest. It is divided into three tehsils and the area of each tehsils is as under

Name OF Sub Division	Total Area (Hectatre)
Toba Tek Singh	129300
Kamalia	111500
Gojra	85100
Total	**325900**

Table 1: Total area of each Tehsil of T.T.Singh

Author[α] : Research Assistant (GIS), The Urban Unit, Lahore, Pakistan



Map 1: Showing study area with forest locations

(http://tmatobateksingh.com/.html 05-12-2008[8]. http://www.tobateksingh.gov.pk/

III. METHODOLOGY

It is supported by the intensive use of geoinformation technologies of (i) Remote Sensing (RS), for its capability to collect accurate information over extensive areas at a repetitive basis, and (ii) Geographic Information Systems (GIS) for spatial analysis, statistics and mapping (Eduard WESTINGA) [4].

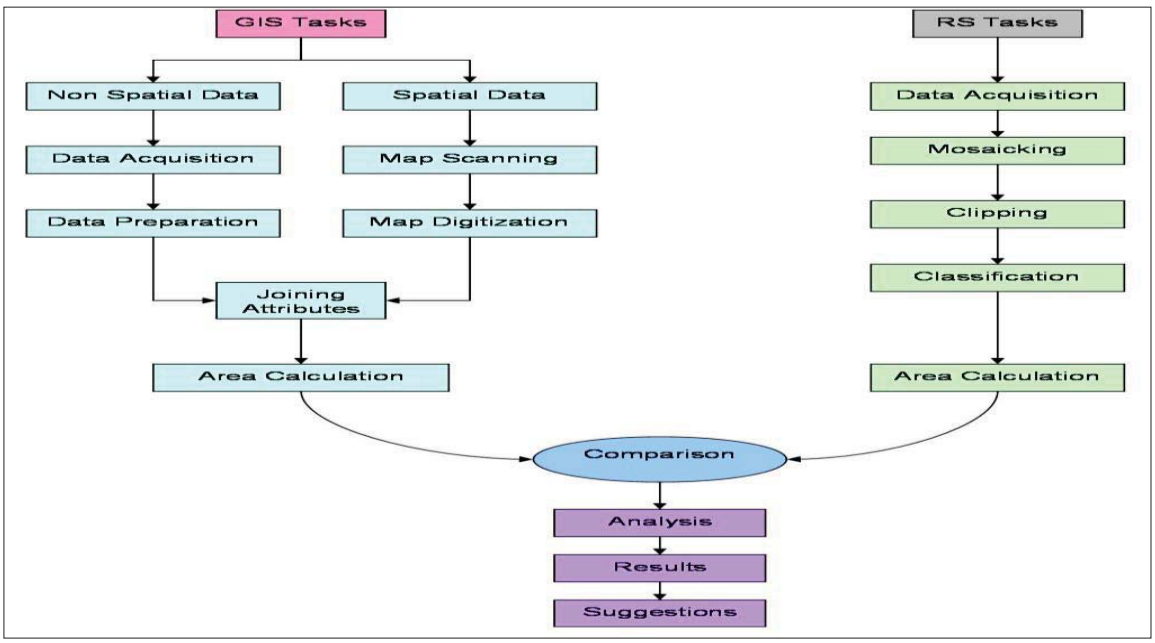


Figure 1: Flow Chart

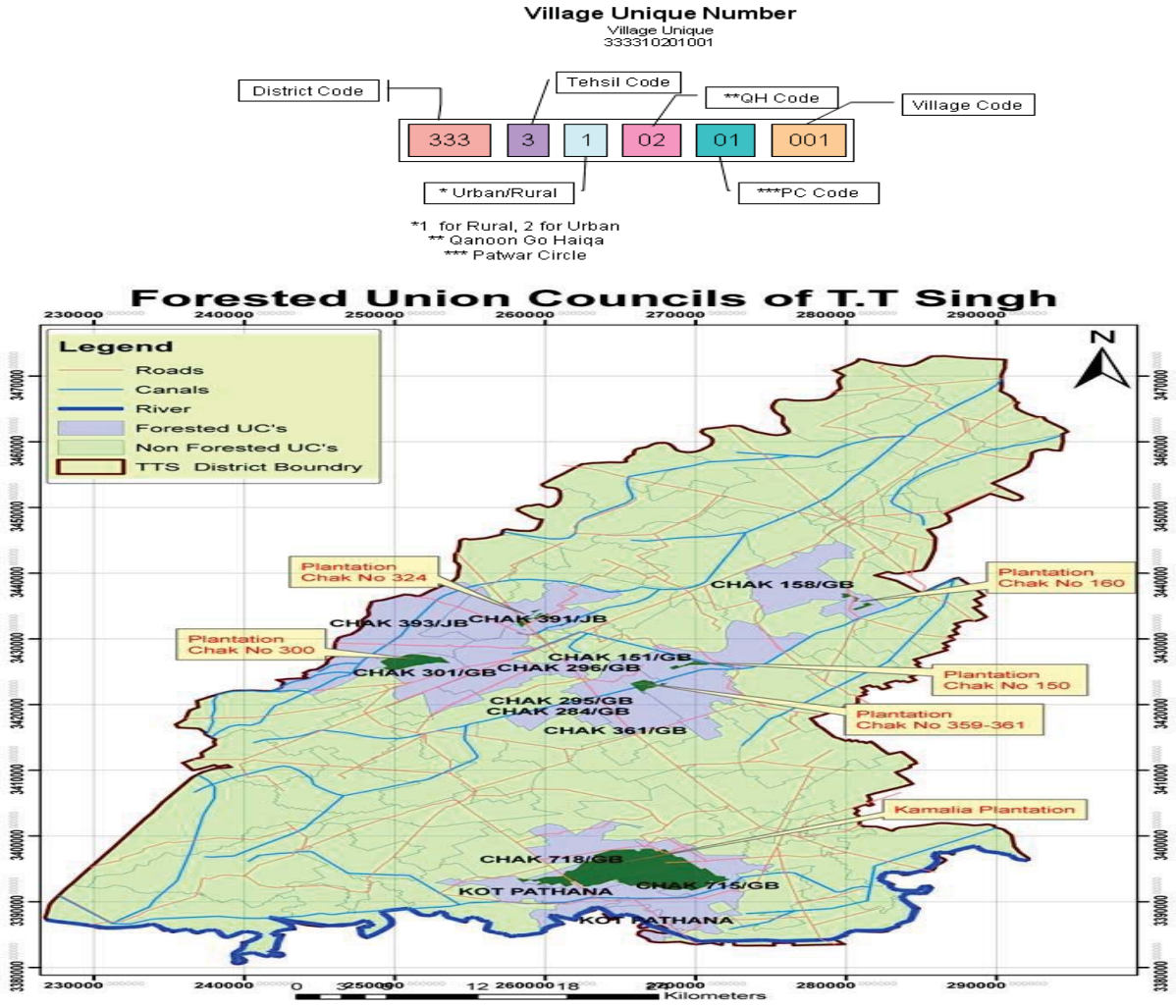
Source maps of Toba Tek Singh at the village level have obtained from census department and used to make the district map at village level along with major features like river, canals, railway tracks, roads etc. Forest boundary maps and compartment inquiry files of the forest have acquired from the provincial, divisional and district forest departments and scanned at 300 dpi to make maps of Toba Tek Singh to locate forest at Union Council and village level.

Raster map of Punjab province obtained from JICA (Japan International Cooperation Agency) is first geo-referenced, then projected .The scan map digitize at district boundaries, and study area digitized at tehsil level boundaries. Shape files of village boundary and forest boundary were converted to KML to find the locations on the Google Earth in order to see the present status of the forest. In order to calculate areas and for correct placement of scale bar all the shape files have first converted to Universal Transverse Mercator (UTM). For the sake of joining attributes to the village points, same coding technique was used as in census 1998.

Already obtained statistics in the form of tabular data format were assigned unique values to villages names in the excel sheet and the same values were also assigned to the attributes of the village boundaries and points in the shape file to join on spatial attributes to the spatial attributes. These attributes have been used to form the maps by using symbology and queries.

The UTM projected shape files have used to calculate areas in acres.

The next step is to mark the forest locations of the entire district. For this purpose, the union councils were assigned unique forest codes to represent forest locations at UC level and then the villages are assigned forest codes to represent forest location at village level. These forest codes have used to filter out the UC and Village location respectively.



Map 2: Showing forested Union Councils

The color scheme has used to represent forests at different levels. After all these processes, the final digital map of the districts Toba Tek Singh is ready to give all the information that a digital map shows. In digital map, the scale used to indicate the base map was 1:50000. Thematic maps have used to highlight the areas of interest.

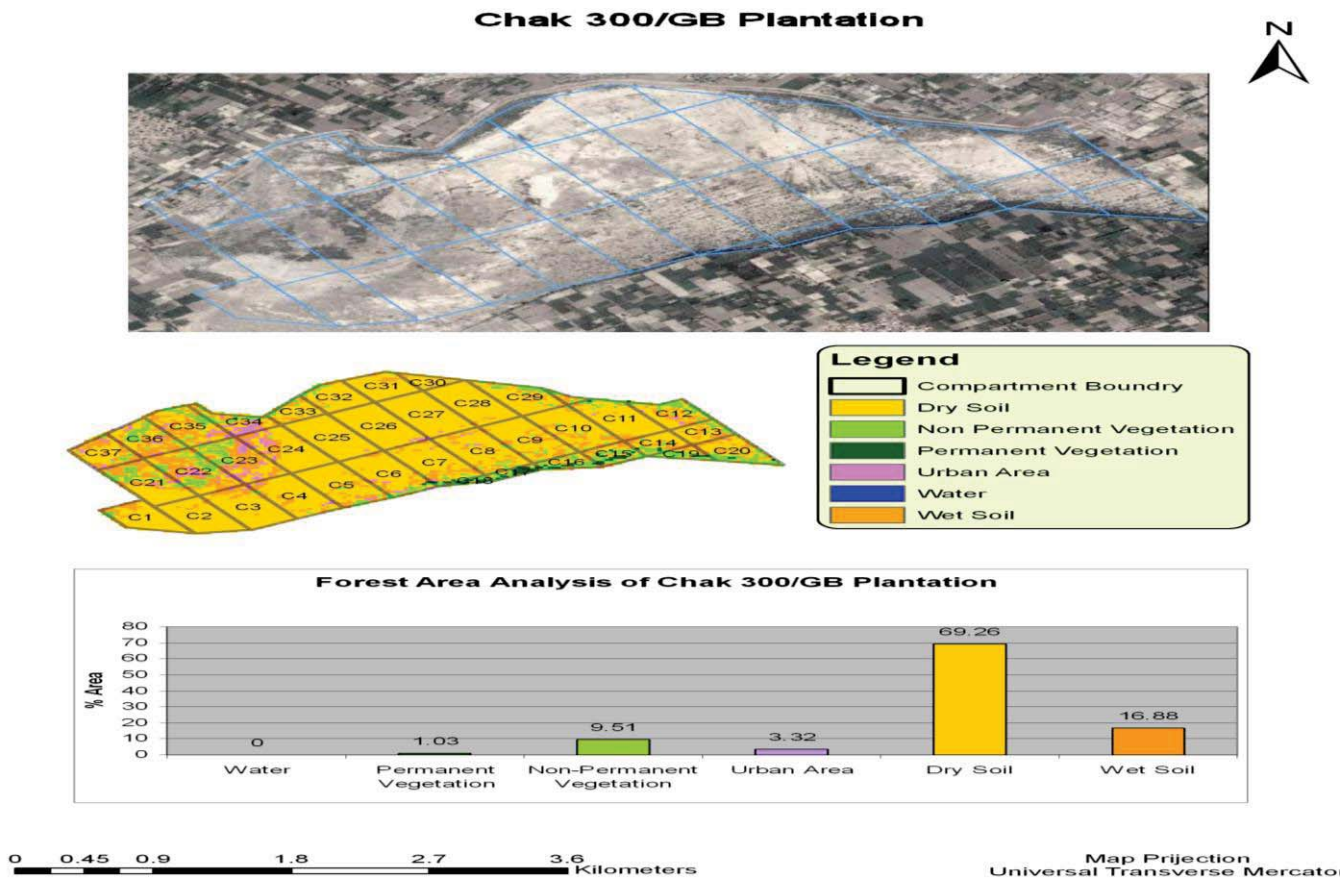
In this research Land Sat Enhanced Thematic Mapper (ETM), sensor data with spatial resolution of 30m has been used. The area of interest (Boundary of Toba Tek Singh) obtained by creating a subset of the data in ERDAS Imagine 9.2. The satellite image and the shape files are transformed on the same projection i.e. Geographic Coordinate System. Our study area falls in two images of land Sat, so both images are cut at the district boundary of Toba Tek Singh.

After this appropriate band combination, necessary contrast enhancement has applied to make image interpretable. These subsets are used for the classification purpose. The unsupervised classification is performed separately on the two-subset images. Image is classified into 200 classes in order to get accurate results. The classes have assigned groups very accurately based on visual interpretation and spectral signature. Six classes of the major land covers are formed in both subset images. I.e. Permanent vegetation, non-permanent vegetation, water, urban area, dries soil and wet soil. The classified images are mosaicked for same projection, equal number of layers and stacked in the same order of the bands. The images are re-projected to UTM to calculate area in acre of the classified image for the each class and areas of the subsets of the each forest boundary are calculated

IV. RESULTS AND ANALYSIS

The results and analysis we presented in the tabular form, bar charts and in form of thematic maps. For this purpose, different tables are converted into Microsoft Excel and bar charts are formed at district, tehsil and chak plantation levels.

The forest locations in the district of Toba Tek Singh are irregularly distributed in all its three tehsils. The forests are named on the basis of the name of the village near by it and which is named on the name of the canal passing by or through the village. Each of the chak plantations area is separately calculated and discussed in order to get the accurate forest coverage from micro scale to macro scale, i.e. from comportment to village, village to tehsil and tehsil to district level e.g. as shown in the figure



District Toba Tek Singh has a total area of 325900 hectares (805287 acres) from which area allotted to the forest department for irrigated plantation is 5896.260 hectares (14569.46 acres), which is 1.8% of the district area. This area is distributed in the three tehsil. The Kamalia has 1.4132%, Toba Tek Singh has 0.3393% and Gojra has 0.0334% proportions.

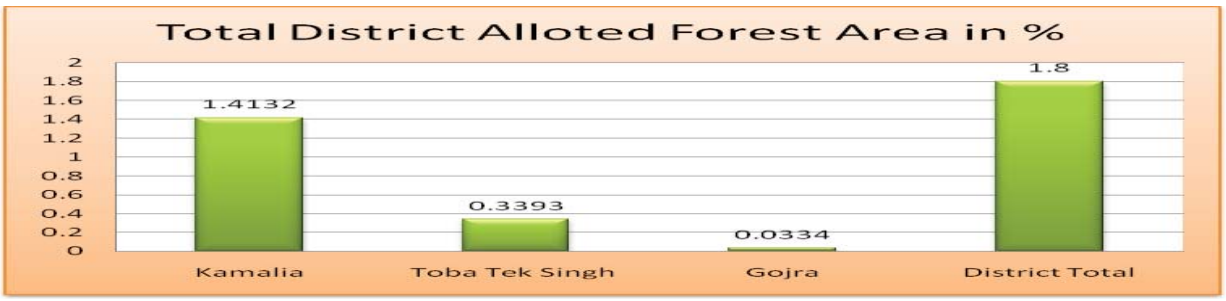


Figure 5: Showing total allotted district area

After comparing both the areas extracted from RS and GIS techniques the existing forest coverage in the three tehsils of study area is in such a way that Kamalia has 0.5913%, Toba Tek Singh has 0.04278% and Gojra has 0.01402%.

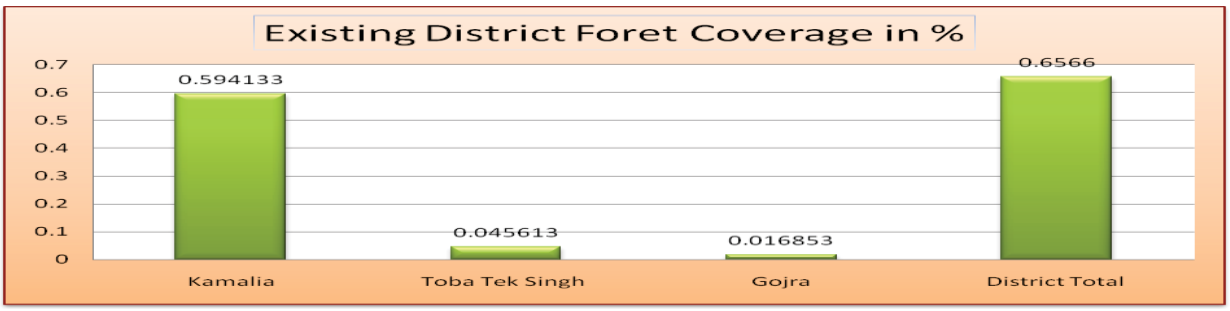


Figure 6: Showing Existing Forest Coverage in district

Finally the existing forest area is 2140.0131 hectares (5287.9 acres) which is 0.6566% of the district area and the remaining area is unutilized barren land and in the form of open area. According to millennium goal it is required to increase the forest coverage up to one percent at provincial and national levels .It could be achieved by considering the district forest coverage at first. For this purpose our study can be considered as model district for 5 years.

In first existing forest coverage can be improved and secondly concepts of agro forestry must be implemented, if it is required to increase in the area of districts and provincial level. Simply to increase the number of trees in an acre so more area form agricultural land will be available if farm forestry taken into account.

But only 2140hectares (5287 acres) under forest which is 0.6566% of the district total area. If we increase the forest coverage hundred percent in the area allotted to the forest department in district Toba Tek Singh which is 5896.260 hectares (14569 acres). Then the total forest coverage increases up to 1.80922% in the district Toba Tek Singh.

If forest department need to increase forest coverage 1% in the district Toba Tek Singh then the forest department must facilitate water supply, suitable tree types, management, monitoring and other necessary irrigation resources. The water supply is arranged from canals, tube wells and other natural and un-natural resources. e.g. Forest coverage must be increased in areas near to the canals like Kamalia plantation, Chak 160 and Bhagat plantations.

Reforestation is too much difficult than the Aforestation. Because the land which remained already forest loss its fertilizer and ability to re-grow forest. So the forest department searches new sites for healthy forest.

Agro forestry can play a major role to increase the forest coverage in the district. So forest department convince the farmers to grow forests on their lands.

The future of the forests in Pakistan depends upon the agro forestry.

V. DISCUSSION

This study focuses the district of Toba Tek Singh. The capacity for conducting this study as well as survey of model forest comprising compartments has also been developed and will benefit the forest, food, agricultural and many other planning departments in the up coming years. The achievement of all objectives and

verified results of about 0.6566% is a remarkable achievement through this research, it was proved that simple and spatial criteria of forest mapping and planning based on GIS and RS techniques.

In this research we have introduced a method or criteria to identify the site for new forests based on provided information and other important parameters i.e. sectioned area, distance from main canal, available unnatural irrigation resource and soil quality.

As RS and GIS technologies are widely used, forest resource investigation method is improved highly, the scope of investigation is wider and wider, and the cycle is shorter and shorter, abundant of information has been obtained. RS and GIS techniques have strong function of managing and analyzing spatial data. Moreover, provides a simple and prompt way to browse the models and relations of resource information. RS and GIS techniques being used in forest resource management realizes modern forest space-time adjusting, predicting, decision, inspecting, mapping and evaluating, which provide a scientific foundation for realizing forest resource development and classification management.

VI. CONCLUSION

The study has indicated the potential use of remote sensing and non spatial data in the environments of RS and GIS techniques for studying forest area calculation, planning and development. GIS techniques integrated in this study has proved beyond doubt its capabilities of spatial analysis. In this study LANDSAT images were used satisfactorily for the identification of utilize, unutilized land and area calculation. In conclusion for detecting changes in areas based on a subject e.g. population increase, vegetation etc, over a period of years both spatial and in quantitative way, integrating remote sensing data and GIS techniques will be useful.

VII. ACKNOWLEDGMENT

Our deepest appreciation and profound thanks go to extremely patient, very friendly and most cooperative attitude and guidance of our supervisor Mr.Javed Sámi (Assistant Professor and Student Advisor, Department of Space Science) for their insightful comments and direction while we were preparing th It is our privilege to express deep sense of cordial gratitude to our respected, highly learned, kind and experienced supervisor Mr. Javed Sami and technical supervisor Mr. Tayyab Ikram Shah (Technical Coordinator JICA) for thier inspiring guidance, valuable suggestions, keen interest, constant help and humble attitude through out the course of this research work.

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Global Journal of researches in engineering
General engineering
Volume 11 Issue 7 Version 1.0 December 2011
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4596 & Print ISSN: 0975-5861

The Solar Energy Potential of Gaza Strip

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Abstract - The solar energy potential of Gaza Strip southern Palestine is investigated based on measurements of a complete year's data at a coastal location. High resolution, real time solar radiation data were collected and processed. Hourly, daily and monthly statistics of solar radiation were made from the 1 min averaged recorded values. Clearness index is discussed on the basis of hourly, daily and monthly averages.

This paper summarizes the many years of data (1989-2002) that have been processed from the Solar Radiation Survey. Typical Meteorological Year files (TMY) based on the direct beam component, and the archived hourly data upon which they are based. The average annual direct beam total for all the stations is 2196 kWh m^{-2} $year^{-1}$. For example, during the 11 years of data that are discussed in the present paper, It is concluded that: (1) sufficient data probably now exist in order to enable one to identify the best places for locating solar power stations; (2) several more years of data will be necessary before a sufficiently reliable data base will exist for the purpose of simulating solar- concentrator power plant performance and determining their economic benefit.

The average annual global horizontal radiation for all stations is 2017 kWh m^{-2} $year^{-1}$.

Keywords: Solar energy, Typical Meteorological Year, Radiation Survey

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I. INTRODUCTION

A Typical Meteorological Year (TMY) consists of twelve monthly files of actual hourly meteorological data selected in a particular manner [1]. The months will not, in general, have come from the same year. Instead, each will have been chosen as being a "typical" representative of the month in question and,ideally, the choice for each will have been made from very many years of accumulated data.

The reason for taking actual months of data rather than averaged files is that the former preserve correlations (both known and unknown) that exist among the different measured parameters (e.g. solar radiation and ambient temperature) and also correlations that exist over a period of several days among values of any given parameter.

Design of active solar space-heating systems is usually based on selecting one type of collector system, usually a flat-plate collector, and designing the auxiliary components to fit that collector system. The type of climate at the location of utilization is not often considered when designing such a solar system. Therefore, a solar system may exhibit a high performance in some areas but low performance in others.Before making an investment decision, it is essential to investigate the solar energy characteristics of the particular location at which the solar energy system is to be used. This includes examination of the nature of the correlations between solar radiation and temperature, so that an optimal design of solar energy system can be established for the particular region [2].

The present study, however, is part of the Gaza Strip Survey, the aims of which are to provide data of relevance to the performance of solar power station. Clearly, therefore, the relevant criterion for this purpose is solar energy. There are in fact two solar radiation components that are measured: the global horizontal radiation and the normal direct beam component. For the given site the former is found to vary by approximately ± 5% from year to year. On the other hand, year to year variations of more than 30% have been observed in the direct beam component, over the comparatively few years that this study has been in progress.

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Fig.1 : shows the locations of the meteorological stations involved in the Gaza Radiation Survey.

Figure1: Gaza Strip

II. DATA CONSTRUCTION

When we have an odd number of years of data, then we "tried to choose" the year whose monthly direct beam average rendered it the median year of the available set. On the other hand, where an even number of years of data were available we "tried to choose" the year whose monthly mean was closest to the average taken over all of the years in the set. The words "tried to choose" have been used because sometimes this was not possible owing to large amounts of missing data in the desired file. In such cases a "second best" choice was made. Regarding small quantities of missing data, even relatively complete day files occasionally have a few hours when one or more instruments were not working properly. In such cases our practice is to look for a nearby qualitatively similar day, copy the relevant data sequence and use it to patch the hole [3]. Table 1 displays the monthly average values of direct beam radiation recorded by each of the stations during the fourteen-year period (1989-2002). Values in bold characters indicate the specific months that were ultimately chosen for each site as the basis for TMY.

The raw data provided by the Israel Meteorological Service include hourly average values of: direct beam radiation; global horizontal radiation; shadow-band pyranometer data; dry-bulb temperature; relative humidity (or alternatively, from some stations, the wet bulb temperature); wind speed and wind direction. Of the solar radiation data only direct beam and global horizontal are archived, the shadow-band data having been used for consistency checks only. Humidity data have been processed using algorithms given in the ASHRAE chapter on psychrometrics [4] in order to compute the humidity ratio. The present study employs a format which the University of Wisconsin originally established for the US SOLMET TMY. For each of the 12 monthly data files, the format allocates successive columns to: month, hour, direct beam, global horizontal, ambient temperature, humidity ratio, wind speed, wind direction, with units [5].

III. SOME OBSERVATIONS

From Tables 1 one sees that Gaza station has provided 11 complete years of data. From table 4 we can see that the years 1995, 1998 and 2001 were relatively rich in direct beam solar radiation whereas 1990 was unusually poor.

Regarding a relative "ranking" of the station, in terms of annual direct beam radiation, at least two methods are available: one based on average data, the other on data from the TMY files. Table 1 includes an

annual average daily radiation value. This average is the average of the annual averages over as many of the 11 years for which there were complete sets of data. The standard deviation has also been indicated. Fig. 2a plots these monthly average direct beam averages in the survey.

Table 2 lists the station ranked in order of descending annual average direct beam radiation, where the annual averages have been computed in the manner described, and multiplied by 365 for purposes of easy comparison with the corresponding TMY results (which are also shown in the table).

It is the annual direct beam totals from these tables that are shown in the last column of Table 2. The monthly mean direct beam values from the TMY files are plotted in Fig. 2b.

Comparison between the two methods of ranking the stations (Table 2) reveals only slight differences. The annual averages are quite similar and the overall ranking remains the same.

Another important use to which the TMY files will be put is in the simulation of non-concentrator systems (e.g. solar ponds [2], photovoltaic solar power plants [3], etc.). Here global radiation is more important than the direct beam component. However, unlike the situation for the direct beam component, the global horizontal radiation fluctuates relatively little from year to year [5].

We may also use the TMY files in order to rank for non-concentrator purposes. Table 3 shows the sites ranked according to the annual global horizontal radiation totals. Fig. 3 plots the monthly global horizontal TMY averages for Gaza site in the survey.

We note that the spread among stations is much "tighter" in Fig. 4 than is the case in Figs. 2 and 3, and the overall shape is much "smoother". These characteristics are symptomatic of smaller changes in the global horizontal insolation , `from year-to-year, compared with the corresponding direct beam insolation values.

Table 1: Gaza monthly direct beam averages [kWh m^{-2} day^{-1}]. Months indicated in bold print were used for TMY Underlined months excluded from consideration

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	Mean	Sigma
JAN				2.83	2.83	2.92	3.97	2.85	3.64	3.48	3.63	3.08	4.49	**3.22**	3.36	**0.54**
FEB				2.26	2.94	4.50	3.53	2.98	4.89	**4.36**	3.96	4.99	4.37	4.92	3.97	**0.92**
MAR				2.52	4.01	3.72	5.02	4.65	4.40	3.30	5.39	4.54	5.57	**4.46**	4.33	**0.90**
APR					5.32	5.29	**5.14**	4.69	5.03	5.87	5.83	4.41	5.38	4.90	5.19	**0.46**
MAY					4.50	**6.45**	6.20	6.45	6.97	5.41	6.64	7.74	6.79	7.43	6.46	**0.94**
JUN				7.06	**7.69**	7.36	7.41	8.15	7.82	7.45	7.42	8.75	8.08	8.43	7.78	**0.52**
JUL		3.57		7.44	7.18	7.02	6.66	4.86	7.72	8.15	**7.41**	6.81	7.73	7.84	7.40	**0.48**
AUG				6.11	6.73	6.75	**6.76**	6.26	7.23	6.96	7.25	6.40	6.78	7.15	6.76	**0.38**
SEP				5.59	5.80	5.16	5.40	5.49	6.67	6.12	6.29	6.05	6.15	**6.01**	5.88	**0.44**
OCT					4.92	4.04	5.12	4.62	4.26	5.86	5.66	3.95	**4.67**	4.18	4.73	**0.66**
NOV		4.72			3.49	3.41	4.56	3.52	4.65	**4.36**	4.84	5.08	4.24	4.53	4.31	**0.58**
DEC		3.29			2.86	**3.51**	3.65	3.62	3.64	3.76	4.34	3.33	3.64	3.14	3.53	**0.38**
ANN					4.87	5.01	5.30	4.84	5.58	5.43	5.73	5.41	5.66	5.52	5.34	**0.32**

Table 2: Relative ranking of Gaza Radiation Survey according to average annual direct beam data (column 2). This ranking is relevant to solar-concentrator systems. Also shown is the slightly different ranking resulting from the corresponding TMY files (column 3)

Station	Average Annual Beam Total [kWh m^{-2} $year^{-1}$]	TMY Annual Beam Total [kWh m^{-2} $year^{-1}$]
Gaza	1949	1957

Table 3: Relative ranking of the Radiation Survey stations according to TMY annual global horizontal Totals. This ranking is relevant to non-concentrator systems.

Station	TMY annual global horizontal total [kWh m^{-2} $year^{-1}$]
Gaza	1905

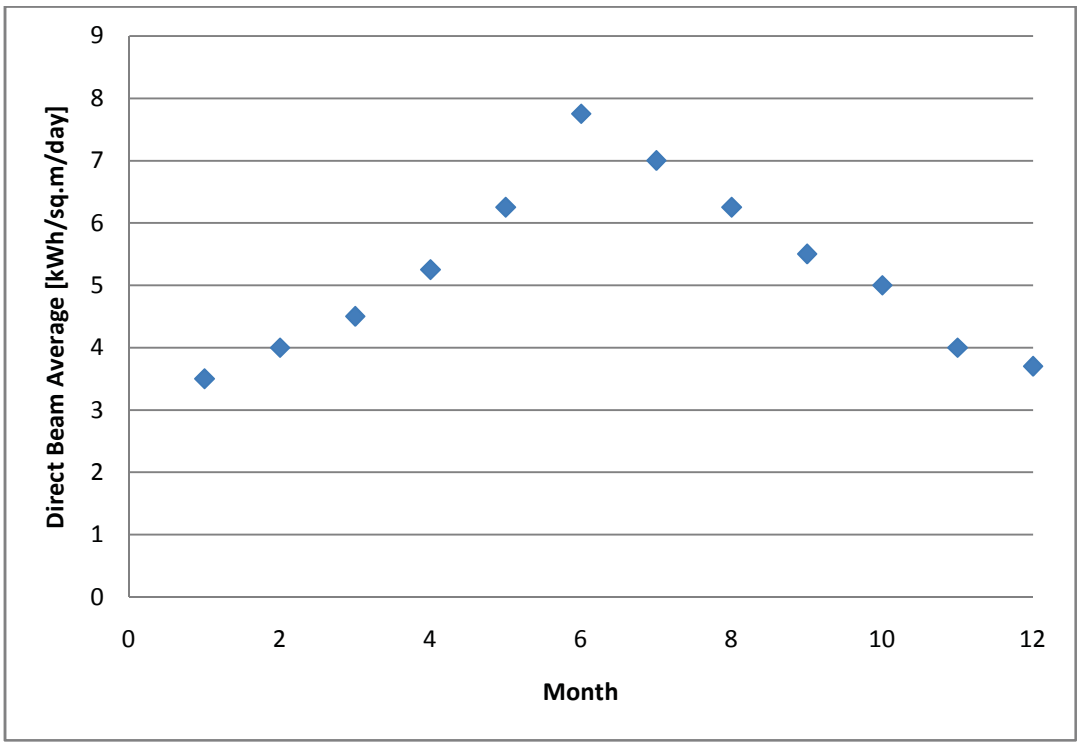

Figure 2: Mean monthly daily average direct beam insolation for Gaza in the Radiation Survey (1989-2002)

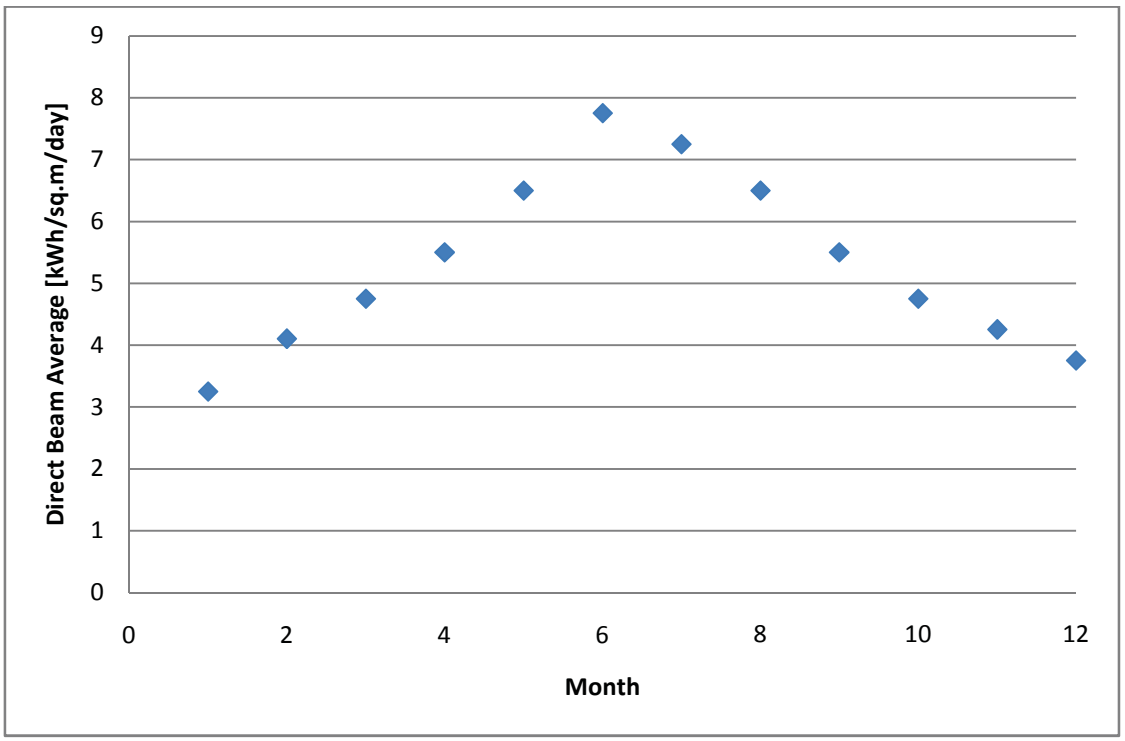

Figure 3: Monthly TMY daily average direct beam insolation for Gaza in the Radiation Survey (1989-2002)

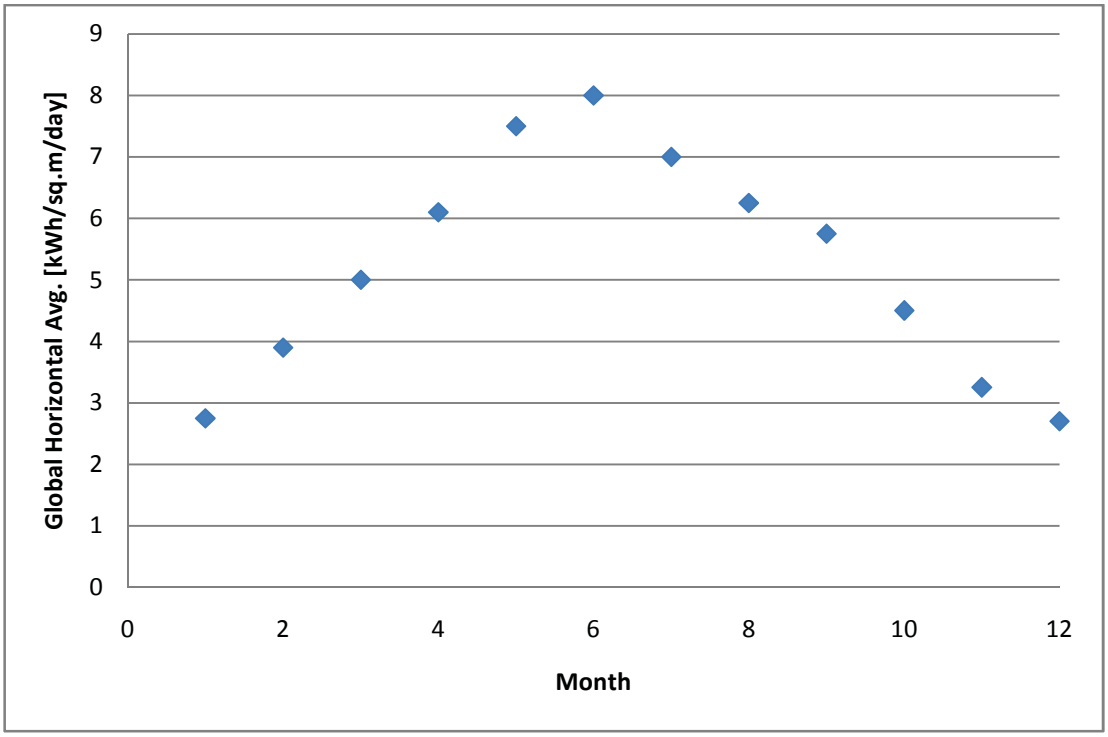

Figure 4: Monthly TMY daily average global horizontal insolation for Gaza in the Radiation Survey (1989-2002)

IV. Conclusions

This paper summarizes the first 11 years of data (1989 - 2002) that have been processed from the Gaza Radiation Survey. This survey of Typical Meteorological Year files (TMY) based on the direct beam component, and the archived hourly data upon which they are based.

For purposes of simulating the performance of solar-concentrator power plants Gaza station is introduced. Annual fluctuations in direct beam radiation may, however, be considerable. For example, during the 11 years of data that is discussed in the present paper. It is concluded that: (1) sufficient data probably now exist in order to enable one to identify the places for locating solar power stations; (2) several more years of data will be necessary before a sufficiently reliable data base will exist for the purpose of simulating solar- concentrator power plant performance and determining their economic benefit.

The average annual global horizontal radiation for Gaza is 2017 kWh m^{-2} year $^{-1}$. For purposes of simulating solar power plants of the non-concentrator variety Gaza station has global horizontal totals up to 6% lower than the mean normal global. We note also that the year-to-year fluctuations in global horizontal radiation are very much smaller than those among the direct beam components. We conclude, therefore, that for non- concentrator purposes Gaza probably now has enough data for reliable simulations.

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Many researchers searching for information online will use search engines such as Google, Yahoo or similar. By optimizing your paper for search engines, you will amplify the chance of someone finding it. This in turn will make it more likely to be viewed and/or cited in a further work. Global Journals Inc. (US) have compiled these guidelines to facilitate you to maximize the web-friendliness of the most public part of your paper.

Key Words

A major linchpin in research work for the writing research paper is the keyword search, which one will employ to find both library and Internet resources.

One must be persistent and creative in using keywords. An effective keyword search requires a strategy and planning a list of possible keywords and phrases to try.

Search engines for most searches, use Boolean searching, which is somewhat different from Internet searches. The Boolean search uses "operators," words (and, or, not, and near) that enable you to expand or narrow your affords. Tips for research paper while preparing research paper are very helpful guideline of research paper.

Choice of key words is first tool of tips to write research paper. Research paper writing is an art.A few tips for deciding as strategically as possible about keyword search:

- One should start brainstorming lists of possible keywords before even begin searching. Think about the most important concepts related to research work. Ask, "What words would a source have to include to be truly valuable in research paper?" Then consider synonyms for the important words.
- It may take the discovery of only one relevant paper to let steer in the right keyword direction because in most databases, the keywords under which a research paper is abstracted are listed with the paper.
- One should avoid outdated words.

Keywords are the key that opens a door to research work sources. Keyword searching is an art in which researcher's skills are bound to improve with experience and time.

Numerical Methods: Numerical methods used should be clear and, where appropriate, supported by references.

Acknowledgements: Please make these as concise as possible.

References

References follow the Harvard scheme of referencing. References in the text should cite the authors' names followed by the time of their publication, unless there are three or more authors when simply the first author's name is quoted followed by et al. unpublished work has to only be cited where necessary, and only in the text. Copies of references in press in other journals have to be supplied with submitted typescripts. It is necessary that all citations and references be carefully checked before submission, as mistakes or omissions will cause delays.

References to information on the World Wide Web can be given, but only if the information is available without charge to readers on an official site. Wikipedia and Similar websites are not allowed where anyone can change the information. Authors will be asked to make available electronic copies of the cited information for inclusion on the Global Journals Inc. (US) homepage at the judgment of the Editorial Board.

The Editorial Board and Global Journals Inc. (US) recommend that, citation of online-published papers and other material should be done via a DOI (digital object identifier). If an author cites anything, which does not have a DOI, they run the risk of the cited material not being noticeable.

The Editorial Board and Global Journals Inc. (US) recommend the use of a tool such as Reference Manager for reference management and formatting.

Tables, Figures and Figure Legends

Tables: Tables should be few in number, cautiously designed, uncrowned, and include only essential data. Each must have an Arabic number, e.g. Table 4, a self-explanatory caption and be on a separate sheet. Vertical lines should not be used.

Figures: Figures are supposed to be submitted as separate files. Always take in a citation in the text for each figure using Arabic numbers, e.g. Fig. 4. Artwork must be submitted online in electronic form by e-mailing them.

Preparation of Electronic Figures for Publication

Even though low quality images are sufficient for review purposes, print publication requires high quality images to prevent the final product being blurred or fuzzy. Submit (or e-mail) EPS (line art) or TIFF (halftone/photographs) files only. MS PowerPoint and Word Graphics are unsuitable for printed pictures. Do not use pixel-oriented software. Scans (TIFF only) should have a resolution of at least 350 dpi (halftone) or 700 to 1100 dpi (line drawings) in relation to the imitation size. Please give the data for figures in black and white or submit a Color Work Agreement Form. EPS files must be saved with fonts embedded (and with a TIFF preview, if possible).

For scanned images, the scanning resolution (at final image size) ought to be as follows to ensure good reproduction: line art: >650 dpi; halftones (including gel photographs) : >350 dpi; figures containing both halftone and line images: >650 dpi.

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Figure Legends: Self-explanatory legends of all figures should be incorporated separately under the heading 'Legends to Figures'. In the full-text online edition of the journal, figure legends may possibly be truncated in abbreviated links to the full screen version. Therefore, the first 100 characters of any legend should notify the reader, about the key aspects of the figure.

6. AFTER ACCEPTANCE

Upon approval of a paper for publication, the manuscript will be forwarded to the dean, who is responsible for the publication of the Global Journals Inc. (US).

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(Free of charge) from the following website:

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the search? Will I be able to find all information in this field area? If the answer of these types of questions will be "Yes" then you can choose that topic. In most of the cases, you may have to conduct the surveys and have to visit several places because this field is related to Computer Science and Information Technology. Also, you may have to do a lot of work to find all rise and falls regarding the various data of that subject. Sometimes, detailed information plays a vital role, instead of short information.

2. Evaluators are human: First thing to remember that evaluators are also human being. They are not only meant for rejecting a paper. They are here to evaluate your paper. So, present your Best.

3. Think Like Evaluators: If you are in a confusion or getting demotivated that your paper will be accepted by evaluators or not, then think and try to evaluate your paper like an Evaluator. Try to understand that what an evaluator wants in your research paper and automatically you will have your answer.

4. Make blueprints of paper: The outline is the plan or framework that will help you to arrange your thoughts. It will make your paper logical. But remember that all points of your outline must be related to the topic you have chosen.

5. Ask your Guides: If you are having any difficulty in your research, then do not hesitate to share your difficulty to your guide (if you have any). They will surely help you out and resolve your doubts. If you can't clarify what exactly you require for your work then ask the supervisor to help you with the alternative. He might also provide you the list of essential readings.

6. Use of computer is recommended: As you are doing research in the field of Computer Science, then this point is quite obvious.

7. Use right software: Always use good quality software packages. If you are not capable to judge good software then you can lose quality of your paper unknowingly. There are various software programs available to help you, which you can get through Internet.

8. Use the Internet for help: An excellent start for your paper can be by using the Google. It is an excellent search engine, where you can have your doubts resolved. You may also read some answers for the frequent question how to write my research paper or find model research paper. From the internet library you can download books. If you have all required books make important reading selecting and analyzing the specified information. Then put together research paper sketch out.

9. Use and get big pictures: Always use encyclopedias, Wikipedia to get pictures so that you can go into the depth.

10. Bookmarks are useful: When you read any book or magazine, you generally use bookmarks, right! It is a good habit, which helps to not to lose your continuity. You should always use bookmarks while searching on Internet also, which will make your search easier.

11. Revise what you wrote: When you write anything, always read it, summarize it and then finalize it.

12. Make all efforts: Make all efforts to mention what you are going to write in your paper. That means always have a good start. Try to mention everything in introduction, that what is the need of a particular research paper. Polish your work by good skill of writing and always give an evaluator, what he wants.

13. Have backups: When you are going to do any important thing like making research paper, you should always have backup copies of it either in your computer or in paper. This will help you to not to lose any of your important.

14. Produce good diagrams of your own: Always try to include good charts or diagrams in your paper to improve quality. Using several and unnecessary diagrams will degrade the quality of your paper by creating "hotchpotch." So always, try to make and include those diagrams, which are made by your own to improve readability and understandability of your paper.

15. Use of direct quotes: When you do research relevant to literature, history or current affairs then use of quotes become essential but if study is relevant to science then use of quotes is not preferable.

16. Use proper verb tense: Use proper verb tenses in your paper. Use past tense, to present those events that happened. Use present tense to indicate events that are going on. Use future tense to indicate future happening events. Use of improper and wrong tenses will confuse the evaluator. Avoid the sentences that are incomplete.

17. Never use online paper: If you are getting any paper on Internet, then never use it as your research paper because it might be possible that evaluator has already seen it or maybe it is outdated version.

18. **Pick a good study spot:** To do your research studies always try to pick a spot, which is quiet. Every spot is not for studies. Spot that suits you choose it and proceed further.

19. Know what you know: Always try to know, what you know by making objectives. Else, you will be confused and cannot achieve your target.

20. Use good quality grammar: Always use a good quality grammar and use words that will throw positive impact on evaluator. Use of good quality grammar does not mean to use tough words, that for each word the evaluator has to go through dictionary. Do not start sentence with a conjunction. Do not fragment sentences. Eliminate one-word sentences. Ignore passive voice. Do not ever use a big word when a diminutive one would suffice. Verbs have to be in agreement with their subjects. Prepositions are not expressions to finish sentences with. It is incorrect to ever divide an infinitive. Avoid clichés like the disease. Also, always shun irritating alliteration. Use language that is simple and straight forward. put together a neat summary.

21. Arrangement of information: Each section of the main body should start with an opening sentence and there should be a changeover at the end of the section. Give only valid and powerful arguments to your topic. You may also maintain your arguments with records.

22. Never start in last minute: Always start at right time and give enough time to research work. Leaving everything to the last minute will degrade your paper and spoil your work.

23. Multitasking in research is not good: Doing several things at the same time proves bad habit in case of research activity. Research is an area, where everything has a particular time slot. Divide your research work in parts and do particular part in particular time slot.

24. Never copy others' work: Never copy others' work and give it your name because if evaluator has seen it anywhere you will be in trouble.

25. Take proper rest and food: No matter how many hours you spend for your research activity, if you are not taking care of your health then all your efforts will be in vain. For a quality research, study is must, and this can be done by taking proper rest and food.

26. Go for seminars: Attend seminars if the topic is relevant to your research area. Utilize all your resources.

27. Refresh your mind after intervals: Try to give rest to your mind by listening to soft music or by sleeping in intervals. This will also improve your memory.

28. Make colleagues: Always try to make colleagues. No matter how sharper or intelligent you are, if you make colleagues you can have several ideas, which will be helpful for your research.

29. **Think technically:** Always think technically. If anything happens, then search its reasons, its benefits, and demerits.

30. Think and then print: When you will go to print your paper, notice that tables are not be split, headings are not detached from their descriptions, and page sequence is maintained.

31. Adding unnecessary information: Do not add unnecessary information, like, I have used MS Excel to draw graph. Do not add irrelevant and inappropriate material. These all will create superfluous. Foreign terminology and phrases are not apropos. One should NEVER take a broad view. Analogy in script is like feathers on a snake. Not at all use a large word when a very small one would be

sufficient. Use words properly, regardless of how others use them. Remove quotations. Puns are for kids, not grunt readers. Amplification is a billion times of inferior quality than sarcasm.

32. Never oversimplify everything: To add material in your research paper, never go for oversimplification. This will definitely irritate the evaluator. Be more or less specific. Also too, by no means, ever use rhythmic redundancies. Contractions aren't essential and shouldn't be there used. Comparisons are as terrible as clichés. Give up ampersands and abbreviations, and so on. Remove commas, that are, not necessary. Parenthetical words however should be together with this in commas. Understatement is all the time the complete best way to put onward earth-shaking thoughts. Give a detailed literary review.

33. Report concluded results: Use concluded results. From raw data, filter the results and then conclude your studies based on measurements and observations taken. Significant figures and appropriate number of decimal places should be used. Parenthetical remarks are prohibitive. Proofread carefully at final stage. In the end give outline to your arguments. Spot out perspectives of further study of this subject. Justify your conclusion by at the bottom of them with sufficient justifications and examples.

34. After conclusion: Once you have concluded your research, the next most important step is to present your findings. Presentation is extremely important as it is the definite medium though which your research is going to be in print to the rest of the crowd. Care should be taken to categorize your thoughts well and present them in a logical and neat manner. A good quality research paper format is essential because it serves to highlight your research paper and bring to light all necessary aspects in your research.

Informal Guidelines of Research Paper Writing

Key points to remember:

- Submit all work in its final form.
- Write your paper in the form, which is presented in the guidelines using the template.
- Please note the criterion for grading the final paper by peer-reviewers.

Final Points:

A purpose of organizing a research paper is to let people to interpret your effort selectively. The journal requires the following sections, submitted in the order listed, each section to start on a new page.

The introduction will be compiled from reference matter and will reflect the design processes or outline of basis that direct you to make study. As you will carry out the process of study, the method and process section will be constructed as like that. The result segment will show related statistics in nearly sequential order and will direct the reviewers next to the similar intellectual paths throughout the data that you took to carry out your study. The discussion section will provide understanding of the data and projections as to the implication of the results. The use of good quality references all through the paper will give the effort trustworthiness by representing an alertness of prior workings.

Writing a research paper is not an easy job no matter how trouble-free the actual research or concept. Practice, excellent preparation, and controlled record keeping are the only means to make straightforward the progression.

General style:

Specific editorial column necessities for compliance of a manuscript will always take over from directions in these general guidelines.

To make a paper clear

· Adhere to recommended page limits

Mistakes to evade

- Insertion a title at the foot of a page with the subsequent text on the next page

- Separating a table/chart or figure - impound each figure/table to a single page
- Submitting a manuscript with pages out of sequence

In every sections of your document

· Use standard writing style including articles ("a", "the," etc.)

· Keep on paying attention on the research topic of the paper

· Use paragraphs to split each significant point (excluding for the abstract)

· Align the primary line of each section

· Present your points in sound order

· Use present tense to report well accepted

· Use past tense to describe specific results

· Shun familiar wording, don't address the reviewer directly, and don't use slang, slang language, or superlatives

· Shun use of extra pictures - include only those figures essential to presenting results

Title Page:

Choose a revealing title. It should be short. It should not have non-standard acronyms or abbreviations. It should not exceed two printed lines. It should include the name(s) and address (es) of all authors.

Abstract:

The summary should be two hundred words or less. It should briefly and clearly explain the key findings reported in the manuscript--must have precise statistics. It should not have abnormal acronyms or abbreviations. It should be logical in itself. Shun citing references at this point.

An abstract is a brief distinct paragraph summary of finished work or work in development. In a minute or less a reviewer can be taught the foundation behind the study, common approach to the problem, relevant results, and significant conclusions or new questions.

Write your summary when your paper is completed because how can you write the summary of anything which is not yet written? Wealth of terminology is very essential in abstract. Yet, use comprehensive sentences and do not let go readability for briefness. You can maintain it succinct by phrasing sentences so that they provide more than lone rationale. The author can at this moment go straight to

shortening the outcome. Sum up the study, with the subsequent elements in any summary. Try to maintain the initial two items to no more than one ruling each.

- Reason of the study - theory, overall issue, purpose
- Fundamental goal
- To the point depiction of the research
- Consequences, including definite statistics - if the consequences are quantitative in nature, account quantitative data; results of any numerical analysis should be reported
- Significant conclusions or questions that track from the research(es)

Approach:

- Single section, and succinct
- As a outline of job done, it is always written in past tense
- A conceptual should situate on its own, and not submit to any other part of the paper such as a form or table
- Center on shortening results - bound background information to a verdict or two, if completely necessary
- What you account in an conceptual must be regular with what you reported in the manuscript
- Exact spelling, clearness of sentences and phrases, and appropriate reporting of quantities (proper units, important statistics) are just as significant in an abstract as they are anywhere else

Introduction:

The **Introduction** should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable to comprehend and calculate the purpose of your study without having to submit to other works. The basis for the study should be offered. Give most important references but shun difficult to make a comprehensive appraisal of the topic. In the introduction, describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will have no attention in your result. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here. Following approach can create a valuable beginning:

- Explain the value (significance) of the study
- Shield the model - why did you employ this particular system or method? What is its compensation? You strength remark on its appropriateness from a abstract point of vision as well as point out sensible reasons for using it.
- Present a justification. Status your particular theory (es) or aim(s), and describe the logic that led you to choose them.
- Very for a short time explain the tentative propose and how it skilled the declared objectives.

Approach:

- Use past tense except for when referring to recognized facts. After all, the manuscript will be submitted after the entire job is done.
- Sort out your thoughts; manufacture one key point with every section. If you make the four points listed above, you will need a least of four paragraphs.
- Present surroundings information only as desirable in order hold up a situation. The reviewer does not desire to read the whole thing you know about a topic.
- Shape the theory/purpose specifically - do not take a broad view.
- As always, give awareness to spelling, simplicity and correctness of sentences and phrases.

Procedures (Methods and Materials):

This part is supposed to be the easiest to carve if you have good skills. A sound written Procedures segment allows a capable scientist to replacement your results. Present precise information about your supplies. The suppliers and clarity of reagents can be helpful bits of information. Present methods in sequential order but linked methodologies can be grouped as a segment. Be concise when relating the protocols. Attempt for the least amount of information that would permit another capable scientist to spare your outcome but be cautious that vital information is integrated. The use of subheadings is suggested and ought to be synchronized with the results section. When a technique is used that has been well described in another object, mention the specific item describing a way but draw the basic

principle while stating the situation. The purpose is to text all particular resources and broad procedures, so that another person may use some or all of the methods in one more study or referee the scientific value of your work. It is not to be a step by step report of the whole thing you did, nor is a methods section a set of orders.

Materials:

- Explain materials individually only if the study is so complex that it saves liberty this way.
- Embrace particular materials, and any tools or provisions that are not frequently found in laboratories.
- Do not take in frequently found.
- If use of a definite type of tools.
- Materials may be reported in a part section or else they may be recognized along with your measures.

Methods:

- Report the method (not particulars of each process that engaged the same methodology)
- Describe the method entirely
- To be succinct, present methods under headings dedicated to specific dealings or groups of measures
- Simplify - details how procedures were completed not how they were exclusively performed on a particular day.
- If well known procedures were used, account the procedure by name, possibly with reference, and that's all.

Approach:

- It is embarrassed or not possible to use vigorous voice when documenting methods with no using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result when script up the methods most authors use third person passive voice.
- Use standard style in this and in every other part of the paper - avoid familiar lists, and use full sentences.

What to keep away from

- Resources and methods are not a set of information.
- Skip all descriptive information and surroundings - save it for the argument.
- Leave out information that is immaterial to a third party.

Results:

The principle of a results segment is to present and demonstrate your conclusion. Create this part a entirely objective details of the outcome, and save all understanding for the discussion.

The page length of this segment is set by the sum and types of data to be reported. Carry on to be to the point, by means of statistics and tables, if suitable, to present consequences most efficiently.You must obviously differentiate material that would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matter should not be submitted at all except requested by the instructor.

Content

- Sum up your conclusion in text and demonstrate them, if suitable, with figures and tables.
- In manuscript, explain each of your consequences, point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation an exacting study.
- Explain results of control experiments and comprise remarks that are not accessible in a prescribed figure or table, if appropriate.
- Examine your data, then prepare the analyzed (transformed) data in the form of a figure (graph), table, or in manuscript form.

What to stay away from

- Do not discuss or infer your outcome, report surroundings information, or try to explain anything.
- Not at all, take in raw data or intermediate calculations in a research manuscript.

- Do not present the similar data more than once.
- Manuscript should complement any figures or tables, not duplicate the identical information.
- Never confuse figures with tables - there is a difference.

Approach

- As forever, use past tense when you submit to your results, and put the whole thing in a reasonable order.
- Put figures and tables, appropriately numbered, in order at the end of the report
- If you desire, you may place your figures and tables properly within the text of your results part.

Figures and tables

- If you put figures and tables at the end of the details, make certain that they are visibly distinguished from any attach appendix materials, such as raw facts
- Despite of position, each figure must be numbered one after the other and complete with subtitle
- In spite of position, each table must be titled, numbered one after the other and complete with heading
- All figure and table must be adequately complete that it could situate on its own, divide from text

Discussion:

The Discussion is expected the trickiest segment to write and describe. A lot of papers submitted for journal are discarded based on problems with the Discussion. There is no head of state for how long a argument should be. Position your understanding of the outcome visibly to lead the reviewer through your conclusions, and then finish the paper with a summing up of the implication of the study. The purpose here is to offer an understanding of your results and hold up for all of your conclusions, using facts from your research and generally accepted information, if suitable. The implication of result should be visibly described. Infer your data in the conversation in suitable depth. This means that when you clarify an observable fact you must explain mechanisms that may account for the observation. If your results vary from your prospect, make clear why that may have happened. If your results agree, then explain the theory that the proof supported. It is never suitable to just state that the data approved with prospect, and let it drop at that.

- Make a decision if each premise is supported, discarded, or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."
- Research papers are not acknowledged if the work is imperfect. Draw what conclusions you can based upon the results that you have, and take care of the study as a finished work
- You may propose future guidelines, such as how the experiment might be personalized to accomplish a new idea.
- Give details all of your remarks as much as possible, focus on mechanisms.
- Make a decision if the tentative design sufficiently addressed the theory, and whether or not it was correctly restricted.
- Try to present substitute explanations if sensible alternatives be present.
- One research will not counter an overall question, so maintain the large picture in mind, where do you go next? The best studies unlock new avenues of study. What questions remain?
- Recommendations for detailed papers will offer supplementary suggestions.

Approach:

- When you refer to information, differentiate data generated by your own studies from available information
- Submit to work done by specific persons (including you) in past tense.
- Submit to generally acknowledged facts and main beliefs in present tense.

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- Do not give permission to anyone else to "PROOFREAD" your manuscript.

- Methods to avoid Plagiarism is applied by us on every paper, if found guilty, you will be blacklisted by all of our collaborated research groups, your institution will be informed for this and strict legal actions will be taken immediately.)
- To guard yourself and others from possible illegal use please do not permit anyone right to use to your paper and files.

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Topics	Grades		
	A-B	**C-D**	**E-F**
Abstract	Clear and concise with appropriate content, Correct format. 200 words or below	Unclear summary and no specific data, Incorrect form Above 200 words	No specific data with ambiguous information Above 250 words
Introduction	Containing all background details with clear goal and appropriate details, flow specification, no grammar and spelling mistake, well organized sentence and paragraph, reference cited	Unclear and confusing data, appropriate format, grammar and spelling errors with unorganized matter	Out of place depth and content, hazy format
Methods and Procedures	Clear and to the point with well arranged paragraph, precision and accuracy of facts and figures, well organized subheads	Difficult to comprehend with embarrassed text, too much explanation but completed	Incorrect and unorganized structure with hazy meaning
Result	Well organized, Clear and specific, Correct units with precision, correct data, well structuring of paragraph, no grammar and spelling mistake	Complete and embarrassed text, difficult to comprehend	Irregular format with wrong facts and figures
Discussion	Well organized, meaningful specification, sound conclusion, logical and concise explanation, highly structured paragraph reference cited	Wordy, unclear conclusion, spurious	Conclusion is not cited, unorganized, difficult to comprehend
References	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring

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ISSN 9755861