T.Y.B.A.

SEMESTER VI (CBCS)

RURAL DEVELOPMENT PAPER-VII

RURAL RESOURCE MANAGEMENT

SUBJECT CODE : 86629

Prof.(Dr.) D. T. Shirke
Offg. Vice-Chancellor,
University of Mumbai,

Prin. Dr. Ajay Bhamare
Offg. Pro Vice-Chancellor,
University of Mumbai,

Prof. Prakash Mahanwar
Director,
IDOL, University of Mumbai,

Programme Co-ordinator: **Mr. Anil Bankar**
Associate Professor of History and Head
Faculty of Arts, IDOL,
University of Mumbai, Mumbai

Course Co-ordinator : **Prof. Subrat Sahoo**
Asst. Professor,
IDOL, University of Mumbai, Mumbai

Editor & Course Writer : **Dr. Kunal D. Jadhav**
Professor,
DLLE, University of Mumbai, Mumbai

Course Writer **: Prof. Sachin B. Raut**
Assistant Professor,
DLLE, University of Mumbai, Mumbai

: Prof. Vivek Chavan
HOD Rural Development,
Khardekar College, Vengurla,
Dist. Sindhudurg

: Dr. Anjali D. Patil
Vikar Career College,
Kannamwar Nagar - 2, Vikhroli (E),
Mumbai - 400083

: Prof. Nitin Kharat
Assistant Professor, Rural Development,
Kirti College, Dadar, Mumbai

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CONTENTS

T.Y.B.A.
Rural Development Paper No.VII
RURAL RESOURCE MANAGMENT
SEMESTER VI

1. **Human Resources**
   a) Concept and Factors of Human Resources
   b) Population-education-health and its problems
   c) Migration–Type, Causes and Remedial Measures

2. **Development of Infrastructure**
   a) Transport and Communication (Electronic Media)
   b) Rural Electrification
   c) Pure Drinking water

3. **Science and Technology for Rural Development**
   a) Uses and Importance of Science and Technology for Rural Development
   b) Agricultural Research and Extension Education
   c) Source of non-traditional energy-equipments and its uses

4. **Rural Energy Resources.**
   a) Concept, Importance and Scope.
   b) Traditional rural energy sources and their limitations
   c) Non-traditional energy sources.

SEMISTER-VI(UARD-604)

Practical Work & Assignment (Any two)

1. Study of Natural rural resources in rural area.
2. Study participation in watershed development programme
3. Environment study of particular village
4. Visit to primary health center
5. Study of drinking water habit in rural area
6. Visit to KVK/Agriculture Research Center/Agriculture University

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1

HUMAN RESOURCES

Unit Structure:

1.0 OBJECTIVES

a) To study the importance of human resources

b) To study the factors and approach to human resources and development

c) To study the obstacles in the development of human resources

1.1 INTRODUCTION

Human resource is considered an important type of resource to attain the economic development of a country. Human resource means the size of the population of a country along with its efficiency, educational qualities, productivity, farsightedness and organizational abilities. By human resource we mean human capital and it implies skills, abilities, and technical knowhow of the population of the country. To develop the human resources of a country it should introduce manpower planning. Human resource with the attainment of economic development must consider should be considered from both the angles the assets and also the liabilities. Proper utilization of natural and human resources is very essential to attain economic development. Production level of national wealth and utilization of natural resources to a great extent depend upon the efficiency of human resources. Increased population is a barrier for the development of the country. As a result, study of human resources in detail is a must to achieve economic welfare. Thus, it is quite important to know both in qualitative and quantitative terms the rate of growth, the size, distribution, the composition and all other demographic features of the population of India. According to Dr. Kallol Guha "A country's human resource (a set of individuals who make up the workforce of an

organization, business sector or economy) is shaped and conditioned through its education system. How a given nation will fair can be predicted by evaluating the state of its primary, secondary and higher education with special reference to its research orientation of the education system."

Human Resource Development is the integrated use of training, organizational and career development efforts to improve individual, group and organizational effectiveness. Herein human resource is the talent and energies of the people available to an organization as potential contributors. They contribute to the creation and realization of the organizations mission, vision, values and goals. And development refers to a process of active learning from experience that leads to systematic and purposeful development of the whole person, body, mind and soul.

Nature Of Human Development:

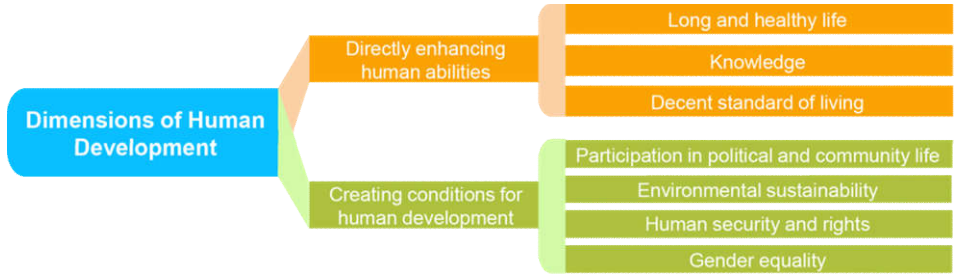
During the second half of the 20th century human development grew out of global discussions on the links between economic growth and development. By the early 1960s economic growth had emerged as both a leading objective and indicator of the national progress in many countries. This paved the way for the human development approach which expands the richness of human life instead the richness of the economy in which human beings live. This approach focuses on creating fair opportunities and choices for all the people.

People:

Growth in income is an important means to develop rather than to an end in itself. Instead of assuming that economic growth will leadautomatically to greater opportunities for all the human development approach focuses on improving the lives of people.

Opportunities:

Human development means giving more freedom and opportunities to people and to the lives they value. In simple words it means developing people's abilities and giving a chance to use them for their own development. For example, education is important but if the person doesn't have skills useful in the market or in demand he or she willbe denied of jobs.



The above diagram shows the fundamental aspects of human development and aspects that help to create the conditions that allow the people to flourish. The three fundamental aspects of human development are to live

a long and healthy and creative life, to have access to knowledge and be knowledgeable, and to lead a decent standard of living. Other aspects are also important like creating the right conditions for human development like participating in the political and community life, environment sustainability, human security and gender equality. As soon as the basics of human development are achieved opportunities for progress in the other aspects of life are opened.

Choices:

Basically, human development is more about choice, about providing opportunities and not insisting them to make use of it. Nobody can guarantee to human happiness and it is the concern of the people who have to make their choices. The process of human development creates an environment for the people individually and collectively, to develop the capacity of the people to their full potential and also to have a reasonable chance of leading a productive and creative life valued by them.

1.2 CONCEPT OF HUMAN DEVELOPMENT

Human development is a process of enlarging people choices which are indefinite and changing over time to time. The three essential preferences necessary for a modest standard of living at all the levels of development are to lead a long and healthy life, to acquire knowledge and to have access to the resources. In addition to the above preferences highly valued by many people range from social, political and economic freedom to opportunities for being creative and productive and enjoying self- respect and guaranteed human rights. But, one thing should be understood that if the essential preferences are not available many other opportunities remain inaccessible. Like every coin has two sides human development also has two sides: a) formation of human capabilities like good health, possessing knowledge and skills and b) making use of their acquired capabilities the productive purposes, leisure or for being active in the social, cultural and political affairs.

If the human development scale does not balance the two sides it results in frustration. Income is one of the important options but is not the sum total of lives. Therefore development is not only the expansion of income and wealth but it should focus on people. The Human Development Resource 1991 has elaborated the concept of human development as “People must be at the center of human development. Development has to be woven around people, not people around development. It has to be development of the people, by the people and for the people.” Absolute consideration was to given to economic growth on the belief that the benefits of growth would trickle down to different sections of the society in the previous concepts of development. But, this hypothesis was not supported as higher growth does not necessarily bring higher degree of welfare for every section of the society. Growth should be to make improvements in people lives. The four major components in the concept of human development are equity, sustainability, productivity and empowerment.

All people should have access to equal opportunities and it should be known that human development is impossible without gender equality. Development will remain weak and unbalanced if women are excluded from the developmental process. Productivity is not the only means to achieve welfare of the society but herein people should be allowed to increase their productivity and participate in the process of generating income and remunerative employment to accomplish higher economic growth. All forms of capital such as human, physical and environmental should be restored. Empowerment is also one of the important aspect of human development. While upgrading the choice of an individual or a section of a society the choices of other individual or a section of the society should not be restricted. This calls for equity in human relationships. Also while improving the lives of present generation the choices of future generations should not be mortgaged. Human Development process should be sustainable and should address both equity within the generation and among the generations enabling all generations, present and future, so that they make the best use of their capabilities.

1.3 DEFINITIONS

Human resource development is an approach that focuses on the people themselves and the opportunities they have. Human resource development is a concept about thriving of the human life and focus on the role of the people themselves to bring a better condition in their life as economic growth does not bring automatic growth in wealth for everyone. Human resource development is defined as "A process of enlarging choices – social, cultural, economic, political. If the focus of development is on people then the range of choices can be enhanced in all the areas of human life for every human being. Human resource development is both a process and an outcome and is not only concerned with the process through which choices are enlarged, but also focuses on the outcomes of the enhanced choices." Human resource development thus defined represents a simple approach with far-reaching conclusions.

(Becker, 1975; Schmidt & Lines, 2002; Harrison & Kessels, 2004) The central focus of the human resource development is on the human capital or the human resource. As the human resource in an organization, based on their competencies, skills, experience and knowledge, they are viewed as the driving force for the success of an organization.

Swanson (1996), defined HRD as "a process for the development and skillful human through the organizational and the training programs for the people of the organization, so that their overall performance could be enhanced".

Nadler (1983) defined HRD as "at a given period of time, organized learning experience so as to bring about the potentiality of change in performance or growth of the individual and the organization as a whole".

Sriyen (1997), considered human resource development as a method of enhancing knowledge, skills and capacity of human resource in the

society. In terms of economy, it could be described as accretion of human resource and its sustainable investment for the development of the International Journal of Marketing and Human Resource Management (IJMHRM)

Michael (2000), the concept of modernization and economic development represents the implicit and explicit values framework for the achievement of desirable goals. Mahatma Gandhi once said "realization of human potential". A country that is unable to develop their human resource in terms of the enhancement of their skills and knowledge cannot utilize their abilities for the welfare of the nation and hence cannot develop anything else.

McLean and McLean (2001), described HRD is any process that has the potential to develop over the short or the long period of time.

McLean and McLean (2001), the results could be defined as the abilities and the recognition for the development of the work-based knowledge, the expertise, the productivity, and the level of satisfaction.

Tanvir Kayani(2008),The role of development of human resource is to improve the quality of life. Various economists argue that the human resources of a country determine the character and growth in the economic and social development of a country. Not gold and silver but only human resource of a nation can make a nation a great & strong.

Tanvir Kayani (2008), human resource development has been considered as one of the most important area of research. The aim of the Human resource development policy is based on the development of the human resource.

Human development can be simply defined as a process of enlarging choices linked to capabilities and functioning's on one side and opportunities on the other side. The functioning's of a person are the valuable things the person does like taking part in the community, being well-nourished and living long life while, the capability of a person stands for the different combinations of functioning's a person can achieve. In short it reflects the freedom to achieve functioning's. development of

human resources can enhance human capabilities – good education, skill training, good health and nutrition, etc. It is seen that unless opportunities exists capabilities cannot be used for productive purposes, for leisure, to participate in political, social or cultural affairs. Through better access to productive resources which, include credit and employment and other resources economic opportunities can be created. Polity and other conditions require political opportunities.

1.4 FACTORS OF HUMAN RESOURCE DEVELOPMENT

1. Physical:

Physical wellness encloses a variety of healthy habits that include adequate exercise, proper nutrition, keeping oneself from bad and harmful habits. Getting regular medical check-ups, protection from injuries and harm, getting information about and identifying the symptoms of diseases.

Developing healthy habits is an investment for the future which would enhance the life quality.

2. Social:

Social factor refers to our ability to interact effectively and successfully globally and to live up to the expectations and demandspersonally. It also means developing understanding with other people showing respect for others and yourself, learning good communication skills and create a support network of friends and family members. It builds a sense of belonging by contributing to the community and the world.

3. Environmental:

Environmental factor involves in socially responsible activities to protect the environment. It creates awareness of the unstable condition of the earth and hoe the wrong daily habits affects the physical environment. It helps to create maximum harmony and minimum harm to the environment on the earth.

4. Emotional:

This dynamic state fluctuates frequently with the other six factors. Being emotional means possessing the ability to feel and express human emotions viz. anger, happiness and sadness also to love and be loved and to achieve a sense of fulfillment in life. Emotions incorporate the ability to share feelings, self-acceptance, self-esteem and optimistic approach.

5. Intellectual Factor:

Like our body our minds too need to be continually inspired and exercised. This intellectual factor encourages creative, stimulating mental activities. Those people who possess a high level of intelligence continue to learn and have an active mind. The available resources are used well by an intellectual person to expand knowledge and improve skills.

6. Occupational Factor:

Occupational factor successfully integrates a commitment to an occupation into a total lifestyle which is rewarding and satisfying. It involves preparing and making use of gifts, skills and talents possessed by an individual to gain happiness, purpose and enrichment of life. An individual's attitude towards the work is related to the development of occupational satisfaction and wellness. Achieving optimal occupational wellness helps to maintain positive attitude towards the job and experience satisfaction and derive pleasure in the job.

7. Spiritual Dimension

A spiritual person seeks harmony between what lies within as well as the forces outside. He possesses a good set of guiding beliefs, principles or values that help give direction to one's life. It incorporates a high level of faith, hope and commitment to the individual beliefs providing a sense of meaning and purpose.

1.5 IMPORTANCE OF HUMAN RESOURCES

a) Appropriate utilization of human resources: To attain economic development of the country human resources is considered very important as it is the most active resource of all other resources. It is very essential to appropriately utilize the natural resources of the country with the help of Qualitative and Quantitative development of human resources. According to Prof. Meier human capital formation means "The process of acquiring and increasing the number of persons who have skills, education and experience which are critical for the economic and political development of the country."

b) Increased Productivity: Human capital plays an important role in the economic development of a country. Prof. Galbraith says that "The larger part of industrial growth is gained not from investing more capital but from human investment and the improvement brought about by skilled people.

c) Development of skills: The lack of investment in human capital results mostly in the slow growth in underdeveloped countries, as these countries suffer from shortage of technically trained and highly skilled and educated personnel required for its industrial sector and they also face the problem of surplus labour in its farm sector. The developed countries maintain high level of investment on the development of manpower resources. Prof. Meier observes that "Investment in human beings is a major source of growth in advanced countries, the negligible amount of human investment in underdeveloped countries has done little to extend the capacity of the people to meet the challenge of accelerated development." For the all-round development of the country the human capital formation is very essential through adequate volume of investment on human development is important.

d) Increased volume of output:

The worker tries to increase his output and income with the knowledge imparted to him. Developing vocational skills help the workers and all other categories of manpower to earn more income in various professions. As a result of human resource development, the production level increases as the knowledgeable and skilled workers make rationale use of all the resources that is made available to them. Good health facilities enhance physical capacity of the workers. Factors like education and training at higher educational set up enables workers to contribute liberally towards faster expansion of output in technical, engineering, machine building, accounting, management etc.

e) Addition to Productive Capacity:

Upgraded technological facilities and improved knowledge and skill modernize the production technologies and thereby add to the productive capacity of the country in general. As a result, human resource development in the form of human capital formation makes necessary addition to the productive capacity of a country in a pleasant way. Human

capital formation promotes higher growth of the economy by adding physical stock of the capital of the country and transfer of technology from foreign countries pave the way for the adoption of modern technology into production to improve the productive capacity.

f) Raises Per Capita Income:

Human resources development through increased formation of human capital can raise per capita income of the country by imparting knowledge to improve the productivity of the workers.

g) Tool for Economic Change:

Human resource development not only make the people knowledgeable skilled and physically fit but also changes the attitudes of the people and improve the personal qualities of the people. These changeswork as a tool for economic change and they are useful to the development of innovative capacity and entrepreneurship as they motivate people to do research, work hard, take risks and apply them to produce new products and develop new processes of production.

h) Improving Quality of Life:

Human resource development paves the way for improving quality of people's life in general and this is possible by making improvements in the three components of Human Development Index (HDI), viz. rise in per capita income, higher educational attainments and increase in life expectancy.

1.6 CHALLENGES IN HUMAN RESOURCE DEVELOPMENT

There are many challenges in the human resource development. These challenges are not related to a single dimension but, they are directed towards multi-dimensional issues to be dealt with immediate attention and effect. Following are the broad categories of the human resource development challenges:

A) Environmental Challenges

B) Individual Challenges

C) Organizational Challenges

A) Environmental Challenges:

The environmental challenges are threats to management which should be handled in an ardent manner. These challenges are related to the external forces that exist in the environment and can influence the performance of an individual or the organization. These eternal forces are uncontrollable.

Following are the environmental challenges faced by the human resources:

1) Job and Family Roles:

Dual- career family's number is increasing day by day wherein both the husband and wife work in order to cope with the hiking prices of the commodities and fulfill the increasing demands in the family. Due to this the woman is always under burden that she has to give time to her family also. The working hours at the job place are strict and tight for the employees that even working men suffer from the employment policies as they don't get time to spend with their family. It is necessary to reframe the policies with this particular challenge and special favorable working policies for the employee.

2) Lack of skills:

The skills required for the service sector are not up to the mark as per requirement due to which it affects the employment of a worker. Lots of changes are taking place in the service sector due to many reasons like change in the tastes & preference of customers, technological change, legal change etc. Therefore, most of the employees lack the standard required skills to perform their duties. It is necessary to look into this challenge and train the new and old employees so that they become efficient and effective workers.

3) Legislation:

It is an old environmental challenge faced by the organizations since many decades. There are certain labour laws declared by the government for the benefits of the workers but some of these laws are disadvantageous for the organizations. If any of the law is violated, serious actions is taken by the relevant government authority resulting in the penalty for the management of the organization.

4) Work Force Diversity:

The changes in the environment provide the opportunities and threats to the human resources. On one hand the diversity creates big problem and on the other hand in the long run the survival and performance is flourished.

5) Rapid Change:

The human resource plays a basic role in response to the environmental change. Changes in the world are taking place at a faster rate as a result the human resource should be quickly adaptive to the changing requirement or new threats of the environment or else they might become outdated from the market.

6) Technology:

As the technology is growing with great speed especially in the field of computers and tele-communication the human resource has to constantly update the skills and expertise. New methods that have emerged quickly

dominate the old ones and make them outdated. So the skills required by the employees also change with every changing technology. This compels the human resource to learn advanced skills 3-4 times in a year.

7) Globalization:

One of the major issue human resources faces today is the issue of globalization. There is a severe competition between the domestic and foreign companies as the world is converting into global business. These competitions result in laying off the effective workforce i.e. the human resources.

B) Individual Challenges:

Problems related to the individual level challenges are as follows:

1) Ethics and Social Responsibility:

In this challenge, the human resources make an effort and favourable behavior to benefit to the society. These ethics serve as the basic principle and as the guidance for the personal behavior.

2) Job Insecurity:

The restructuring and downsizing in the employment places develop a sense of insecurity of job in the human resources. They desire to get a steady job rather than a job with promotional future. The layoff of the human resources in the period of cut throat competition creates a fear about the insecurity of their jobs that would hinder their effective performance.

3) Brain Drain:

The brain drainage is a serious issue in the hi-tech companies. One of the challenges for human resources management is the detachment of the key potential employees which link with the competitors for higher remunerations etc. It is a loss of intellectual property and in many situations the human resources at higher levels while leaving their jobs also take with them the potential lower level employees.

4) Productivity:

Productivity is defined as the measure of the value that a human resource can add to the final product or service. The increased output is reflected as increased productivity. The two important factors that affect the human resources are ability and motivation. The ability can be improved by hiring and replacement along with proper training and career development. The high quality of work life serves as an accelerator to the motivational factor of the human resource.

5) Empowerment:

It is seen that now a days due to the changes in the work place and environment the human resources exert more control on their work as compared to their superiors. This individual control of human resources is

called empowerment which helps to work with enthusiasm, commitment and they learn new skills as normal decisions are taken by them about their work by themselves as a result, they enjoy their work.

C) Organizational Challenges:

The organizational challenges for the human resources development are related to the factors located inside the organization. Thought he challenges are evolved as a byproduct of the environmental challenges they can be controlled by the management of the organizationto a greater extent. The human resources manager notices the challenges and takes corrective measures before they become serious issues. When the human resource is effectively used in combination with the other factor of production, the opportunities in the environment are availed and the threats & challenges are eliminated.

The competitive positions can be availed by lowering the costs and strengthening its cash flows. The labour cost of the organization is minimized through effective compensation system that adopts innovative reward strategies. By doing this the organization gets the ultimate advantage of the favorable behaviors of the employees. The effective employees selected are given proper training and they stay with the organization for a longer duration. The work of the employees should be restored along with the improvement in the health and safety issue of the working environment.

To improve the processes within the organization that would ultimately result in the improvement of the final product or other services total quality management programs should be implemented. This quality improvement can lead the organization to a competitive advantage.

To gain competitive advantage organization should employ such people who have recognizable capabilities and can develop extra ordinary competence in the specific area. Restructuring of the organization is one of the techniques in which the methods of performing different functions are altered positively. Now-a-days the major functioning in some organizations is outsourced. Human resource department is involved in the

mission oriented and strategic activities for the development of the organization.

1.7 SUMMARY

Human resource is considered an important type of resource to attain the economic development of a country. Human resource means the size of the population of a country along with its efficiency, educational qualities, productivity, farsightedness and organizational abilities. Proper utilization of natural and human resources is very essential to attain economic development. Production level of national wealth and utilizationof natural resources to a great extent depend upon the efficiency of human resources. Human Resource Development is the integrated use of training, organizational and career development efforts to improve individual,

group and organizational effectiveness. Human development is a process of enlarging people choices which are indefinite and changing over time to time. The three essential preferences necessary for a modest standard of living at all the levels of development are to lead a long and healthy life, to acquire knowledge and to have access to the resources. There are many challenges in the human resource development. These challenges are not related to a single dimension but, they are directed towards multi-dimensional issues to be dealt with immediate attention and effect.

1.8 SELF-STUDY

1) Write short note on human resources.

2) Explain in short the human development approaches

3) Explain the concept of human resources.

4) Give some of the definitions of human resource development.

5) Which are the factors of human development resource?

6) What are the challenges in the human resource development?

2

POPULATION EXPLOSION

Unit Structure:

2.0 OBJECTIVES

a) To study the concept of population explosion

b) To understand the nature of increase in population

c) To study the causes of population explosion

d) To study the effect of population explosion on the economy of the country

e) To study the remedial measures on population explosion

2.1 INTRODUCTION

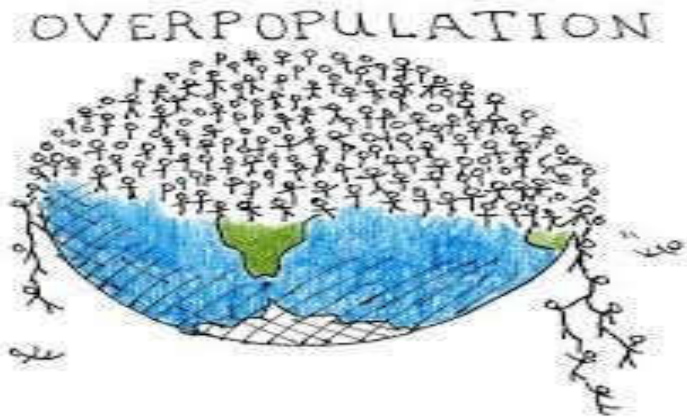
Every nook and corner of India clearly displays the increasing population – at the railway station, on the road, highway, metro station, airport, market, shopping mall, bus stop, hospitals, temples, social gatherings or religious gatherings. All the above places are crowded at any time of the day or night. This shows that our country is overpopulated. India is the second most overpopulated country after china. According to the 2011 Indian census population of India was 1,210,193,422, which means we have crossed the one-billion mark till now and by 2025 we will be the number one populous country.

Despite the fact that the programs like family planning, population policies and welfare undertaken by the government of India have led to a continuous decrease in the fertility rate, but the actual population control will take place by 2050 only. Is population explosion a boon or a curse has been bothering us since the problem of increase in population has come up. India being a developing country increasing population is a curse as it is destroying and has become a hindrance to the development of the country and its society. Lack of resources is a major problem faced by the developing countries. The rapidly increasing population further deteriorates this problem of resources leading to increased poverty, malnutrition and other problems related to increasing population.

Population means the whole number of inhabitants or people in a country or region and population explosion is a pyramiding of number of a biological population. Increase in the number of people in a pyramid related to the increase in the population. As the number of people in a pyramid increases the problems related to the increased population also increases. Birth rate, death rate and migration are the main factors affecting the population change. Birth rate is the ratio between the births and individuals in a specified population and time and death rate is the ratio between the number of deaths and individuals in a specified population and time. Migration is the number of people in a country, place or locality moving in (immigration) or out (emigration). Population change is equal to the births + immigration and death + emigration.

2.2 CONCEPT

Population is defined as a group of individuals of the same species living and interbreeding within a given space. Population often relied on the same available resources, is dependent on the same environmental restraint, and also depends upon the availability of other members to endureover time. Population is examined by how individuals interact with each other and as a whole interact with the environment in which they live. Population ecologists depend upon a series of statistical measures (demographic parameters), to describe that population as a tool for objectively studying population. Collecting and analysing the number of population is known as demography. Demography is the study of the characteristics of populations and includes any statistical factors that affect population growth or reduction. Population size, age structure, density, birth rate, death rate and sex ratio are also the important parameters.



Rapidly increasing population has put tremendous strain on our environment. Increasing demand of the increasing population on our global environment are threatening the future of sustainable life on earth. The developed countries pollute the environment and deplete its resource while the developing countries are under pressure to compete economically and their industrial growth is damaging the environment as well. Forest are being destroyed at an alarming to support the growing populations demand for housing areas. Due to unrestrained use of fuel and energy many non-renewable resources are ending up in depleting. Many parts of the world suffer from shortage of food and water. Humans continue to put more stress on the limited natural resources of our planet.

The depletion of natural resources and biodiversity, producing lots of waste and destroying natural habitats are the serious problems. Global warming is one of the largest environmental effects of human population growth which will lead to the rising sea levels and extreme weather conditions in the future on earth. The above issues need to be taken notice of to ensure the life on earth to be sustainable throughout the next century.

2.3 NATURE OF POPULATION EXPLOSION

Human overpopulation occurs when there are too many people for the environment to sustain and it could apply to the population of a specific region, or to world population as a whole. Scientifically there is overpopulation when the ecological footprint of a human population in a geographical area exceeds the carrying capacity of any area. This damages the environment faster than nature can repair it, possibly leading to an ecological and societal collapse.

The undesirable condition where the number of existing human population exceeds the carrying capacity of earth is termed as overpopulation. Certain factors like reduced mortality rate, better medical facilities, depletion of precious resources result in overpopulation.

Technological advances also have affected humanity. A better medical treatment facility save lives and has increased lifespan resulting in the growth of population. In human history the birth and death rate have always been able to balance each other and have maintained a sustainable population growth rate. Developing nations face the problem of overpopulation more than the developed countries. Wars, Natural calamities and manmade hazards couldn't affect the population on the earth. Scientist says that the overall human impact on the environment due to overpopulation, over consumption, proliferation of technology and pollution has drifted the planet into a new geological epoch known as the Anthropogenic. It is also believed that waste and over-consumption, especially by wealthy nations, is putting more strain on the environment than overpopulation itself.

2.4 CAUSES OF POPULATION EXPLOSION

The recent increase in the world population is due to

1) The increase in birth rates due to improved medical treatments.
2) The decrease in death rates due to better medical facilities and advancements in the field of medicine.
3) Immigration to the developed countries due to the reasons like better job opportunities, pollution free environment, better facilities and so forth.

Population explosion in India has the following aspects:

It is seen that every fifth living person on the globe is an Indian. India adds more than 46,500 persons to its population every day. By 2035, India would be the world's most populous state. 50 % of the increase in India's population in one decade is in the five states of Bihar, Madhya Pradesh, Assam, Rajasthan and Uttar Pradesh (BIMARU states). The couples entering the reproductive span than those leaving it is more than three times i.e the fertility rate of the younger group is three times higher than those of passing out from the reproductive range. If the population in India goes on increasing at this alarming rate life would be miserable for them. They would be facing with the problems of medical facilities, education, housing, scarcity of food and half the nation would be below poverty line.

Causes of overpopulation:

1) Widening Gap between Birth and Death Rates:

The birth rate has shown negligible decline and death rate has gonedown sharply resulting in the increase widening gap of Indian population and is the root of overpopulation. The population will be steady if the number of children born equals the number of adults dying. In a way we can say the discovery of agriculture provided our ancestors the ability to sustain their nutrition without hunting that paved the way to create first imbalance between the two rates.

2) A Psychological Component:

Many years ago, a small part of the population had enough money to live in comfort while the rest part faced poverty and would give birth to large families to make up for the high infant mortality rate. Poverty, natural disaster or the need of more hands to work are the major factors for overpopulation. Education makes an individual liberal, broad-minded, welcoming new ideas and rationale. If both male and female are educated, they will easily understand the logic of family planning and can plan their family, but if they are illiterate they would be orthodox, illogical and very religious minded and would fall prey to anti-social activities.

3) Lack of family planning:

Family planning has a direct link with female education, and female education is directly associated with age at marriage, general status of women, their fertility and infant mortality rate and so on. Children are married at an early age resulting in giving birth to many children. A large number of girls even today are married at an age at which they are not ready for marriage either socially and emotionally, or psychologically and chronologically. The reason behind this is illiteracy, living below poverty line and have very little or no knowledge of family planning. These people don't understand the importance of family planning and the harmful effects of overpopulation. The religiously orthodox and conservative people are against the use of family planning measures.

4) Better Medical Facilities:

Technical advancements is the main reason to disturb the balance of birth rate and death rate. With the help of science and technology better means of producing food was invented to feed the increase number of people. Medical science made many discoveries to defeat a whole range of diseases. Vaccines helped to cure many of the diseases taking thousands of lives. Increase in food supply with very few means of fatality collapsed the balance and this became the starting point of overpopulation.

5) Advancement in fertility treatment:

Pregnancies have become safer now days due to modern techniques. Effective medicines have increased the chances of conception leading to rise in the birth rate. With latest technological advancements itis possible

for the couples to conceive by undergoing fertility treatment and have their own babies.

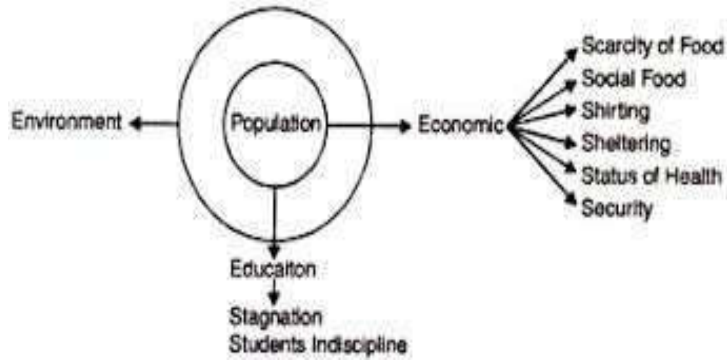
6) Migration:

Migration from rural areas to urban areas or more developed states in the country where best facilities are available in terms of education, medical facilities, employment and security is also the cause overpopulation in the country or anywhere in the world. Difference between the outgoing and incoming of people is narrowed and leads to more demand of food, clothing, energy and housing facilities and also gives rise to shortage of resources available. Overall population remaining the same affects the density of population making the place overcrowded.

Poverty is the cause and effect of the population growth. Giving birth to many children by the poor people in the family indicates the paradox of population-poverty interrelationship. Having produced many children to struggle for the family's needs the children are forced to stay at home to do the household chores instead of going to school and support the families' household income. These illiterate and ignorant children will follow their fathers' steps for his family's survival. It is satirical that a big family size is the poor man's only way to struggle with poverty caused by the population explosion.

2.5 EFFECTS OF POPULATION EXPLOSION

In 1800 the earth's population was 1 billion but after only two centuries the global population is 6 billion, half of which lives in urban areas. Population size is an important factor to measure environmental impact. The impact of this population explosion is seen from the changes that have taken place in greenhouse gas emission, extinction of species, pollution, soil erosion, depletion of natural resources. The combined effects of population growth, consumption, overuse, wastage and misuse of resources has strained the capacity of the earth to sustain life.



Major impacts of overpopulation are as follows:

Overpopulation has caused damage to the physical environment i.e. land, water, air, soil and minerals. The overuse, utilization and misuse is due to the growth in human population. More cultivable land has been made available by clearing forests, reclaiming wet lands, ponds and green belts to feed the increased population. Advanced agriculture utilizes more water, more fertilizers and more pesticides which makes the soil infertile. More population means more space is required to construct houses, requires more consumer goods, more means of transport, more consumption of fossil fuels and more pollution. Pollution of land, air and water cause a number of problems in the physical environment affecting the biological environment to a great extent.

Air and water pollution:

More and more forests are cleared for housing facility for the increased population and wood is required for fuel purpose. Deforestation has led to air pollution, soil erosion and global warming. The suns heat and carbon monoxide gases get trapped in the earth's atmosphere cause greenhouse effect. Increasing population has not only polluted the air but also water. Increasing population demands more number of factories leading to air, water and other types of pollutions. Water and soil pollution also come from the agricultural sector. More use of chemical fertilizers, pesticides, fungicides, germicides in the agricultural field also leads to water and soil pollution.

Increased population has increased pollution which in turn is leading to a more hostile environment for human beings.

Deforestation:

Forest the important natural resource of India have moderate influence against floods thus protecting soil erosion. They enhance the quality of environment by influencing the ecological balance by checking soil erosion, conserving water, maintaining soil fertility, balancing carbon dioxide and oxygen in the atmosphere, regulating water cycles and floods, etc. India has a forest cover of 76.52 million square kms. of recorded forest area, but the actual forest cover is only 63.34 million square kms. deforestation on large scale has brought us face to face with a major ecological and socio-economic crisis.

Depletion of ozone layer:

The ozone layer protecting the earth from the ultraviolet rays of thesun has been ruined by the effect of the Chloro Fluro Carbon (CFCs) gradually. Chemicals like bromine halocarbons, nitrous oxide from fertilizers also have harmed the ozone layer. Nitrogen oxide and methane have adversely affected the stratosphere ozone layer.

With the increase in the human population the concentration of CFCs also has increased resulting in the ozone hole. Also other emissions derived

from human activities have depleted the ozone layer. An enormous big hole in the ozone layer above the Antarctica has threatened not only the continent but also many parts of the world of Antarctica's melting icecaps.

Extinction of many species:

It is due to human activities massive extinction of many species on going. Modern agricultural practices damage the earth of its thin layer of topsoil through wind and water erosion. This erosion destroys the precious micro ecosystem which takes centuries to form and support life on land. Many species on earth are of great importance to human beings and all forms of life as sources of food, fodder, medicines, fuel, building materials. Around 20,000 species of plants are used for medicinal purpose all over the world. The recreational, emotional, cultural, spiritual and aesthetic needs of the people are met by the diversity of nature.

Land or Soil Degradation:

The demand for food, energy and other human requirements depends upon the preservation and improvement of the productivity of land. Land stores water and nutrients required for plants and other living micro-macro-organisms. The loss of arable land – soil degradation has been caused due to a number of factors – deforestation, overgrazing, over exploitation of fuel wood, agricultural activities and industrialization. In order to combat soil degradation several measures like watershed management, soil and water conservation, reclamation of waterlogged and saline land, sand dune stabilization, forest and range management and to restore the soil fertility in arable lands by using green manures and cultivation of appropriate crops.

Global Warming and Climate Change:

Global warming is one of the greatest threats to the planet. There is a worldwide consensus among climate scientist that in the past 140 years the global temperature has raised about 1F (0.4C – 0.8C). Climate change evolves so slowly that the difference cannot be seen easily. The IPCC projects the temperature in the Middle East to increase by 1 – 2C by 2030 to 2050. Nature reserves currently compromise about 10% of land

area globally, but most are small, disconnected from other reserves, and are exposed to tremendous human pressures. Population size also is an important factor in measuring environmental impact. The combined effects of population growth, wastage and misuse of resources, consumption and overuse have strained the capacity of the earth to sustain life.

2.6 REMEDIES TO CONTROL POPULATION EXPLOSION

The Government of India has initiated a bold population policy to keep the economic growth of the country in pace with the increasing demands of the increasing population. To name a few following steps playa major role in controlling population –

a) increasing the welfare and status of women and girls,

b) encouraging women empowerment,

c) spread of education,

d) sex education,

e) encouraging male sterilizationand spacing births,

f) increasing awareness for the use of contraceptives and family

1. planning methods,

g) free distribution of contraceptives and condoms among the poor, h) more health care centres for the poor people,

h) open dialogue on abortion and voluntary sterilization,

i) raising awareness among the people regarding family planning and letting them to know the serious after effects of over population.

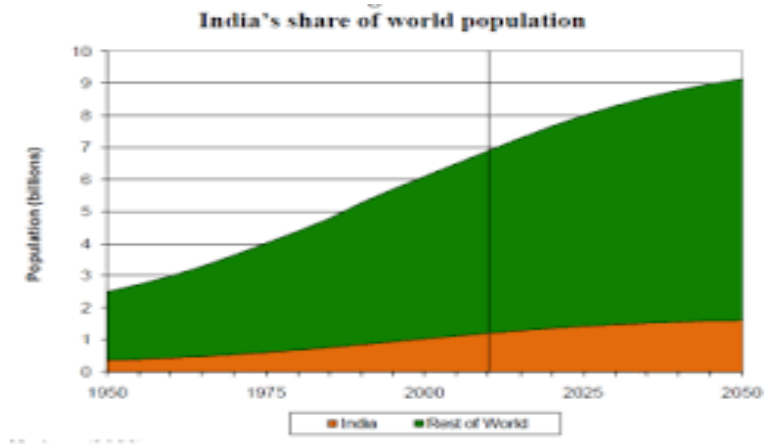
Tax Benefits or Concessions also be helpful to control overpopulation and give positive results. Government should frame policies like to waive certain part of income tax or to lower the rates of income tax for those married couples who have single or two children. Also should think of some other solutions related to tax exemptions to control overpopulation.

Increasing public awareness and implementing strict population control norms by the government will pave the way for the country's economic

prosperity and control of population. India's strengths in the global world in different sectors may it be in science & technology, medicine & health care, military, communication, entertainment, business and industry, literature and so on can't be overlooked.

2.7 SUMMARY

A population is a group of individuals of the same species interacting within the same space. The health and behaviour of a population is determined by the way those individuals interact with each other and with their surrounding environment. We can determine the status of a population by measuring and calculating elements common to all populations, such as size, density, fecundity, mortality, sex ratio, and age structure. These demographic statistics provide researchers with standardized metrics for comparing populations and assessing extinction risk. Just as a doctor can't diagnose an illness with only a blood pressure measurement, we can't manage populations based on demographic parameters alone. However, demographics provide a baseline for monitoring population health and offer insight into the mechanisms driving population declines.



Poverty is the cause and effect of the population growth. Giving birth to many children by the poor people in the family indicates the paradox of population-poverty interrelationship. It is satirical that a big family size is the poor man's only way to struggle with poverty caused by the population explosion. Population size is an important factor to measureenvironmental impact. The impact of this population explosion is seen from the changes that have taken place in greenhouse gas emission, extinction of species, pollution, soil erosion, depletion of natural resources. The combined effects of population growth, consumption, overuse, wastage and misuse of resources has strained the capacity of the earth to sustain life. Pollution of land, air and water cause a number of problems in the physical environment affecting the biological environmentto a great extent.

2.8 SELF-STUDY

1) Explain the concept of population explosion.
2) Write short note on nature of population explosion.
3) What are the causes of population explosion?
4) Give the effects of population explosion.
5) Suggest the remedies to control population explosion.

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3

EDUCATION RELATED PROBLEMS

Unit Structure :

3.0 OBJECTIVES

a) To understand the concept of Education

b) To study the Problems in education due to over population

c) To study the obstacles in education in the process of rural development

d) To Know the methods to improve education in rural areas

3.1 INTRODUCTION

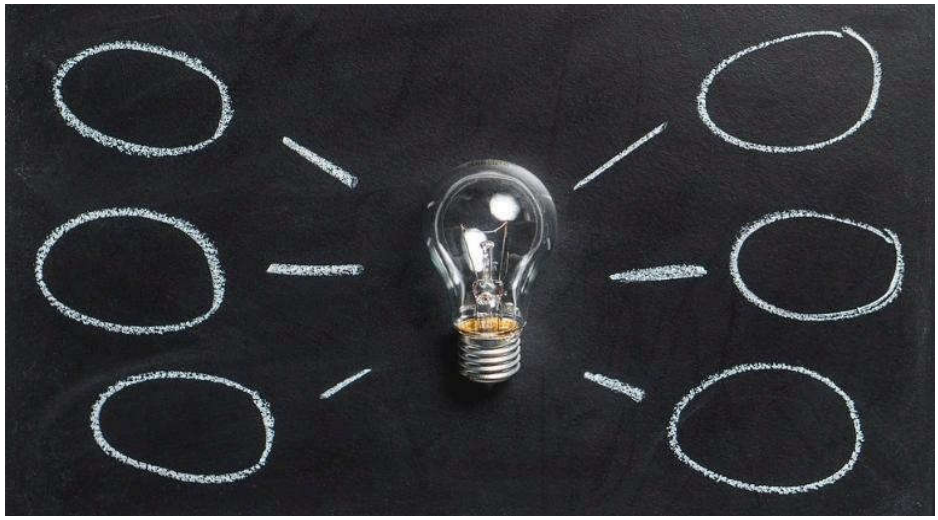
Higher education which was considered to be a safe place, intoday's world is now being exposed to ambitious forces. Education is factual service. Effective involvement of the service provider i.e. higher education brand and the consumer which are students is very crucial. Education in India is stricken by many difficulties like poor or lack of infrastructure, Access to villages in remote areas, lack of financial backing and overall poor quality of educators. Wide fluctuation in educational attainment and literacy rates is found around the regions and social classesof India. India has a positive demographic opportunity having half of its population in the working age group and education is the tool to realize this demographic potential. Quality schooling is the basis to ensure the all- round development of a person, along with nutrition in the childhood days, health care and good guidance. Good quality education not only depends on infrastructural facilities like classrooms, availability of chairs and desks, provision of digital learning, water and sanitation facilities, availability of electricity, availability of chairs and desks but also softer elements like access to

books and learning materials, professional competencies of teachers, presence of school staff, among others. The density of rural schools in India and teacher – student ratio have both improved with enrolment ratio showing an upward trend. But, at the grass- roots level, the quality of education in rural India requires much changes.

3.2 CONCEPT

If a country's rural education sector is working well, it reflects on the entire economic state of a country. Education plays a crucial role in shaping an individual's personality. As Late president of India, Shri. A.P.J. Abdul Kalam has said "Almost half of the population of the world lives in rural regions and mostly in a state of poverty. Such inequalities in Human Development have been one of the primary reasons for unrest and in some parts of the world, even violence."

A survey reveals that India's organized sector has only 34 million people forming a very small stratum of the total population which says a lot about the education system and literacy rate in India. It is obligatory to make efforts for the recovery and progress of the rural economy in generaland in particular with a thrust on agriculture for the population living in rural areas. Education is not only the mirror of the society but also theseed and flower of the socio-economic development as it transforms the human being from ignorance to enlightenment, from social backwardness to social amelioration and from underdeveloped nation to faster social and economic development.



Transformational change in rural areas is possible only if education is linked to such areas to build architecture of a Comprehensive Nation. Education determines the level of prosperity, welfare and security of the people in a world based on science and technology. Illiteracy is a grave obstacle to social and economic development but education is the true alchemy that can bring India its next golden age. The motto of educational development is "All for knowledge, and knowledge for all."

Education is a dynamic process starting from birth as a child is surrounded by parents and other siblings by experiencing his surroundings and responding to it. The child tries to learn from the information from the surrounding physical and social environment and responds to it accordingly. Rural development in general refers to the process to improve the quality of life and economic well-being of the people living in isolated and sparsely populated areas. However, the character of rural areas has been changed due to changes in the global production networks and increased urbanization.

3.3 IMPORTANCE OF EDUCATION IN HUMAN LIFE

Economic development, physical and social infrastructure and education play an important role in rural development. There are a large variety of rural development approaches all over the world as rural areas are highly distinctive from one another. Rural development actions mainlyaim for the socio-economic development of the rural areas and the rural government policy is to develop the undeveloped villages. Rural development's main aim is to find ways to improve the rural lives with theparticipation of the rural people themselves in their sustainable rural development so that they can meet the requirements of the rural areas. Educational programs contributing to rural development should be controlled locally, they should be practical, applied, problem-posing and should focus on functional specialization. Relevant locally controlled educational programs play a key role in rural development in developing nations as the outsiders may not understand the setting, culture, language and other things prevalent in the local area. They diagnose their needs, assert their rights by taking control of decisions affecting their lives, it provides trained manpower in rural areas, they provide trained manpower in rural areas, also providing employment and income opportunities by linking rural and urban areas, by increasing labour force productivity and by developing leadership. An education plays a key role in rural systems of production, supply, marketing, health care, education, personal maintenance and governance. Education imparts social change, improves individuals social position and standard of living, activates participation inrural and cultural development, proclaim their rights, increases critical abilities of rural people to recognize their needs, take good control of decisions affecting their lives, links rural and urban areas, provides trainedmanpower and also increases labour force productivity, employment and income opportunities in rural areas and develops leadership. Education has a desirable controlling effect over development of the rural individual, family, community and society which leads to reduced poverty, equality inincome and controlled unemployment.

3.4 POPULATION BARRIERS IN THE GROWTH OF EDUCATION IN RURAL INDIA

Taking into account the education system of India not only the highly advanced educational institutions in the urban sector should be considered but also the progress of education at the grass roots level is of primary concern as majority of the schools are located in rural areas. Statistical records show that rural education in i9ndia has developed to some extent,

but still there are quite a number of serious barriers to the growth of education in the countryside. Education is the doorway to the wider world leading to the road to improvement of the society and the nation as a whole. The first and foremost step to lead the way for the development of Indian educational system is to identify the barriers in its path.

Following challenges are faced by the growth if Indian rural education:

a) Due to low income of the rural people it is difficult to maintain a family of 4-5 members. As a result children from these families are not sent to school and are sent to work to assist the earning member so as to add an extra income to the gross earnings of the family.

b) A major drawback of schools in rural areas is the lack of quality education which is due to few committed teachers, unavailability of proper text books and insufficient learning material available in the schools.

c) Though the numbers of students attending schools in rural areas have increased, over fifty percent of fifth standard students are not able to read even a text book of second grade or solve simple mathematical sums.

d) Unavailability of good transport facility in rural areas children have to walk miles to reach the government schools which demotivate the childrento attend schools on a regular basis.

e) Inadequate infrastructure in the rural schools like small classrooms, inadequate teaching equipment, lack of playgrounds and unclean toilets is also a reason to drive away the students from school.

Efforts from the NGO's (Non-Government Organizations) have helped the local governing bodies in the rural areas to build competently equipped and well-facilitated educational institutions. They also lend support to underprivileged children to have access to proper education, thus contributing to the progress of rural education in India. The right reformation can definitely bring about a positive change towards the development of rural education in India.

3.5 POPULATION PROBLEMS ASSOCIATED WITH EDUCATION IN RURAL INDIA

Concept and phenomenon of education based on school going is ofmodern origin in India and today it is the most influential agent of modernization to lead a comfortable life in this fast changing world.

Earlier in the past education was restricted only to upper caste and the content that was taught was descriptive. While the upper caste had traditionally enjoyed the advantages of educational attainments in terms of enrolment and retention in rural India, the lower caste lagged behind in primary schooling. The children from lower caste were withdrawn from school at an early age due to the cost of educating and work needs of poor households.

Income and caste are very much co-related to each other as is seen that lower castes have less incomes and upper castes with better endowments in terms of land, income and other resources. It shows there isa clear divide in the villages based on caste lines and access to schools.

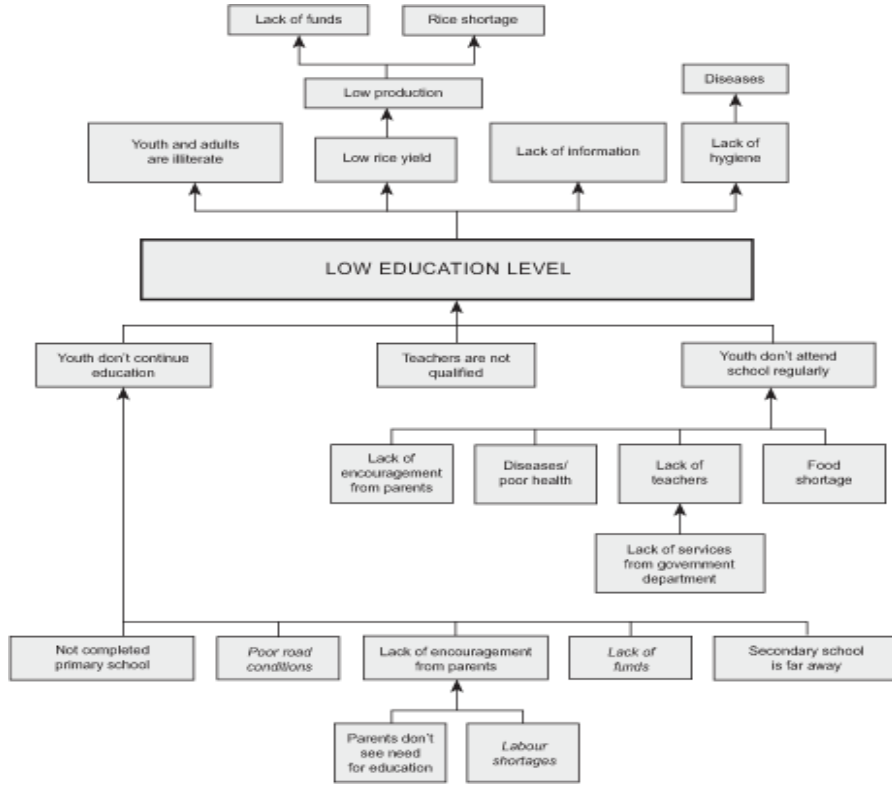
Children from the poor class having low income have to enrol themselves in government operated schools as they provide a number of incentives like low expenditure on books, fees, uniforms, etc., while children from upper caste having high income are sent to private schools giving more importance to English and computers as it is their perception of private schools to impart quality education in English medium. The poorrural girls are excluded from the schooling process as they enter late in school and drop out earlier.

Another cause for lack of interest to become literate is the parents illiteracy. Children enrolled to school from illiterate families are the first generation learners who have to handle and manage on their own with their school life, learning languages and other cognitive skills without their parents help and guidance. Illiterate parents think education is the vehicle of social mobility, so they do whatever they can to educate their children. Education and subsequent attainment of job in towns and cities is often looked upon as a means to come out of their position on caste hierarchy by earning more income.

In India religion has great impact on the minds of the people and exerts a great influence in their behaviour. Religious beliefs and practices of a community to a great extent affect the attitude, behaviour and motivation towards education of an individual or a group.

Defects in the present education system:

According to Amartya Sen, " Primary education in India suffers not only from inadequate allocation of resources, but also from terrible state of management and organization." According to him the three major defects in the present educational system are the physical environment, the curriculum or the content taught, and the teaching method or the teacher, who is teaching.



1) Physical Environment:

Education should not limit itself to the sphere of the school but should encompass nearly each and every aspect of life. Education has to be the foundation for the students to look around the world in a meaningful manner and to interpret the things they see. Schools should be the places where the ideas of education are planted in the students.

The present situation indicates that though the seeds of education are planted into the children it does not go much further than the school system. Generally it is thought that school is a place for teacher to instruct the children on the three Rs'- reading, writing and arithmetic. The schools are not considered as places, where the students should be taught the life skills necessary for them to succeed in their future life endeavours.

Access to school in India is not a problem as it is within a walking distance of 1 km. The main problem is that the school system is not prepared for mass education. In rural areas the classrooms in most of the primary schools are not made to attract small children, they are typically uninteresting, have leaking roofs with uneven floors and dirty mats and full of holes for the children to sit. More than this most of the schools don't have electricity, pure drinking water or toilet facilities. In some schools students of different ages are made to sit in single room as at a given time, a typical school can have at the most only two teachers to teach the students of all five primary classes. The teachers use the teaching methods like they make the students copy or recite from the textbooks. No normal sounds of joyous laughter, singing or reciting poems, creative play of words, excited discovery, animated participation or the irrepressible curious questioning the characteristic feature every child of that age is found in the primary schools. Everything in school is done mechanically as if it is a mechanical race to achieve 'schooling for all'. The main aim of education 'learning for all' is completely missed out. More emphasis is placed on establishing schools but not on what goes on inside the school resulting in high enrolment figure and equally high dropout rate.

The students compulsory have to attend the school and also have totake all the exams resulting in a sizeable number of students failing and compelled to repeat classes. These students lose hope and inculcate a senseof despair among the students, reducing the potential of their human development. The main reason for school dropouts and the failure of the school system is the quality of education and not the parental poverty and disinterestedness.

2) Defects in curriculum:

Present education system in India is teacher centric. In India education from times immemorial is quite expensive as it is related to gain and transmit knowledge. Information is the foundation on which knowledge rests was and is still limited. A teacher, together with a united set of books is the knowledge base, which anchors the education process is the active agent, who communicates the information to the students, who are the passive receptors of information. Learning by memorization is the most favoured method as the information transferred is highly confused and the

student is not entirely sure about the motive behind knowing all those contrasting facts is.

Curriculum-makers in India feel that maximum knowledge should be given to the children so as to catch-up with the other students in the advanced countries and try to include as much information and knowledge as possible in the curriculum. But it is to be understood that the capacity to understand the explosion of technologies does not grow equally fast among the children. So the main aim of children's education needs to be to 'promote concept formation and to enhance their capacity for theoretical built-up. All children are natural observers and they can construct their own explanations, but the children have a contrast experience from the educational system. Our education system waves of the children's mind and personality to develop. The knowledge imparted is not continuous and is distributed in sections and are arranged in the form of different pieces of syllabus. The information is fragmented, confused and jumbled.

In Indian education system, whatever is taught is linked with how it is taught and assessed. The examination system in India is perverted and discourages good classroom practices by forcing children to answer phony meaningless questions, and suppress the curiosity and expressions of the child from the early age only. Our present education system emphasizes on written questions based on trivial recall and exempts all activity-based learning. The curriculum framers ignore the fact that the natural learning process in children is far from linear. So the content taught cannot be determined by what has to be covered in higher classes, but by the children's ability to comprehend the concept at a given age.

Other major drawback is that the curriculum prescribed in thetextbooks to a great extent is irrelevant in context of rural people as the curriculum makers are from urban areas who believe that the rural children need to be taught to conduct their lives properly and only positivesituations from their lives should be interpreted. The fact that the rural children are much more conscious of the conflicts and complexities of life,far more knowledgeable about the natural world and rural children especially the tribal children, are aware of rich bio-diversity around them, which forms a part of their reality, is absolutely ignored.

There have been attempts to change the elementary school curriculum so that it would be child- centred, activity -based and joyful. But the changes were only makeover accompanied by song and dance without any radical restructuring in the content and design. Our education system is highly monopolistic rigid and controlled by bureaucratic departments resistant to change and are too inflexible to learn from the experiences of those working in close contact with the children.

3) The Teacher- most important resource:

The most important resource for quality education the teacher actually has the weakest voice in the matters of concern with primary education and occupies the lowest position in the hierarchy. The teacher along with the teaching responsibility has to bear the burden of many other assignments like census collection, conducting poverty surveys, to make people aware of the family planning programs, etc. this problem becomes more critical in village schools having single or at the most two teachers. There is insufficient number of teachers in many of the schools as there is no new recruitment, lack of requisite qualification for a teachers post, the number of female teachers is less which accounts to be one of the causes for low literacy rate. It is a serious problem if the teachers are academically less qualified and they have chosen teaching profession as the last option, also there is lack of motivation on the part of teachers. In addition the teachers are burdened with the classes having more children or different class sitting in one class which cannot be managed, their efforts are not recognized, miserable working conditions and above that their salary is very low due to which teacher tend to give up their jobs.

3.6 REMEDIES TO SOLVE PROBLEMS INEDUCATION

1) Quality Education:

Memorizing doesn't mean to learn and is the biggest flaw in our education system. Our testing and marking systems should be built to recognize original contributions, problem solving, in the form ofcreativity, valuable original research and innovation. Our education system rarely rewards those deserving highest academic accolades.

Quality education should be provided to the regular students or to the hearing impaired or slow learners, so that they meet their needs and enhance their skills and to get better employment options.

2) Government Funds and Private Capital:

The government cannot afford to provide higher education to all the people in the country as it is very costly for the government to do so. The share of GDP towards the educational sector need to be increased, which at present is 6%. Allowing profit making will encourage serious entrepreneurs, investors and innovators to take interest in the education sector. The government doesn't have enough money to provide higher education of reasonable quality to all, and it also has no excuse to prevent private capital from coming into the educational sector.

3) Powerful Central Body:

A powerful central body should be set up to govern all schools andshould have the power to make laws and regulations applicable to them. A standard medium and standard curriculum must be set by abolishing all other boards like state boards and other boards. Syllabus of standard medium should be based on the abilities of a child of a particular age that will be applied uniformly, but should not neglect local languages. The schools or institutions will be accredited by the governing body but will be free to make decisions for their smooth functioning within the bounds of powers granted to them. The central body will be solely responsible for the collection and management of the funds given by the central and state governments.

4) Inclusive Education System or Personalized Education:

Growth in education sector should incorporate all sections of society like rural, urban poor, woman Backward classes etc. However Indian education system is built on the presumption that if something is good for one kid, it is good for all kids. But it is not taken notice that somekids learn faster, some are comparatively slow, some are visual learners, some are auditory learners, while some learn faster from experience. If there is decentralization of education, there could be an outburst of new and innovative courses geared towards serving various niches of learners. Central regulation kills choice and stifles innovation too. As far as education is concerned there is close connection between availability of choices, profitability, entrepreneurship, de-regulation and emergence of niche courses and these are al interconnected.

5) PPP Model:

Public-Private sources and to encourage the active participation of the private sector in national development. It is more forcefully advocated when public resources are projected to be inadequate to meet needs.

6) Laying the Basic structure of Education:

The legislature should enact a legislation which lays down certain basic regulations in education in consultation with educationalists and all educational institutions across the country should follow it to solve most of the current problems with the education system in India. The legislation should aim to bring uniformity in education that is provided by various institutions.

7) Adoption of Technology:

Effective use of technological tools in teaching will solve many problems of infrastructure, quality, etc.

8) Education Policy:

Education policy should be updated frequently and should also cover personality development aspect and also imbibe cultural values and social services in students.

9) The International inspiration:

Curriculums should be reviewed and encouraged. “Give a man a fish and you feed him one day, teach him how to catch fishes and you feedhim for a lifetime.” There should be focus on Value Education, Personality Development, Extra Curricular activities and sports. Independent thinking, skill development, creativity, vocational training, entrepreneurial spirit, effective use of technology etc. should be encouraged along with practical based industry-linked curriculum..

10) Teacher Training:

As the teachers virtually hold the destiny of the future generations in their hands teachers training one of the most chaotic, neglected and deficient

sectors of India's vast education system needs to be taken care of.

11) Lack of effective policies:

The government has to take some strong steps against those policies that discriminate between sections of the society and have to put more effort to frame some effective policies to improve the Indian education system. the educational policies need frequent update.

12) Lack of Quality Teaching:

The teachers should be given training to target areas of learningthat can work on computer-aided teaching and technology led learning. Technology solutions that reduce the role of the teacher or remove them from the process will often face resistant. The teacher should continue to lead the classroom albeit with the aid or use the technology platform that is provided. Rules for continuous teacher quality upgradation system should be facilitated by the government. The teachers should not be burdened with works like administrative work, election work, etc. other than education work. Centralization of recruitment, training, incentive structure, promotions, etc. should be done.

13) Lack of Ethics and Transparency:

The corruption in the education system should be taken seriously and tackled. Recruitment of people with high ethical standards and right attitude should be done. Joint effort of government and examination regulatory bodies should tackle the problem of malpractices in exams efficiently.

14) Lack of Competitiveness:

To make the education system more relevant and upgraded, Innovation and research in the system is necessary. Educationalists, academicians and scholars should be encouraged to join policy making process of the government. Student Exchange Programs should be promoted.

15) Lack of Affordable Education:

Education should bring social equity be it in gender, castes or financial status. Inclusive Education System should be created and there should be regulation in fee structure by creating proper guidelines.

16) Redefine the purpose of the education system:

Even-though we have newly acquired skin of modernity, our education system is still a colonial education system geared towards generating babus and pen-pushers. The goal of our new education system should be to create entrepreneurs, scientists, innovators, artists, thinkers and writers who can establish the foundation of knowledge based economy rather than the low-quality service provider nation that we are turning into.

17) Take mediocrity out of the system:

Today's education system encourages mediocrity – in students, teachers and throughout the system as it is easy to survive. But if we want excellence mediocrity has to be discarded as an option. Hard work is always tough and the path to excellence is charged with difficulties. It is very much essential to make the path of mediocre people so difficult that excellence is the only output in students, teachers and on the whole the entire education system.

18) Change of Goal:

India's rote-based Board Exams are a source of the learning crisis observed in primary schools. The board exams that measure learningneeds to be corrected as the focus of students, parents and teachers is on maximizing marks and not learning or understanding. This can be changed and is not so difficult as there are so many exams that can serve as a benchmark for this change. There is a need to change the goal post by reforming board exams to test understanding and not recall.

Non-Government Initiatives

E-Vidyaloka, a non-profit organization, connects the rural learners and teaching volunteers through digital classrooms. The volunteers consist of a varied bunch like IT professionals, housewives and retired defence personnel. They organize Skype classes according to the availability of volunteers and batch sizes. The organization tries to properly channelize the supply in the sector where there is demand. However, frequent power cuts and poor internet connectivity in rural areasaffect the productivity of the classrooms.

3.7 SUMMARY

Rural education holds the key to solving many of India's primary problems like youth disenchantment, poverty and crime. Education has improved dramatically over the last three decades. Schools have become accessible to most children; both student enrolment and attendance are at the highest level. The RTE Act guarantees a quality education to a wider range of students. Still challenges in teaching and learning outcomes across all regional, cultural and socio-economic subsets prevent us from harnessing the true potential of vast human resource and keep the country educationally backward. We need teachers and students to adopt

computational learning as a way of life. The path involves active guidance by a master teacher, including giving students practice facing real problems, testing solutions, making mistakes, seeking help and refining approaches. Comprehensive dialogues between teachers and students delineate how reflection-in-action works, what boost it, and behaviour or attitudes that can avert the development of personality.

3.8 SELF-STUDY

1) Explain the concept of education.

2) Give the importance of education in human life.

3) What is the need of education in rural development?

4) What are the problems in education in rural development?

5) Suggest the remedies to solve problems in education.

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4

RURAL HEALTH-PROBLEMS AND REMEDIES

Unit Structure :

4.0 OBJECTIVE

1) To understand the concept of Health
2) To know the rural health problems and programs in India
3) To know the health care and health facilities in India
4) To know the importance of health awareness programs
5) To find the solutions to rural health issues

4.1 INTRODUCTION

Rural health is one of the vital elements of rural life. As more than 70% of the population lives in rural areas have unsatisfactory health facilities and the mortality rate due to diseases is at high risk. Rural health care is one of the gigantic challenges faced by the Health Ministry in India. Healthcare is the basic right of every individual, but lack of quality infrastructure, qualified medical functionaries and non-access to basic medicines and medical facilities prevent the facilities to reach the 60% of rural population in India. India being a nation of villages requires an intensive approach towards rural health. To improve the existing condition of health in rural areas there is need of new practices and procedures to ensure that quality and timely healthcare reaches the deprived sections of the rural society in India. Due to loopholes in implementation of the policies and programs run by the government of India the success and effectiveness of these

programs is questionable. Rural areas have been influenced by various contagious diseases like worm infestation, diarrhea, measles, amoebiasis, malaria, whooping cough, reproductive tract infections, hepatitis, tuberculosis, typhoid, respiratory infections and pneumonia. The diseases spread mostly because of the insanitary conditions in the households further aggravating by the lethargic conditions of the people and government. Even though the village level institutions take care of sanitation through its outreach services under ruralhealth care the Primary Health Centre (PHC), still it's a long way to upgrade our health system in rural areas. Primary Health Centre is the primary location for diagnosis and first referral of these patients. To overcome the present challenges there is need to strengthen the co- ordination between the primary and tertiary level institutions.

4.2 CONCEPT

The word "Health" refers to a state of complete emotional and physical well-being and health care exists to help people maintain its optimal state of health. Good health is central to handling stress and living a long and active life.

Facts of Health:

- In 1986, the WHO clarified that health is " A resource for everyday life, not the objective of living. Health is a positive concept emphasizing social and personal resources, as well as physical capacities."
- Health can be defined as physical, mental, social well-being and as a resource for living a full life.
- It refers not only to the absence of disease, but the ability to recover and bounce back from illness and other problems.
- Factors for good health include genetics, the environment, relationships and education.
- A healthful diet, exercise, screening for diseases and coping strategies can all enhance a person's health.
- In 1948, the World Health Organization (WHO) defined health as "Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity."
- It can be assumed that health is a resource to support an individual's function in wider society.
- Many researchers have defined health as the ability of a body to adapt to new threats and infirmities.
- Mental, Physical, Spiritual, Emotional and Financial health are the different types of health and are linked to lower stress levels and mental and physical well-being.

Mental and Physical health are the two most common types of healththat are discussed. Physical health is the one in which the bodily functions are

working at peak performance due to not only of lack of diseases but also due to regular exercise, balanced nutrition and adequate rest. Treatment is taken only when necessary to maintain the balance. Mental health refers to a persons emotional, social and psychological well-being. Both physical and mental health are linked are important for full andactive lifestyle. If a person is suffering from chronic illness his ability to complete regular tasks is affected leading to depression and stress. It is notpossible to avoid disease completely, but developing resilience and preparing the body and mind to deal with problems that may arise is a stepto be taken.

4.3 RURAL HEALTH PROBLEMS IN INDIA

As it is seen 75% of the healthcare infrastructural facilities are concentrated in the urban areas but only 27% of the population resides there. The remaining 73% of the population lives in rural areas lacking primary healthcare facilities. The rural healthcare sector in India is characterized by lack of qualified and quality staff, unavailability of necessary medicines and adequate infrastructural facilities, patients are still in the hands of phony doctors and unscientific medical practices. The villagers have to travel a long distance to get medical treatment to the nearest hospitals in case of emergencies and private transport is only available which many of them can't afford. There is a steady growth in private healthcare facilities but, there is a serious deterioration in the quality in the public healthcare sector.

Factors affecting the rural healthcare sector:

Indian rural community opts for government healthcare facilities due to monetary issues and unaffordable transport options to the urban centres.

The most important factor is turning a deaf ear to the patients or their relatives and due to poor literacy their innocence is exploited and are not allowed to know their rights. Most of the centres in the rural areas are run by unskilled or semi-skilled paramedics. Rural people get easily cheated by a group of health workers and middlemen if the patients are sent to the tertiary care hospital in case of uncontrolled situation. Unavailability of the basic medicines in rural areas is a constant problem of India's rural healthcare.

Other than the above factors the other factors affecting the rural healthcare sector are as follows:

1) Infrastructure: Lack of adequate infrastructure is the biggest concern for the rural healthcare system as they are under-financed, use of low quality equipment, inadequate supply of medicines and lack of qualified and dedicated human resources. Under-developed roads, railway network and poor power supply make it difficult to set up a good rural healthcare facility.

2) Doctor: The rural healthcare infrastructure has a three-tier system having a sub-centre, a PHC and a CHC. There is shortage of doctors and trained nurses in rural areas as a result patient is not always treated on time in rural India.

3) Insurance: Rural healthcare lacks insurance facilities and India has one of the lowest per capita healthcare expenditures in the world.

4) Affordability: Health has becoming increasingly costly, with the advancement of technology, high cost of diagnostic facilities and the commissioned charges. There are limitations on the people as they cannot afford the heavy costs of the health services when they visit private hospitals.

5) Unavailability of medical stores: Supply of basic medicines is not regular and are often unavailable in rural areas.

6) Lack of awareness: There is lack of awareness about proper healthcare in India. People need to be educated on the importance of sanitation, health and hygiene, nutrition, healthcare policies, their rights, importance of medical services, need for proper waste disposal facilities, financial support options, medical insurance facilities.

4.4 HEALTH CARE IN RURAL AREAS

Healthcare is the right of every individual but due to lack of quality infrastructure, qualified medical functionaries; access to basic medicines and medical facilities does not reach to 60% of the population of India. The key challenges in the healthcare sector are low quality of care, poor accountability, lack of awareness and limited access to the medical facilities. Awareness is about developing an understanding of one's mental health needs and the potential to be vulnerable to further episodes of mental illness. Awareness is a developmental process. Awareness is a complex and individual learning process that involves a growing understanding of the self and the place of mental illness within the self-identity. Awareness is a paradox of acknowledging potential vulnerability to future illness, while maximizing mental health and not being constrained by a mental illness sick role. Awareness is strongly influenced by attitudes toward mental illness in the community and in services. Awareness comprises a general understanding of one's mental health, but also more specific knowledge of risk and protective factors for mental health. Support to develop awareness can be provided through psycho-education, peer support, and the help of others such as family and carers who can learn to read the early warning signs and communicate this knowledge to the person who is not able to do so.

People take time to develop awareness, and some people may take a considerable period of time to do so. This can be challenging for families and care takers, as well as for service providers. Lack of awareness can be due to incomplete or inappropriate treatment, whereby continuing symptoms interfere with the development of awareness, and this may require change to a more effective treatment approach. Some people are reluctant to develop awareness as a result of a range of personal, social and cultural barriers, and the use of motivational interviewing may be helpful to understand and overcome these barriers. For other people, the denial of awareness is an important coping mechanism at that time, which is a choice that needs to be respected when it is not harmful.

There is a need of new practices and procedures to ensure that quality and timely healthcare reaches the deprived corners of the Indian villages. Due to gaps in the implementation of the government policies and programs the effectiveness and success of these programs and policies is questionable. Maternity deaths in India are also in large numbers of which majority are in rural areas where rural healthcare is poor. A majority of people in India go to local private health sector as their first choice of care due to non-accessibility to public healthcare and low qualityof health care services. But, private healthcare is expensive, unaffordable by low income rural folks, unregulated and variable in quantity.

To control the spread of diseases and reduce the increasing mortality rate and provide adequate health facilities, special attention should be given to the health care in rural areas. Various organizations have come forward to improve the healthcare and technology plays a crucial role to facilitate this. Many solutions for the successful implementation of these changes are provided by the Information and Communications Technology.

Technology and Rural Health:

Many organizations are working alongside the Government and NGOs to relieve the burden on the public health system by using mobile technology. Leading Global Organizations of healthcare industry are using mobile technology to enhance the quality of care and bridge the gaps in the healthcare services.

Gram-vani provides cutting-edge mobile and IVR solutions to automate processes and applies best practices in the field. It provides services to healthcare sector, social sector and corporate organizations to connect the markets in the remotest areas. It has built simple technologies on mobile to suit the needs of different sectors of the society. Mobile and IVR services give an extensive reach across the demography to enhance the quality of care and bridge the gaps in healthcare services in rural India.

Improving Healthcare on the ground:

With the use of mobile technology many healthcare projects and quality of maternity healthcare in India is upgraded as patients perception of quality of care and satisfaction with care are critical to utilization of health services. By using this technology women are made aware of their rights to demand good quality of care, accountability is brought by highlighting lapses in the health delivery process and there is increasing uptake of appropriate health services at the right venues.

Mobile technology helps to encourage the members to engage and share their stories with each other and also to demand grievance redressal and accountability from the health system.

Campaigns for healthcare accountability are organized on mobile vaani to understand the present scenario of health facilities, to identify major issues that people face while going for health services, to review thecondition of PHC infrastructure and its connectivity to nearby villages and to build awareness regarding personal and family healthcare. Other social campaigns on mobile vaani platform are conducted to identify, understand and get solutions for public problems and social issues.

The campaigns are active discussions wherein the community members contribute their views about different issues and these discussions are then converted into manageable threads.

Gram Vaani Technology for Advanced Healthcare System Delivery:

Gram Vaani was started in 2009 with the intention of reversing the flow of information to bottom-up instead of top-down.

v Survey: A questionnaire containing multiple-choice questions, quantitative input questions are created and qualitative audio recordings are done that are broadcast to different contact groups like ASHA workers (community health workers), AWWs (Aanganwadi workers)

vInform: ASHAs or AWWs are able to send messages on best practices that are to be followed during ante-natal care, danger signs to look out for, and ensure that they take expectant mothers for institutional delivery.

vAnswer: It is an extension to vInform technology useful for ASHAs and AWWs where in if they have any questions or concerns, they can record their message which can be answered by experts live or through recordings over the phone.

Gram Vaani work with organizations all across India and other developing parts of the world.

4.5 HEALTH FACILITIES IN RURAL AREAS

The poor state of the health system in rural areas is not the outcome of a particular occurrence but a consolidated outgrowth of degraded system. Poor health system not only signifies lacunae in the existing policy and infrastructure but blockage in potential development also. The expenditure on public health is ignored by both the state and common man also. In view of common man spending on public health is useless as they think the quality of treatment and medicines in government hospitals is degraded. Moreover the common man's investment in health in private practitioner and private hospitals has worsened public health system in India. The setback and frustration along with the growing ineffectiveness of the government sector has driven the poor sector people to seek help from the private sector.

Inefficient Physical Infrastructure: The sub-centre (SC) the most peripheral institution is the intermediary contact point between the Primary Health Centre (PHC) and the community. The sub-centres should take care of basic health needs of the people in its vicinity. PHC provided integrated curative and preventive healthcare to the rural people laying emphasis on preventive and primitive aspects. Community Health Centres (CHC) at upper level provides comprehensive coverage of health care to the patients referred from the PHC. Above all poor infrastructure of the hospitals is a serious concern.

Underutilization of existing rural hospitals: The rural hospitals lack efficient health infrastructure in rural areas on one hand and on the other the available infrastructure is not utilized by the people. Despite the availability of comparable medical services rural patients ignore the local rural hospitals. The rural people often opt for urban hospitals fit for any kind of hospitalization resulting in the closure of rural hospitals or they are open but without any patient. It is seen that the public doctors quiet often provide private services instead of going to their designated centres.

Inadequate Human Resources: The rural public health facilities face the problem of inadequate manpower across all cadres in the rural health system. Unavailability of trained doctors and medical professionals and absenteeism of the available staff have paralyzed the rural health facilities. The fact that there is certainly a serious lack of dedicated administrative action towards providing effective service attributes to the frequency of absenteeism.

Apathetic Attitude of Medical Professionals: Most of the medical practitioners neglect the Primary Health Care system. doctors in primary care centres have less competence and make less effort than staff in the private hospital sector. The medical education does not prepare the graduate to function effectively in the rural areas. Students who have paid heavy fees for private medical education, prefer to pursue their career in such places where they can recover their investment (the fees).

Dominance of Unregulated Private Medical Professionals: The insensitivity of public doctors leads to unregulated private practitioners in health sector. Amongst them some are fake allopathic doctors in rural areas, actually having no medical training. This generation of unregulated and unqualified private providers demands an effective regulatory system.

Non-Preparedness to Fight with Epidemic in Rural Areas: The rural health system lags behind in its responses to pandemic eradication. Most of the epidemics like Dengue, Diarrhea, Malaria, Cholera, Pneumonia in rural areas are not controlled through proper vaccination policies as a result hundreds of people die. Government hospitals lack the adequate facilities that deal with the cases of different epidemics and deadly diseases. In many places the hospitals are understaffed and even lack basic healthcare facilities like beds, X-ray machines. Encephalitis is one such that has crippled the government efforts to control its expansion in rural areas. it is estimated that around 20% of the Indian population is not covered under the vaccination coverage.

High Neonatal Mortality: The death of infants till the age group of 5 years is alarming in rural areas. This frequency of infant deaths among 1 year old is 51/1000 live births. The causes for these deaths are supposed to be premature birth, low weight, trauma, birth asphyxia, etc. This problem is corroborated by malnutrition of children and their mothers. Social factors also contribute towards the neonatal deaths. Several female infant deaths occur due to the gender bias towards infants. Along with BIMAROU states Andhra Pradesh, Karnataka and Maharashtra are the worst faring districts in terms of infant mortality rate. Child mortality rate is much higher among Scheduled Tribes (STs) than other social groups. Infant Mortality Rate (IMR) is not a problem of one or two states but of majority of the states that downgrades India's position in terms of global ranking of IMR.

Inequitable Immunization: The government-run immunization programs are also not equity-based. Particularly households in the districts having civil disturbances and inaccessible territory or region have very poor access. Poor access to health services among the STs is partial. The reason is that they live in remote rural and forest areas having inhospitable region wherein medical facilities are often unavailable. Even if the medical facilities are available absence of healthcare providers is high as a result monitoring becomes difficult.

Inclination towards Home-based Deliveries: The maternal mortality is still a hindrance in the advancement of rural health. The pervasiveness of home-based delivery leads to frequent deaths of pregnant women. Most rural women opt for home deliveries due to poor access to and low quality of healthcare in the maternity centres.

Lack of coordination between Medical Research Institution and Health Service Delivery Institution: It is perquisite that there should be coordination and cooperation between different research centres and health service delivery institutions in India. The medical research

institution should update the technical knowledge of existing medical professionals. Along with diagnosing the disease, the medical research institution should formulate epidemic response plan and also can help in indigenizing global technologies and ensure its availability at economical rate by partnership development between the community, health service providers and the government.

Lack of Community Participation: Many a times it is seen that the rural health system is disconnected from the rural masses requirements. The demands of community in terms of treatment, diagnosis, prevention of various diseases, etc. are ignored resulting into pandemic. Lack of coordination with the locals leads to ineffective monitoring of disease and maintaining hygiene and sanitation. Therefore it is necessary to involve the community in designing, staffing and functioning of local primary healthcare centres and in many other forms of support.

4.6 SOLUTIONS TO RURAL HEALTH ISSUES: RURAL HEALTH CARE PROGRAMS

Government has taken many steps to institutionalize the existing rural health framework. Many strategies and missions have been initiated by the government to improve the rural scenario.

National Rural Health Mission (NRHM):

NRHM was started in 2005 to address infirmities and problems across primary health care and bring about improvement in the health system and the health status of rural people. NHRM works on the principles laid down in the national and state health policies and the vision of Millennium Development Goals by providing accessible, affordable, effective, accountable and reliable healthcare to all the citizens in particular the poorer and vulnerable sections of the population. NRHM is a scheme of central government to improve the provision of basic healthcarefacilities in rural India by making changes in the existing degraded healthcare delivery system and by promoting good health through improvements in nutrition, sanitation, hygiene and safe drinking water. Through NRHM, the unit level health care centres like PHC, SC have been strengthened. Various PHCs have been transformed into 24X7 PHCs with proper medical facilities. In addition, the patients have been linked with mainstream health system through a wide network of ASHA workers across the country.

Janani Suraksha Yojana (JSY):

Janani Suraksha Yojana is a flagship programme of Government of India under NRHM which is intended to promote institutional delivery to reduce maternal and neo-natal mortality. It provides cash incentives for women to deliver in a government or accredited private medical facility. Under JSY, the ASHA workers work as interface between rural health system and community and increase cases of institutional deliveries through escorting pregnant women, proper medical facilities for ante-natalcare.

Health Insurance through Rashtriya Swasthya Bima Yojana (RSBY)
Rashtriya Swasthya Bima Yojana (RSBY) launched in 2008 is one of landmark schemes in the area of Rural Health offering a micro-insurance product for households designated as "below the poverty line (BPL)" and aims to cover up to 60 million households throughout the country. The objectives of the RSBY are to provide financial protection for households affected by major health shocks and improve health outcomes for poor households. RSBY insures BPL families for hospitalisation costs and allows them to choose between public and private hospitals. Beneficiaries must pay a nominal registration fee while the cost of premium payments is shared by the central and state governments.

The beneficiaries under RSBY are entitled to an insurance cover of INR 30,000 for most of the diseases that require hospitalization. The Government has fixed package rates for medical and surgical interventions, or procedures, for a large number of interventions. Pre-existing conditions are covered from day one and there is no age limit for the insured. Coverage extends to a maximum of five members of the family which includes the head of the household, the spouse and up to three dependents. The scheme places control over a significant amount of resources in the hands of the beneficiaries. Every BPL household is now a potential client from whom the hospitals can earn significant revenues if they can get themselves empanelled and provide quality health care

Mobile-based Primary Health Care System:

The Mobile-based Primary Health Care System initiated in 2005 is having crucial role in the area of rural health as it uses a mobile phone to transmit a person's vital signs. . Primary health care services based on mobile devices ensures improved access to primary healthcare. The health professionals remotely monitor patients suffering from chronic diseases across the country offering a wide range of services such as health education, promotion of nutrition, basic sanitation, the provision of mother and child family welfare services, immunization, disease control and appropriate treatment for illness and injury.

Initiative has been taken by a Bangalore-based firm called Centre for Development of Advanced Computing (CDAC). The Software components under the development are Patient Database management, Interaction between doctor and a patient, capture of Medical data acquisition- such as ECG, images of heart, lung, eye etc. and Scheduling management. It also provides development of Localization Support in national and other Indian languages in mobiles by providing interface for translation.

Indira Gandhi Matritva Sahyog Yojana:

Indira Gandhi Matritva Sahyog Yojana (IGMSY) aimed to encourage women to follow Infant and Young Child Feeding (IYCF) practices including early and exclusive breast feeding for first six months was started in 2010. IGMSY a centrally sponsored scheme was implemented through the state ICDS Cells with 100% financial assistance from the ministry of Women and Child Development. This scheme promotes the

demand for cash transfers to all pregnant women and lactating mothers in selected districts and also promotes the demand for mother and child care services through providing incentives based on fulfilment of specific conditions. Registration within four months of pregnancy was the first milestone to receive cash benefits of Rs. 1500/- at the end of 2nd trimester and every registered mother would have a Mother and Child Protection Card under IGMSY. The scheme would also ensure accessing provisions for counselling, iron and folic-acid supplements that are vital for the health of both the mother and the child. IGMSY would strive to ensure the maximum immunization of every pregnant woman in close collaboration with the health workers. Research studies all round the world shows that globally, the universal practice of exclusive breastfeeding for the first six months of life reduces young child mortality rate by 13%. Under the complete supervision of Auxiliary Nurse Midwife (ANM) the Accredited Social Health Activists (ASHA) would support all health related interventions under the IGMSY in coordination with the Anganwadi Workers (AWWs).

4.7 SUMMARY

As more than 70% of the population lives in rural areas haveunsatisfactory health facilities and the mortality rate due to diseases is at high risk. Rural health care is one of the gigantic challenges faced by the Health Ministry in India. India being a nation of villages requires an intensive approach towards rural health. To improve the existing condition of health in rural areas there is need of new practices and procedures to ensure that quality and timely healthcare reaches the deprived sections of the rural society in India. Due to loopholes in implementation of the policies and programs run by the government of India the success and effectiveness of these programs is questionable. The word “Health” refers to a state of complete emotional and physical well-being and health care exists to help people maintain its optimal state of health. Factors affecting rural health care system are infrastructure, doctor, insurance, affordability, unavailability of medical stores, lack of awareness, illiteracy and unavailability of basic medicines, etc. Various organizations have come forward to improve the healthcare and technology plays a crucial role to facilitate this. Government has taken many steps to institutionalize the existing rural health framework. Many strategies and missions have been initiated by the government to improve the rural scenario.

4.8 SELF-STUDY

Q - 1Write Short note on Rural Health in India. Q - 2 Explain the Concept of rural health in India?

Q - 3 What are the Rural Health Problems in India?

Q - 4 Give an account of the Health Care in Rural Areas.

Q - 5 Answer in detail about the Health facilities in rural areas?Q - 6 What are the Solutions to Rural Health Issues?

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5

DEVELOPMENT OF INFRASTRUCTURE

Unit Structure:

5.0 OBJECTIVES

1. To study the rural basic infrastructures
2. To study the problems of the poor and strategy for sustainable development
3. To know the importance of rural infrastructure in rural development
4. To understand the concept of rural infrastructure
5. To know the role of infrastructure and its development

5.1 INTRODUCTION

Infrastructure plays a crucial role not only for the country's economic growth but also in the progress of human development. Rural areas account for a larger part of the geographical area in India. Census 2011 reports that there are 6.4 lakh villages in India, which shelter more than two-third of the country's population. It has been a major problem to provide basic infrastructure facilities to this large section of the population, which is spread across 3.28 million square kilometer of the country's geographical area. The developing countries having low income have many rural infrastructural deficiencies despite having a large variation in the rural infrastructure. The deficiencies in rural infrastructure in transport system, energy, telecommunication, etc. leads to poor functioning of the other related infrastructural facilities. It is very true that

the development of rural infrastructure promotes growth and poverty alleviation and the economic rates of return to the investments are also high.

A country's prosperity depends upon the countries agricultural sector, its market and development in the industrial sector. Electricity, supply of finance and transport facility, machines, tools and implements, skilled workers, energy, market place are all important and all the above said facilities are called as the infrastructures of the economy. The infrastructure facility is very important from the point of view of development of the country. India being land of villages developing India means developing the Indian villages in reality. Infrastructures play an important role in rural development as transport and communication connect the villages to the market areas, and energy & irrigation are necessary for agriculture and village industries. Scientific development, information technology mobilizes the development of agricultural industries. Development of human resources depends on the education and health facilities provided. Investment in rural infrastructure is the need of today. Planning commission realized the need of the hour and from the first five years plan it decided to make an increase in the investments in rural infrastructures. Increase in the investment in countries infrastructure is seen as per the necessity.

Social and economic infrastructure is very important in the rural development. Development is faster due to the infrastructural facilities. Rural infrastructure plays an important in the development of human resources - To reduce the rural backwardness, Development of human resources, Increase, in the momentum of production factors, For the development of the agricultural sector, Momentum to the rural industrial sector, Decrease in the poverty, Social and Cultural progress.

5.2 CONCEPT OF RURAL INFRASTRUCTURE

Rural infrastructure plays an important part in the economic and social development of the country. Basic infrastructure is the capital of the society. It is difficult to define social and economic infrastructures because of their flexibility. Paul, Rosenten, Reigner, and Narks have defined social and economic as 'Investment done in the work which is socially beneficial'. Those social investments that are indirectly beneficial to the production processes are termed as basic infrastructure. Rural infrastructure directly does not produce goods but create a favorable condition for raising the economic level.

To achieve the goal of rural development, to gain momentum in the development process rural infrastructure plays an important part. Social and cultural development also depends on the infrastructure. After adopting the concept of welfare state government is making a large investment in the rural infrastructure. By adopting the policies of privatization, liberalization and globalization since 1990 private sector is investing on large scale on the infrastructure. Due to which there was a drastic change in the infrastructural facilities. Following factors are included in the rural infrastructure:

1) Public Amenities-

a) Electricity for the agricultural and industrial sector.

b) Transport and communication – indivisible factor of the d evelopment process.

c) Supply of drinking water through taps for people's health.

d) Disposal of filth and waste matter for health and cleanliness.

2) Public construction-

a) Construction of roads for the transport of agricultural produce, raw material and finished products from the industrial sector.

b) Irrigation projects to supply water to the agricultural sector.

3) Public transport service-

a) Transport is one of the important factors of the basic infrastructure. It includes road transport, railway transport, waterways and airways. Transport service is very essential for transporting the agricultural produce to the market. Economic and social development takes place because of transport service.

Q1. Explain the concept of rural infrastructure.

5.3 ROLE OF RURAL INFRASTRUCTURE IN RURAL DEVELOPMENT

In any country, infrastructure plays a very important role in supporting nations economic growth. Typically, rural infrastructure assumes great importance in India because of the country's predominantly rural nature and the crucial linkages of rural infrastructure to economic growth, poverty alleviation and human development as a whole in the country. In fact, as per Census 2011, there are 6.4 lakh villages in India, which shelter more than two-third of the country's population. In such a scenario, the role and importance of rural infrastructure in India cannot be negated.It is to be noted that rural infrastructure includes irrigation, rural housing, rural water supply, rural electrification and rural telecommunication connectivity. In general, rural infrastructure can provide basic amenities that improve the quality of life of the rural people.It is also very crucial for agriculture and agro-industries. The rural road infrastructure can provide mobility and connectivity to more than 800 million people living in rural areas. Rural road infrastructure can help in eradicating poverty in rural areas as it can provide better livelihood to people and better access to education and health services and other basic services.

Rural electrification infrastructure can very well cater to the requirements of agriculture and other activities including irrigation pump sets, small and medium industries, khadi and village industries, cold storage chains, healthcare, education and rural IT. Rural water supply system

infrastructure can lead to sustainability of systems and sources and tackle the problem of water quality, thereby, increasing good health of people. Rural housing infrastructure can improve the living standard of thepeople. Development of rural power, irrigation, water, sanitation and road infrastructure can increase productivity, savings, income and tourism and result in better jobs and health of rural people. Thus, better infrastructure has the potential to promote overall growth of the rural community and impact the country's economy as well.

Q. Answer in short - The role played by rural infrastructure in rural development

5.4 TRANSPORT & COMMUNICATION

Transport:

Rural road connectivity is not only the key component of Rural Development in India, but also recognized as an effective poverty reduction program. An improved accessibility to all quarters of a village is an indispensable prerequisite for the provision of adequate living conditions in rural areas. The interdependency in change of land use and transportation is not promoted in rural areas and this keeps the economic system inactive in these areas. The absence of roads in rural areas leads to stagnation of socio-economic conditions of the villagers.

The network planning should promote the objectives like accessibility and connectivity to most of the places in the region. A proper skeleton of road network will create a promotional impact of land use activity. Transportation is the movement of people, animals and goods from one location to another. Modes of transport include air, rail, road, water, cable, pipeline and space. Transport is important because it enables trade between people, which is essential for the development ofcivilizations.

Road ways:

A road is an identifiable route, way or path between two or more places. Roads are typically smoothed, paved, or otherwise prepared to allow easy travel, though they need not be, and historically many roads were simply recognizable routes without any formal construction or maintenance. In urban areas, roads may pass through a city or village and be named as streets serving a dual function as urban space easement and route. Road transport offers a complete freedom to road users to transfer the vehicle from one lane to the other and from one road to another according to the need and convenience. It is possible to provide door- to - door service only by road transport.

Rail Transport

Railways are an important means of land transport. The India railway system is today the largest in Asia and the second largest in the world. The Indian railways carry crores of passengers and heavy and bulky goods from one part of country to another. Railways connect all the important

towns and cities. Railways provide a cheap and fast means of transport. In many times of crisis, such as floods, famines and wars,railways carry men and materials to places where they are most needed. Inbig cities, we have local train service also. Kolkata is the only city in our country, which has an underground railway system, called the Metro service. Freight trains traditionally used boxcars, requiring manual loadingand unloading of the cargo. Railways have directly or indirectly have created employment opportunities throughout. Transport of goods has become easier from different parts of the country. It has resulted in the growth of industrial sector in the country.

Air Transport:

Aero planes are the fastest means of transport. All our major cities are connected to one another and to almost every part of the world throughair transport. Air transport has made not only our country but also the entire world very small. Helicopters and Aeroplanes are pressed into service in times of floods, other natural calamities or accidents. However, air travel is expensive. It is also not possible to transport heavy and bulky goods by air. The development of fast means of transport has increased thetrade not only within the country, but also between different countries of the world. It is now possible to buy goods produced in other parts of the country, and the world, from our local market.

Water Transport:

Ships and boats are means of water transport. Ships sail in the oceans and seas, carrying all types of goods from one part of the world to another. India has many ports along its long coastline. Steamers and boats sail along big rivers carrying passengers and goods from town to town, along their banks in India. Big rivers like the Ganga and Brahmaputra are used extensively as an inland means of water transport. The backwaters of Kerala are also widely used for water transport. Water transport may be slow as compared to road, rail or air transport but it is a cheap way to transport bulky goods over long distances. In the same way water transport is carried out through rivers, lakes, canals, creeks.

Q. Explain the various modes of transport.

Information and Communication technology:

Since early 90s Information and Communication Technologies are playing a pivotal role in the development process. In the globalization era, India using ICTs to promote their development programs as well as reaches the poor to strengthen their livelihood.

Technology is a double- edged sword in present days. It has become a part of life and livelihood of the people in the country. In the 20 th century, rapid technological advances led to rising standards of living, literacy, health and life expectancy. The promise of Information and Communication Technologies (ICTs) for the 21st century likewise presents both opportunities and challenges. ICTs, like all technologies, are

tools. In the era of globalization information revolution and the extraordinary increase in the spread of knowledge have given birth to a new era- one of knowledge and information that affects directly economic, social, cultural and political activities of all regions of the world, including India.

In easy terms ICT is defined as technologies that facilitate communication, processing and transmission of information in the electronic format. The progress of any market mainly depends on the access to information. The Information and Communication Technologies (ICTs) greatly facilitate the flow of information and knowledge by presenting the rural consumers extraordinary opportunities to attain their own entitlements. There is a comprehensible relationship between ICTs and the rural consumer empowerment. ICT can be used as an effective tool for rural consumer empowerment. The rural consumer acting solely will be able to obtain the information they require once they have access to Internet. The knowledge obtained is sufficient to begin the process of identifying and mobilizing proper information resources. It can be used to create the demand that will generate the detailed information requirements necessary for the construction of useful information system.

Beneficial for the farmers:

One of the benefits of ICT lies in providing timely and accurate information. Now the rural consumer can get information about the weather, including monsoon and threat of floods and other natural calamities. It reduces the farmer's dependence on uncontrollable natural factors and also allows them to plan their crops accordingly. It acts as a warning signal and helps the farmers to avoid risks. ICT has remarkable potential to make the information available at the right time thereby empowering the rural consumer. It is considered as the lifeline of economic and social development of the rural consumers.

Hindrances in implementing ICT in rural areas-

a) Due to lack of awareness about information technology and illiteracy it can be a hindrance in implementing ICT in rural areas

b) Inadequate, inconsistent and unpredictable power supply in the rural areas poses a serious threat to efficiency of ICT.

c) Non-accessibility of secure, robust and economical broadband connectivity in rural market continues to hamper the growth of ICT.

d) Poor people and disadvantaged group like women may have restraint in the use of ICT for their specific purpose.

e) Software packages and content not in local language is another hindrance for rural consumers as most of the rural consumer are not comfortable in English language.

f) Short lifecycle of IT assets due to high rate of depreciation and obsolescence is another factor acting as a threat to the viability of ICTs.

Developing ICT for Rural Consumers-Planning and Implementation:

Assessing the information needs are very essential elements in the context of ICT for rural consumers. The marketers and software developers should keep in mind wide range of resources and applications of ICT that are of potential use to the consumers. Actually it is the information that has direct impact on the demands of the rural market so it is of paramount importance that any applications should be developed only after an accurate assessment of the needs and wants of the rural consumers. The organizations have to use rapid and participatory rural appraisals and other survey instruments to ensure timely and accurate information about the rural market. These tools could be used in the context of ICT initiatives. Once the information needs of the consumers are assessed, marketing plan and software applications should be developed with continuous involvement and feedback from rural consumers. For effective utilization of information about the rural consumers, the information has to be divided into different information networks and organized accordingly. The working group of the ministry ofIT recommended computer education at the block level by establishing computer education amenities in rural areas. This is a segment where investment is required incessantly in order to improve the educational standards of the rural consumer.

Initiatives for rural consumers need to be approached with a measure of carefulness. The challenge is to help build the capacity of market intermediaries or assist in the establishment and promotion of consumer information centers. To achieve sustainability marketing strategy must deal with the real needs of the rural consumers. The rural youth has to be given a major place in the whole plan. Training the youth to broaden the concept of ICT successfully is very essential. It should be made mandatory for the sarpanch to be computer literate. Software packages in local languages need to be developed to have a wider usage ofICT by rural consumers. Incentive should be provided to encourage the rural consumer to adopt the program. The Panchayat can propose the names of few persons to get training in information technology. There is also a gender dimension to the information needed. For instance, quite often women require specific health related information. The position of women has to be dominant in the villages. Rural women have proved their mettle in many endeavors like in the development of cooperatives and SHGs (Self Help Group). The women have to assume larger responsibilities, as they are the promoters of tomorrow's citizens. The rural consumers should have a sense of ownership of the knowledge management centers; otherwise it will be difficult to sustain them.

The ICT network should include information on preventive health issues, to prevent any possible spread of epidemics and other diseases. Ministry of Information technology (MIT) has also initiated a development project on telemedicine in association with leading medical institutes. Community radio and the All India Radio can be of immense help in communicating up to date information to those who will benefit from it. In order to reach to the bottom of the pyramid level an integrated ICT system is of supreme

value. It is very important that the content be made available to the rural consumer in their local language so that they decipher the content easily. Mobile phones can be also used as a potential source of growth. Mobiles allow communication to bridge the digital divide by leapfrogging and breaking the hierarchical pattern of technology diffusion. Short message Service (SMS) can be used to deliver a wide range of information to rural consumers like crop prices, weather patterns, utility services etc. Panchayat are the movers of rural economy. To promote ICT in rural market, the best way is to make panchayat IT savvy. The development of online panchayat will lead to efficient selling and distribution of crops. With the availability of the Internet in rural market, the procurement process can be reorganized. The requirement of the middlemen will be reduced to a great extent. Farmers can deal with the end users like the industrial buyer and consumers directly. It will bring about synergy of farmers and manufacturers and equally benefit them. Farmers will receive more value and the industrial buyer will enjoy less cost and better quality of agricultural products. This will make panchayat hub of distribution and selling in the rural market and thus can protect the farmers from exploitation.

One of the important methods is by arranging seminars at the village level. Education is the moral fiber of any state. In this regard, exclusive programs and television channels are dedicated to, direct the education chapters. This has become possible in rural areas as they cannot leave the daily employment and come to nearby towns to avail education. In this regard, educational programs on television are a forward step. Some private companies have been extremely successful in implementing ICT in villages. It has brought about exceptional transformation in the rural market and is helping to lessen the rural seclusion. It has led to more transparency for farmers and improved their productivity and incomes. It demonstrates that a large corporation can play a major role in organizing markets and increasing the efficiency of an agricultural system in ways that benefit both farmers and stakeholders.

The rapid expansion of Information and communication technology will significantly improve the living standards of the rural consumers. The need to carry out research on implementation of ICT inthe rural market is of utmost importance. The application of ICT in various sectors of rural market such as education, health, agriculture, farming and rural economic development will definitely accelerate the rural growth. Despite the fact that ICT has significantly entered into all aspects of our lives, impact of ICT in rural areas is very limited. The answer therefore lies in effective transfer of funds from the urban areas to the rural areas to initiate the development in the rural areas. At the same time the attitude of rural consumers also needs to be changed as they thinkthat developmental work is the task of government only. It can be observed that at the village level, where the panchayats are given money for various projects and they get the work done by villagers by paying them meager amount. They are thus exploited because of illiteracy and general ignorance. Hence the slogan of consumer involvement works only when the villagers see some tangible

benefits. We can infer from our experience that a close and continuing association between information providers and consumers is essential for effective information delivery.

Q. Explain the different means of Communication.

5.5 RURAL HOUSING AND RURAL ELECTRIFICATION

Access to energy is a cornerstone for development and for a better quality of life. If there is no access to energy it has negative impact on all aspects of life like education, health, employment and irrigation. Now India is at the peak of energy transformation, leading the global progress in electricity access. Half a billion people gained access to electricity in India between 2000-2016, increasing the share of grid-electrified households from 43% to 82%. Several new efforts are underway at the central and state levels with the goal of achieving universal household electrification in order to meet the rapidly increasing demand of electricity. The Planning Commission's strategy for the development of rural India and the United Nation's Millennium Development goals depends on the integration of electricity services to achieve a set of varied development goals.

A new proposed definition of village electrification came into effect in the year 2004 - 05:

1) Basic infrastructure such as Distribution Transformer and Distribution lines are provided in the inhabited locality as well as the Dalit Basti / hamlet where it exists. (For electrification through Non-Conventional Energy Sources a Distribution transformer may not be necessary).

2) Electricity is provided to public places like Schools, Panchayat Office, Health Centers, Dispensaries, Community centers etc. and

3) The number of households electrified should be at least 10% of the totalnumber of households in the village.

Rural Electrification in India:

After the independence the need for extension of the electricity system to rural areas was felt. The Rural Electrification Program was launched in India with two distinct dimensions a) Village Electrification and b) Irrigation Pump Set Energization. The prior enhances consumer satisfaction and the latter optimizes crop yield. The main sources of funding for the rural electrification are a) The Rural Electrification Corporation b) Plan Allocation to the states c) Funds support from Government as loan and grant d) institutional financing bodies like Commercial Banks e) International financing agencies like OECF, etc.

Rural Electrification Corporation (REC):

The Rural Electrification Corporation (REC) was established in July 1969 as a public sector undertaking with the main objective to finance Rural

Electrification (RE) schemes and promote rural electricity cooperatives for funding rural electrification projects across the country.

The main objectives of REC are:

i) To subscribe to special rural electrification bonds issued by SEBI on conditions to be imposed from time to time.

ii) To promote, develop and finance viable decentralized power system organizations in cooperative, joint, private sector, panchayat and/or local bodies.

iii) To finance and /or execute works on small, mini and micro generation projects, to promote & develop other energy sources and to provide financial assistance for leasing out the above sources of energy.

iv) To administer the money received from the government and other sources as grants.

v) To promote and finance rural electricity cooperatives in the country.

vi) To finance survey and investigation of projects.

vii) To promote, organize or carry on the business of consultancy services and/or project implementation in any field of activity engaged in India and abroad.

Major Rural Electrification Schemes in India:

Rural Electrification is the backbone of rural economy and also a basic input for rapid rural development. It is the main infrastructure for ensuring rapid growth of agricultural sector and agro-based industries in the rural areas. Some of the rural electrification schemes implemented are as follows:

Pradhan Mantri Gramodaya Yojana (PMGY):

The PMGY was launched in 2000-2001 to provide additional financial assistance for minimum services like rural health, education, drinking water and rural electrification, by the central government to all states on a loan (90%) and grant (10%) basis. The PMGY was coordinated and monitored by the Rural Development Division of the planning Commission and under this scheme the states had the flexibility to decide on the inter-reallocation of funds amongst the basic services. This scheme was discontinued from 2005 onwards.

KutirJyoti Program (KJP):

KJP was initiated to provide single point light connection (60w) to all the Below Poverty Line (BPL) households in the country in 1988-89. KJP provides 100% grant for onetime cost of internal wiring and service connection charges and provision for 100% metering for release of grants. As of now more than 5.1 million households have been covered under the scheme. In May 2004 the scheme was merged into the, Accelerated Electrification of one lakh villages and one crore Households and now merged into the RGGVY.

Minimum Needs Program (MNP):

The MNP targeted states having less than 65% rural electrification and provided 100% loans for last mile connectivity. Due to the difficulties in implementation this scheme was discontinued in 2004-05.

Accelerated Rural Electrification Program (AREP):

The AREP, operational since 2002, covers electrification and un-electrified village and household electrification and provides an interest subsidy of 4% to the states for RE programs. The interest subsidy is available to state governments and electricity utilities on loans availed from approved financial institutions like the Rural Electrification Corporation (REC), Power Finance Corporation (PFC) and from NABARD under the Rural Infrastructure Development Fund (RIDF).

Rural Electricity Supply Technology Mission (REST):

REST was launched with an objective of electrification of all villages and households progressively on 11th September 2002 and by the year 2012 to fulfill the objective through local renewable energy sources and decentralized technologies, along with the conventional grid connection. REST come up with an integrated approach for rural electrification and aims to

- To identify and adopt technological solutions
- To promote, fund, finance and facilitate alternative approaches in ruralelectrification
- To review the current legal and institutional framework and make changes when necessary
- To coordinate with various ministries, apex institutions and researchorganizations to facilitate meeting national objectives.

After Electrification of one lakh villages and one crore households, MNP and KJP are merged with the RGGVY.

Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY)

RGGVY is the latest national rural electrification scheme launched in April 2005 by the Ministry of Power to execute the vision for rural electrification. The objectives of RGGVY are:

- 100% electrification of all village and inhabitations in in the country.
- Free of cost electricity connection to BPL households.
- Electricity access to all households.

To achieve the said objectives RGGVY anticipates creating a 1) Rural Electricity Distribution Backbone (REDB) with at least one substation (33/11 KV or 66/11 KV) in each block. 2) Decentralized Distributed Generation (DDG) systems where the grid is not cost-effectiveof feasible.

3) Village Electrification Infrastructure (VEI) with at least one distribution transformer in each village / habitation.

RGGVY puts rural electricity as a necessary component for broad based economic and human development. It also looks at 24 hours supply of quality grid power to rural areas for spreading industrial activity, provision of modern healthcare facilities and the use of IT.

Q. Give the importance of rural electrification in rural development.

5.6 WATER SUPPLY AND PURE DRINKING WATER

Water:

Water factor depends on many other factors as it is a limited natural resource and conservation of it is very essential. Underground water level can be increased by means of water saving methods like percolating the water in the ground, by building bunds to stop flowing water and equal distribution of water, digging trenches to store water and thereby increase underground water level and most important is to plant more and more trees to increase the water level. This water can be utilized during the non-rainy seasons.

Water conservation methods are implemented everywhere to deal with the water storage problem. Available water is related to the various factors like soil conservation, afforestation, and bunding on the mountain slopes. The more conservation of water is the more availability of water. Konkan region receives heavy rainfall during the season still they suffer the problem of water shortage. Nature gives us water in abundance but it is we who are responsible for this water shortage problem and not the nature. We should take more efforts to conserve water through bunding and making the water percolate in the soil to increase the surface water and the underground water level. So planning is essential so that we don't face the water problem.

More water will be required due to increasing industrialization, population, urbanization and other reasons. To fulfill these needs millions of rupees have been invested on various schemes for the same. Water facilities were provided to the urban areas through the water schemes from the rural areas. But the fact is that no measures were taken for water conservation in the rural areas, which is the greatest demerit of our planning. Because of this even after 71 years of independence we are not able to solve the water problem of our country.

There is consistency of rainfall in our country with increase or decrease in the proportion of rainfall. If the rain -water is conserved and harvested at the time of rainfall we won't ever face drinking water problem in future. This gift of nature must be preserved and conserved and utilized in an organized manner.

Water Supply: Water is absolutely essential to life. It contributes to the wonder and majesty of the natural world, whether through the babbling of a small brook or the vast ocean. There are several key

sources of water related to one another through the working of water cycle.

Water Cycle:

The cycle begins with water particles rising off the ocean waters. Clouds gather these droplets until reaching the saturation point. Saturation occurs when a cloud catches so many particles that it must release the burden as rain. When clouds move over a landmass, the droplets form rain, ice or snow depending on weather conditions. This water source falls to the earth to enter lakes, rivers and streams. Droplets also become absorbed into the ground to replenish the ground water. Runoff from the earth pushes this water source into our lakes, rivers and streams and eventually back into the ocean to begin the cycle again.

Natural springs:

Earlier we could drink water from the springs without treating it. But now a day, water from springs has to be tested to make it sure it isfree from chemical toxins and biological organisms. Ozone is added to purify the water as it reduces to ordinary oxygen normally suspended in water or released into the atmosphere. This ozone purified water is then bottled to make bottled spring water. And if it is naturally carbonated it is sparkling water.

Rivers and Lakes :

Water from rivers and lakes is used as a standard source of water for human consumption. These sources are restored regularly by the actions of weather. But this water cannot be used directly for drinking purpose. It has to be treated to make it fit for consumption. Water treatment plants pump water into their facilities, filtering and adding chemicals to purify the water. Lakes and rivers are the source of tap water. It is purified and disinfected usually with chlorine, but sometimes fluoride is added. It is then supplied to the homes across the area for individual homes for consumption and other uses of water.

Ground Water :

Groundwater lies in pockets beneath the surface of the earth typically existing between layers of rocks. Those living in rural areas or those who don't have access to municipal corporation water supply often use this ground water source for wells. The water cycle replenishes groundwater tables at a relatively predictable rate based on climate. The ground water levels can be affected during drought conditions. Wells can be either near the surface or they can draw up water from very deep. They need to be tested for purity. But some wells offer pure, drinkable water.

Desalination:

Desalination is a process in which the seawater is treated to remove salt from it. But in this process additional minerals from this water are removed. Huge processing plants around the world convert seawater to potable water suitable for human consumption. This type of natural water source conversion requires extensive treatment and the expensive use of electricity to run the water processing plants.

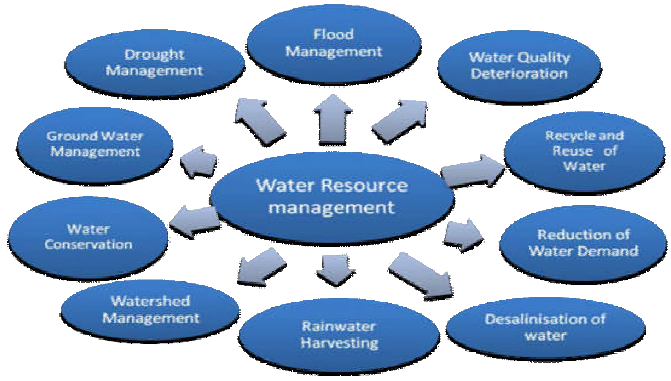
Harvested Rainwater:

Rainwater harvesting is a common practice in the more arid regions of the world. Typical rainwater harvesting setups include a barrel attached to the downspouts on the roof a perfect opportunity to collect and store rainwater for use around the exterior of homes in different places. More sophisticated collection devices are used like flat, sloped sections of the roof designed to collect more rainwater per square inch. The rainwater runs at an angle toward a collection point, funneling water into a catch basin. This non-potable source of water helps to minimize the costs of using a potable water supply for watering crops and general landscape maintenance. Rainwater is actually pure. It has to be purified as it may get dirty and contaminated by the roof or surface where it is caught, gutters or pipes, and storage.

India's huge and growing population is putting a severe strain on all of the country's natural resources. The rural population of India comprises more than 700 million people residing in about 1.42 million habitations spread over 15 diverse ecological regions and providing drinking water to such a large population is a challenge. Characteristics like non-uniformity in the level of awareness, socio-economic development, poverty,

education, practices and rituals add to thecomplexity of providing water in India. Provision of clean drinking water has been prioritized in the Constitution of India with the Article 47 conferring the duty of providing clean drinking water and improving public health standards to the state. Since independence the government has initiated various programs to provide safe drinking water to the rural masses. But still lack of safe and secure drinking water continues to be a major obstacle and a national economic burden.

It is estimated that by 2020 India will become a water stressed nation as the average ability of water in the country is reducing regularly with the increasing population. The pressure of development is changing the distribution of water in the country on one hand and access to adequate water on the other has been referred to as the primary factor responsible for limiting development. Assuring that the available water is safe for drinking is a challenge by itself and while accessing drinking water it continues to be a problem.



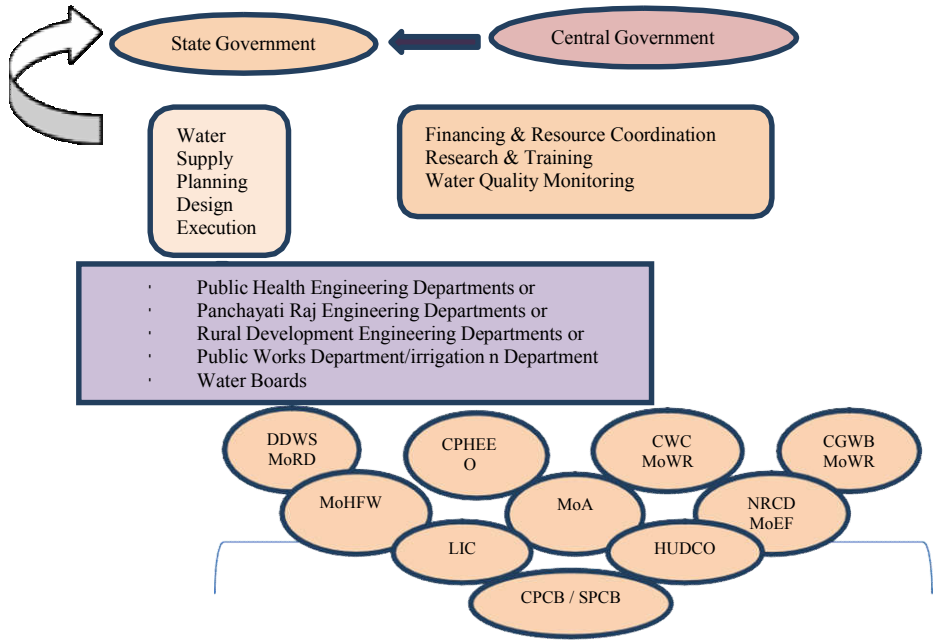
Water Resource Management and Procurement Methods

Quality of water is deteriorated by the pollution and over- exploitation, rapid pace of industrialization and more stress on agricultural growth combined with financial and technological constraints and non-enforcement of laws. Non-uniform distribution of rainfall many a times aggravates the problem of water quality. The sewage discharge, industrial waste, run-off from agricultural fields and waste water disposal from the urban areas add to the water pollution and quality of water is affected. Floods and droughts affect the quality of water and also lack of awareness and education among users degrade the water quality. Aspects like hygiene, environment sanitation, storage and disposal are the demanding elements that can maintain the quality of water resources and more over it is the user involvement in managing the water quality.

To ensure sustainability of the systems, initiatives were taken to institutionalize community participation in the implementation of rural drinking water supply schemes through the sector reforms project from "Government oriented supply driven approach" to "People oriented demand responsive approach".

Government of India launched the National Rural Drinking Water Quality Monitoring and Surveillance Program in 2006. This anticipated the institutionalization of community participation for monitoring and surveillance of drinking water sources at the grass-root levels. The grassroots level includes the Gram Panchayats, Village Water and Sanitation Committees, followed by checking the positively tested samples at the district and state level laboratories.

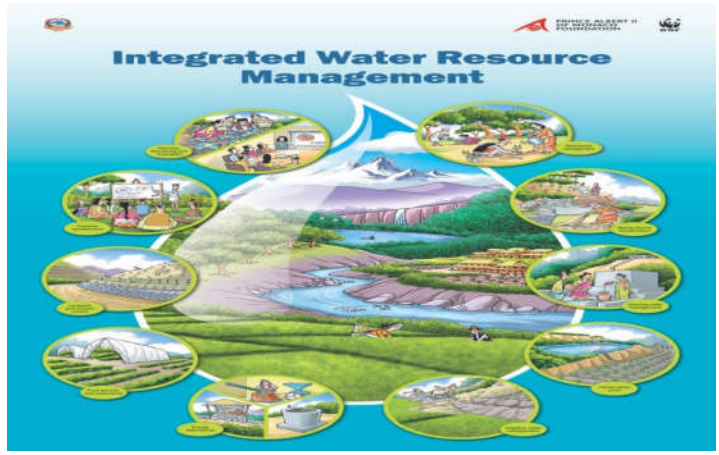
The following figure depicts the institutional structure for water and sanitation supply in India.



Though not directly involved in the supply chain, the judiciary has also played a role in resolving conflicts and taking up issues of public interest. With several institutions involved in water supply, inter-sectoral coordination becomes critical for the success of any programme. Water supply and sanitation is a State responsibility under the Indian Constitution. States may give the responsibility to the Panchayat Raj Institutions (PRI) in rural areas. At present, states generally plan, design and execute water supply schemes (and often operate them) through their State Departments (of Public Health Engineering or Rural Development Engineering) or State Water Boards. Highly centralized decision-making and approvals at the state level, the characteristic of the Indian civil service, affect the management of water supply and sanitation services.

Drinking water supply in India continues to be inadequate, despite longstanding efforts by the various levels of government and communities at improving coverage. The level of investment in water, albeit low by international standards, has increased in size during the 2000s. Access has also increased significantly. At the same time, local government institutions in charge of operating and maintaining the infrastructure are seen as weak and lack the financial resources to carry out their functions.

Most water sources are contaminated by sewage and agricultural runoff. India has made progress in the supply of safe water to its people, but gross disparity in coverage exists across the country. A number of innovative approaches to improve water supply and sanitation have been tested in India, in particular in the early 2000s.Depleting ground water table and deteriorating ground water quality are threatening the sustainability of both urban and rural water supply in many parts of India. The supply of cities that depend on surface water is threatened by pollution, increasing water scarcity and conflicts among users. In some coastal area's seawater desalination is becoming an important source of drinking water supply.



Integrated Water Resource Management (IWRM) is an approach for the management of water and related natural resources management at the community level. The poster demonstrates the good practices for sustainable use of water.

5.7 SUMMARY

Infrastructure plays a crucial role not only for the country's economic growth but also in the progress of human development. The deficiencies in rural infrastructure in transport system, energy, telecommunication, etc. leads to poor functioning of the other relatedinfrastructural facilities. Rural infrastructure plays an important in thedevelopment of human resources - To reduce the rural backwardness, Development of human resources, Increase, in the momentum ofproduction factors, For the development of the agricultural sector, Momentum to the rural industrial sector, Decrease in the poverty, Social and Cultural progress. An improved accessibility to all quarters of a village is an indispensable prerequisite for the provision of adequate livingconditions in rural areas. Transport is important because it enables trade between people, which is essential for the development of civilizations. Information and Communication Technologies are playing a pivotal role in the development process. ICT has remarkable potential to make the information available at the right time thereby empowering the rural consumer and is considered as the lifeline of economic and social development of the rural consumers. Access to energy is a cornerstone for development and for a better quality of life. The Rural Electrification

Corporation (REC) was established in July 1969 as a public sector undertaking with the main objective to finance Rural Electrification (RE) schemes and promote rural electricity cooperatives for funding rural electrification projects across the country. Provision of clean drinking water has been prioritized in the Constitution of India with the Article 47 conferring the duty of providing clean drinking water and improving public health standards to the state. Since independence the government has initiated various programs to provide safe drinking water to the rural masses. But still lack of safe and secure drinking water continues to be a major obstacle and a national economic burden.

5.8 SELF-STUDY

Q-1. Explain the Concept of rural infrastructure

Q-2. What is the Role of Rural Infrastructure in Rural Development?

Q-3. Write short note on - Transport & Communication.

Q-4. Give an account of Rural Electrification.

Q-5. Write short note on: Safe & Pure Drinking Water

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Magtapp Application

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6

SCIENCE &TECHNOLOGY FOR RURAL DEVELOPMENT

Unit Structure:

6.0 OBJECTIVES

1. To study the concept and uses of science and technology
2. To know the obstacles in the use of science and technology
3. To know the system programs implemented by Agricultural Research and Extension

6.1 INTRODUCTION

Science and technology play an important part in our country to bring about a social and economic change in our country, especially in rural areas. Major objectives of rural development are – to improve the living conditions by providing food, shelter clothing, employment and education, to enhance productivity in rural areas, to eliminate poverty. It also involves people in planning and development through participation in the decision-making process and through decentralization of administration, to ensure justice and equal opportunities to the rural population. For the development of rural areas, utilization, protection and enhancement of natural, physical and human resources, it is essential to make long term improvements in the rural living conditions. The significance of science and technology has to be recognized, as it also provides jobs and income opportunities for the rural people while maintaining and protecting the environment of the rural areas. There has been an increasing interest in

rural development and systematic efforts are necessary to create better living conditions within the rural areas as majority of the populations of the developing countries live in rural areas.

6.2 CONCEPT

Science and Technology have always been an integral part of Indian culture. The Indian Renaissance, which coincided with our independence struggle, witnessed great strides made by Indian scientists. This innate ability to perform creatively in science came to be backed with an institutional setup and strong state support after the country's independence in 1947. Since then, the Government of India has spared no effort to establish a modern S&T infrastructure in the country. The department of science and Technology plays a vital role in the promotion of science and technology in India.

Most of the development in India has taken place with the help of science and technological factors. Technology plays a major role in the development of various sectors of rural areas like agriculture, small-scale industries, houses, buildings, dwellings, education system, medical facilities, offices and many others. It is only through science and technology major improvements can be made.

6.3 USE OF SCIENCE AND TECHNOLOGY

The methods of science and the culture of technology have to be operated in a systematic manner. E.g. Observation, classification, measurement, recording, comparison with the earlier experience, making and testing the hypothesis by using new and innovative experiences. The culture of technology must make note of specification for material, the product used and the process that has been followed, its performance indices, future plans and effective use of resources, energy, finances and materials. The upcoming new developments in Space Research, Biotechnology, Computers, Microelectronics and Hi-tech will benefit the rural areas to a great extent. In case of rural development, only those technologies should be used that can be easily managed and repaired. Locally available skills, tools and materials are used to sustain the technological factors. In rural development use of such technology should be made that can be easily managed and repaired. Technologies used should be economically sustainable, beneficial and contribute towards a healthy rural population. Low cost technology with minimal usage and maximum benefit (Appropriate Technology) should be implemented.

1) Information and Communication technology:

Developing countries use low cost technology wherein the cost of computers is low. Computers are used on large scale as they are the technical means i.e. internet is used to find out information regarding any area, topic, subject or problem.

2) Energy:

India has abundance of Renewable Natural Resources that can help to generate energy. Wind, Water, solar energy from sun, Geo-thermal energy and Tidal power are the natural sources of energy that can be used to produce energy. Solar energy with the help of solar cells can be used to produce electricity, wind energy can be used to generate electricity by using windmills or wind turbines, hydroelectricity can be generated with the help of water resources using hydroelectric generator and hydraulic turbine converts the flowing water energy into mechanical energy. Bio butanol, biodiesel, biogas and vegetable oil are also considered to be the sources of energy. Both rural and urban areas can benefit to a great extent by using renewable source of energy to generate electricity and many more areas of development.

3) Health care:

Science and technology play a major role and is an important tool used by the Indian government to ensure affordable healthcare for all the Indians as per the sustainable development goal of the United Nations Development Programme (UNDP). Ministry of Science and Technology brings interventions to make healthcare accessible and affordable like low cost vaccines to prevent diseases, diagnostic kits to detect diseases and medicines to treat them. In addition the Ministry focuses on the health care delivery system with the growing engagement of the private sector, especially start-ups and small industries and availability of a proper technology translational mechanism ensures this. Use of technological factors and advancement in the field of science has made it possible for medicines and innovative machines for their existence in hospitals and health care centres in rural areas.

4) Agricultural Technologies:

Continuous improvements in digital tools and data along with the collaborations among the farmers and researchers across the public and private sectors have boosted the modern agriculture. More technological advances have appeared in the agricultural field due to which it is possible for farmers to utilize scientific data and technology in improving crop yield and keeping themselves updated with the cutting-edge methods of farming.

Mobile technology plays an important role in monitoring and controlling crop irrigation systems and moisture sensors in the ground are able to communicate information about the level of moisture present at certain depths in the soil. Ultra sound not only checks the baby animals in the womb but also can check the quality of meat of an animal before goingto the market. DNA testing helps the producer to identify animals with good breed and desirable quality and also can help the farmer to improve the quality of his herds. Mobile technology helps to keep an eye on the employees on farm and can also keep a closer eye on the animals when they are away or home for the night. Crop sensors help in applying fertilizers in effective manner to maximize the crop production. With

optical sensors the farmers are able to see how much fertilizer a plant requires, based on the amount of light reflected back to the sensor.

5) Construction:

Several technologies have been implemented to develop low cost building materials, designs and construction techniques. For the construction of houses or buildings; technology such as rammed earth, Dutch bricks and cob is used, which make the houses and buildingsstrong, adaptable to all the environmental conditions. These materials are easily available and are not expensive. There is availability of non- erodible mud plaster for the protection of mud walls from rain. The rural people are able to access these materials in a manageable way to carry out the construction in an appropriate manner.

6) Cooking:

Cooking stoves that are smokeless and wood conserving lead to greater efficiency. It saves time and labour, reduces deforestation and has lots of health benefits. Solar cookers are more beneficial depending on the climatic conditions and the methods of cooking. With the provision of electricity in rural areas they are making use of electric stoves to cook food.

7) Refrigeration:

There is an increase in the temperatures all over the world due to global warming. Certain food items in rural areas in warm weather conditions need to be stored in a cool temperature to prevent them from decaying or spoiling also need of cold water during hot weather conditions has become a necessity in rural areas also. Due to electricity problems and fluctuations in the power it is not possible to use a refrigerator in rural areas, hence pot refrigeration system can be a solution which keeps things fresh even without electricity.

8) Television & Radio:

Technological means like radio and television have improved the lives of rural people as they take pleasure of these inventions not only for entertainment but also to gain knowledge for agriculture purpose, new advancements in their related field and many more and applying the appropriate methods in their occupational field. Television and radio have become the major source of entertainment. They learn so many things and apply them in their daily routine work like program on agriculture, weather forecast, market related news, cooking shows for women, educational programs for children, etc.

9) Computers:

Rural youth and students are making use of computers to a major extent to augment their understanding in terms of various concepts. By using computers they not only acquire an efficient understanding of the academic concepts, but also are able to work on their tasks and

assignments efficiently and communicate. Computer centers have been setup in rural areas so that individuals can work on computers and make use of other technologies, such as printers and scanners. This scene is common in the rural areas near to the cities or big villages. But the situation is different in the remote rural areas. They don't have access to regular flow of power supply, internet issue as a result no access to computers or computer centers and other related facilities.

10) Mobile phones:

Use of mobile phones by different category of people belonging to different age groups has become a common feature among rural individuals. They use this technology for various purposes. Even though they are ill-literate or have low literacy skills they use mobile phones for communicating and for recreational purpose. It is difficult for the students to make use of mobile phones for educational purpose as of, they can't afford for android phones and even if they have them network issues prevent them from getting benefit for educational purpose.

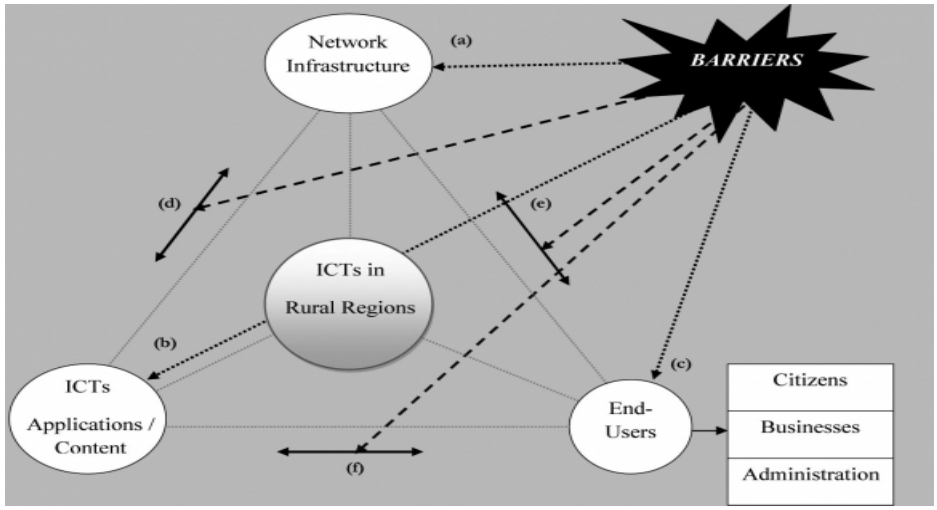
6.4 IMPORTANCE OF SCIENCE & TECHNOLOGY

The importance of science and technology to the rural societies arebeing recognized since a long time. Enormous efforts have been taken inthe development of science and technology in India after independence and there is an urgent need to deliver it to the most-needy people, so that they are able to meet the challenges of the technologically refined world. A profound impact on the society has been produced on a large scale as the advances in science and technology continue to create newer methods of communication and information management. S & T offers bizarre opportunities and challenges for scientific endeavours. Behaviour patterns and practices, local customs and values are deeply rooted in rural areas and are not easily displaced by science or modern approaches based on new knowledge. The S & T policies that are framed should take into account the nature of the local environment so that the benefits of science and technology can be effectively delivered to the rural society, which is a challenge for the management of rural natural resources and environment. Rural society should explore the socio-economic implications of new technologies, especially to identify emerging opportunities, the impact of S & T on the society and mainly the early warning system for natural disasters can help them to know the coming problems and be ready to face them. The accelerated growth and remarkable influence of new technologies, the information and communication technology along withinternet are raising global awareness about the power of technology.

By making the technologies accessible by improving the connectivity, computerization and content areas development the digital divide gap between the rural and rural areas can be minimized. In the same way harnessing the potential of S & T for systematic and coordinated use of local resources is of paramount importance in the context of pollution, degradation of the environment and sustainable development.

A multidisciplinary base has to be setup to create awareness in technological literacy. Education system should be such that a student should learn everything but specialize in anyone of the subject in short it should aim at a Jack of All Trades but Master of One. The population at large appreciates science not for its discoveries, but for the inventions that spring from the new knowledge. For this we should give not only technological literacy but also the equipment facilities for testing out ideas. We need to have this technological literacy in all villages, so that they can test, adapt and use new technology, having a base of the pro-requisite skills and technology culture. Effective Rural Development will promote S & T Growth While S & T is needed for rural development, it is equally true that S & T growth also needs true rural development.

6.5 ISSUES REGARDING THE USE OF SCIENCE & TECHNOLOGY



Barriers appearing in the adoption /use of ICTs in rural regions

A) Barriers related to the deployment of network infrastructure in rural regions are mainly associated with the –

1. Costs that are involved in the deployment of this infrastructure combined with the lack of sufficient demand (for e.g. the remote, sparsely populated rural areas) render relative investments that are financially unsustainable.

2. Dearth of continuous and high speed network connections.

3. Diversity of ICTs applications and the respective network infrastructure requirements in e-platforms necessary for community-specific ICTs applications and m-platforms necessary for personalized farm-specific ICTs applications.

B) Barriers related to the development of specific ICTs applications &content in rural areas –

1) Lack of Skilled people to build and run ICTs applications and content.

2) Lack of access of rural areas to hardware and software equipment'sand the cost that are involved to develop specific applications.

3) Lack of regionally focused and demand driven approach to identify specific needs that could be relevant for the rural areas.

4) Lack of region specific knowledge and respective needs of the various rural regions may result to a discrepancy of applications and the content developed as per the real needs of rural population.

5) Costs that are involved in content development are different as per the different needs and preferences of different groups that call for aregion specific user oriented content development and adapted to the specific rural context.

6) Barriers related to the management of the digital content are due to constraints in coherence and inter-operability of data and information sources.

C) Barriers associated with the adoption & use of technology by theend-users in rural areas –

1) Lack of trust to technology at the local society.

2) Lack of Skilled human resources.

3) Low level of entrepreneurship in rural regions.

4) Lack of training opportunities or structures offering a chance to rural population to develop skills and competencies on ICTs and their applications focused on the specific needs of the rural people.

5) Lack of new technology culture for the older age groups in rural areas who influence the susceptibility to adopt and use ICTs and their applications.

6) Lack of knowledge offered by ICTs applications for personal and business development.

7) Lack of institutional capacity and capacity of the people who are involved in the information procurement in rural areas.

8) Limited range of e-government services using open IT standards, introducing barriers to the end-users relating to the necessity to use commercial technology or software.

9) Low level of sector-specific applications in rural regions that hamper the ICTs adoption rates at the business level.

10) Language skill acts as a barrier for rural population and businesses and limits the benefits derived from the ICTs applications.

11) Lack of ability to build various kind of local partnerships ensuring thatinformation is accessible by all local stakeholders.

12) High costs of accessories (PCs, mobiles etc.) and use of ICTs for business and citizens also act as a barrier.

13) Barriers due to culture and traditions of rural social systems in locally oriented rural economic system may be stronger, while in open, export oriented rural economic systems it may be weaker. This may result in reluctance to shift to a new, less controllable regime thus, blocking social anchoring of ICTs in local rural communities.

D) Barriers related to missing or of limited capacity network infrastructure –

1) The multiplicity of applications like e-platforms for community applications, personalized applications, satellite technology for farm management purposes, m-platforms for farmers personalized applications for specific network requirements in rural areas.

2) Lack of region specific and demand driven approach to network infrastructure and ICTs applications and content development leads to a mismatch of network infrastructure and ICTs applications and content.

E) Barriers relating to the type of network infrastructure selected for the support of e-applications in each specific rural region-

1) Network infrastructure technology adopted should adjust well to local pattern of communication or else can place barriers to the rural people in joining the 'trip', due to lack of familiarity, trust, etc.

2) Lack of establishment of multi-device / multi-channel access can exploit multiple and diverse communication tools that integrate the full range of existing media.

3) The tendency of deploying network infrastructure focuses more on the technological aspects than the communication and networking potential leading to a dominated technology-led service provision approach. If focused on the generation of good communication links it can develop a sense of a social entity, than on the technological attributes of this infrastructure.

4) The other barriers include the costs involved in using the network infrastructure and getting access to the necessary equipment to join the network.

F) Barriers related to the type of applications and relating content for different types of end-users-

1) Matching ICTs applications / content to the specific needs of end-users is a key issue towards the log-in perspective.

2) Lack of effective interaction among the developers of ICTs application and end-users in rural areas.

3) Lack of users involvement in the design of the various ICTs applications and content.
4) Lack of simplicity of applications.
5) Lack of multimodal, multi-channel system of digital communication integrating all media.
6) Over-focus of ICTs application on technological aspects than the communication and networking potential.
7) Costs involved in the access and use of the ICTs applications and content.

6.6 ROLE OF INFORMATION TECHNOLOGY

Importance:

The ultimate objective of both research and extension systems is to increase agricultural production and their role in generating and transferring technology is complementary. It is essential that the research institutions must have information on the problems, technology requirements and socio-economic and ecological environment of producers to formulate research agendas and to set priorities. Researchers should interact with the producers continuously during the process of technology generation. Extension services play a mediatory role between the farmers and the researchers. An efficient two-way communication process is necessary for generating and transferring technology effectively and its success is determined by the effectiveness of linkage between research and extension institutions.

Designing:

The basic study in designing any research-extension system is technology flow which facilitates diagnosis of research-extension linkage problems. the technology flow concept is based on the assumption that technology is derived from science and flows from research station to users with or without an intermediary agency like extension service.

Technology Development Processes:

Technology development process includes the technology generation, testing, integration, production, dissemination and adoption. Technology generation is the same as applied research, wherein knowledge that is acquired from basic science research is organized, interpreted, reformulated and translated into technology. In technology testing results of new technology in the field are verified to obtain feedback in the earlier stage through farming systems research (FSR) and On-farm trials. Extension service help is sought for technology testing as its widespread network helps in reaching the farmers especially in the less fertile regions. Technology integration deals with the fine tuning and packaging of technologies into specific recommendations and technology production comprises of designing & producing information materials, improved inputs, training programs, etc. Technology dissemination delivers the technology to the farmers.

Agricultural research incorporates the activities from strategic research to technology production while the extension function includes technology testing to dissemination. Thus we can say technology testing integration and production play an important role in the linkage between research and extension.

The Linkage Problem:

Agricultural research institutions concentrate on strategic research and technology generation and neglect technology integration and production activities resulting in the critical linkage problems. The additional effort essential for coordinating and building expertise is also a major constraint. The linkage problem is more severe where research and extension functions are performed by separate public institutions. Researchers do not receive enough information about the environment andresource constraints under which farmers are operating in the absence of effective linkage. The linkage problems cause disruptions in technology flow leading to low adoption rates, increased time intervals between development and adoption of new technology, reduced efficiency in the use of resources, duplication of efforts, unnecessary competition and the increased cost of agricultural research and extension activities.

Agricultural research and extension systems:

Agricultural research and extension functions are generally organized under a ministry of agriculture and are hierarchically structured from national level to field level. Such research extension systems are found mostly in developing countries. There are separate institutions or departments within the ministry for performing these functions and these institutions or departments may have different organizational structures and operational procedures. Universities and national research institutes are generally research centres, while the agricultural department performs the extension function.

Agricultural Extension Division:

The major activities of Agricultural Extension Division are technology assessment, demonstration and capacity development through a network of 11 Agricultural Technology Application Research Institutes (ATARIs) and 721 Krishi Vigyan Kendras (KVKs). ATARIs play the role of coordination and monitoring.

The Agricultural Extension Division at National level is headed by Deputy Director-General (Agricultural Extension) and supported by two Assistant Director-Generals, three principal scientists, one Deputy Secretary and one Under Secretary.

Krishi Vigyan Kendra (KVK) – Farm Science CentreVision –

Science and Technology-led growth leading to enhanced productivity, profitability and sustainability of agriculture.

Mission –

Farmer – centric growth in agriculture and allied sectors through application of appropriate technologies in specific agro-ecosystems perspective.

Mandate –

Technology Assessment and Demonstration for its Application and Capacity Development

Activities -

- On-farm testing to assess the location specificity of agricultural technologies under various farming systems.
- Organize Frontline Demonstrations to establish production potential of technologies on the farmer's fields.
- Capacity development of farmers and extension personnel to update their knowledge and skills on modern agricultural technologies.
- To work as knowledge and resource centre of agricultural technologies for supporting initiatives of public, private and voluntary sector in improving the agricultural economy of the district.
- Provide farm advisories using ICT and other media means on varied subjects of interest of farmers.

Programs of Division of Agricultural Extension:

On Farm Trials (OFT), Frontline Demonstrations (FLD), Capacity Development of Farmers, farm women, rural youth and Extension Personnel, Farmers' participation in extension activities, Production of Quality Seeds, Production of Quality Planting Materials, Production of Quality Livestock Strains and Fingerlings, Testing of Soil, water, plant, manures samples, Pulses Seed Hubs, Skill Development, Attracting and Retaining Youth in Agriculture (ARYA), National Innovations on Climate Resilient Agriculture (NICRA), Farmer FIRST, Mera Gaon- Mera Gaurav (MGMG) are the programs of the Division of Agricultural Extension.

New Initiatives of Division of Agricultural Extension:

- Knowledge Systems and Homestead Agriculture Management in Tribal Areas (KSHAMTA) – (KVKs across the country conducted on- farm trials and frontline demonstrations. Capacity development of farmers/farm women and extension personnel were done through training programs. Extension activities were organized by the KVKs. The technological inputs like seeds, planting material and livestock strains and fish finger lings were produced by KVKs. Besides, by analyzing samples of soil, water, plant and manure, mobile advisories were sent to farmers onvarious aspects of agriculture.)

- In-situ Crop Residue Management (sensitized people about theharmful effect of residue burning, benefits of in-situ residue management and government schemes of availability of subsidized machines)

- Linking KVKs with common service centres (CSCs) (provided technological solutions to the farmers visiting CSCs with agriculture related technological problems)

- Role of KVKs in Jal Shakti Abhiyan of Ministry of Jal Shakti (activities like, discussion on water conservation and efficient water use including use of micro irrigation systems, live demonstration on drip and sprinkler irrigation systems, Nukkad Natak, farmers scientist interaction, quiz competition on water management, drawing/rangoli competition, filmshows on importance of water conservation and micro Irrigation, demonstration on roof top rain water harvesting, sharing of farmers' experiences, method demonstration on measurement of soil moisture with electronic moisture meter, exhibition, distribution of saplings of trees, felicitation of farmers, etc. were conducted under this new initiative) Establishment of District Agricultural Meteorological Units (DAMU) under KVKs **(**Under MoU with India Meteorological Department (IMD) provided agro-met advisory Services in local language in the countrythrough KVKs to serve the farming community in different agro-climatic zones to reduce the risk due to climatic aberration and improve productivity)

ICT Initiatives:

- **Web portal –**KrishiVigyan Kendra Knowledge Network Portal was launched in 2016 for regular monitoring of KVKs and provide information and advisories to the farmers.

- **mKisan Portal –** It provides timely and need based information on weather, market, various farm operations, outbreak of pest and disease incidence and their control measures, etc. to farming community and mobile agro advisories are provided farmers by the KVKs using mKisan portal.

Types of agriculture and research – extension linkage:

The nature of research – extension linkage problems differ with the different agroclimatic and socio-economic characteristics of the

agriculture in the local areas. The research-extension linkage is well established in those areas where there is high-input, high yielding production systems and is found in developed countries and some developing countries. Overproduction and mounting costs are the problems faced by the farmers here. A strong linkage between research and extension exists in the areas that have benefitted from the green revolution. Here applied research has made a striking impact on food-grain yields. This sort of agriculture is found in the high-capacity areas of tropical countries and has irrigation facility in particular.

As they generate urgently needed foreign exchange and produce food-grains research and extension systems are organized and managed to meet the technology demand of the above said category.

There is a need to strengthen the research-extension linkage in those areas that have poor and diverse resources inheritance and ecologicalconditions (low and uncertain rainfall, lack of irrigation, poor infrastructure, low and uncertain yields, degradation of resources). The potential to increase agricultural production is high & unexploited and it is a challenge to develop sustainable technology for the heterogeneous agro- ecological and socio-economic conditions in these areas. Here the technology needs of farmers are mainly expressed through government policy as the farmers are not organized.

Specific Operational Reasons for Poor Linkage:

The reasons for poor linkage between research and extension are political, technical and organizational.

Political:

This is specific to institutional politics and different interest groups. Lack of external or internal pressure on the institutions and personnel is one of the demerit for achieving high level performance. Intervention by the national policy-makers is generally very less except in exceptional circumstances, like disease outbreaks, major crop shortfalls, etc. But external pressure can come from national policy makers, foreign donors, farmers or the private sector. As the farmers are not organized, private sector is insignificant in resource-poor areas the pressure exerted by resource poor farmers on research and extension is also negligible. The institutions and personnel involved in research and extension tend to be motivated by their own social and political needs rather than by the needs of resource-poor farmers due to lack of effective external pressure leading to neglect of linkage activities.

Technical:

Technical reasons are pertinent to peculiar types of activities and methodologies associated with technology development and delivery. To be effective in less productive and more diverse environments lack of professionalism and decentralization, integrated with less hierarchical management. Require more location-specific interpretation of problems and adaptation to technology. Lack of essential infrastructure compels the

researchers and extension personnel to adopt alternative technologies not appropriate for the region. Lack of flexibility in initiating the various links required for different types of technology.

Organizational:

Organizational reasons comprise those problems associated to structural problems, resource problems, communication problems, motivational and incentive problems.

a) Structural problems :

There are differences in orientation and work style, concerns related to competence, and level of contact between research and extension personnel. A particular technology is shoved upon a locality andextension workers are forced to promote it though it does not correspond to the local agro-ecological or socio-economic conditions. Linkage activities are often assigned to an inappropriate institution or department. Excessive centralization of authority reduces flexibility which is important for linkage activities, while excessive de-centralization results in meagre consideration given to the linkage activities.

b) Resource problems:

Linkage functions like publications, testing of research results and training of extension workers often lack sufficient financial resources or there may be sufficient human resources in the organization but they may not be available for linkage activities.

c) Communication Problems:

There is a wide difference in the value systems, educational backgrounds and communication methods between research and extension workers. Extension workers anticipate researchers as working in ivory towers producing technologies not useful at farm level and researchers interrogate extension workers capability to understand research outcomes, to communicate accordingly with the farmers and contribute valuableinputs.

d) Motivational and incentive problems :

Extension workers may have little incentive to perform linkage activities but rewards for journal publication may be higher. As a result the researchers and extension agents avoid linkage activities such as adaptive field trials and preparation for written materials for extension agents.

e) Institutional Incompatibilities –

Research by commodity and extension by region; different clientele; or different time schedules for planning and budgeting – can vigorously deter linkage development.

6.7 SUMMARY

Science and technology play an important part in our country to bring about a social and economic change in our country, especially in rural areas. For the development of rural areas, utilization, protection and enhancement of natural, physical and human resources, it is essential to make long term improvements in the rural living conditions. The significance of science and technology has to be recognized, as it also provides jobs and income opportunities for the rural people while maintaining and protecting the environment of the rural areas. Technology plays a major role in the development of various sectors of rural areas like agriculture, small-scale industries, houses, buildings, dwellings, education system, medical facilities, offices and many other. Low cost technology with minimal usage and maximum benefit (Appropriate Technology) should be implemented. A multidisciplinary base has to be setup to create awareness in technological literacy. An efficient two-way communication process is necessary for generating and transferring technology effectively and its success is determined by the effectiveness of linkage between research and extension institutions.

6.8 SELF-STUDY

1. Give the concept of and use of science and technology in rural development.
2. What is the importance of science and technology in rural development?
3. What are the Obstacles or Barriers in the use of Science & Technology?
4. Give the importance of agricultural research and extension in rural development.
5. Write short notes on:
   a) Types of agriculture and research – extension linkage
   b) Reasons for poor linkage between research and extension
   c) Technology Development Processes
   d) Barriers associated with the adoption & use of technology by the end-users in rural areas

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7

RURAL ENERGY RESOURCES

Unit Structure:

7.0 OBJECTIVES

1) To understand the concept of Non-conventional sources of energy.

2) To study the types of Non-conventional sources of energy.

3) To know how the Non-conventional source of energy can be used for rural development.

4) To understand the different factors in rural areas to generate energy from Non- conventional sources.

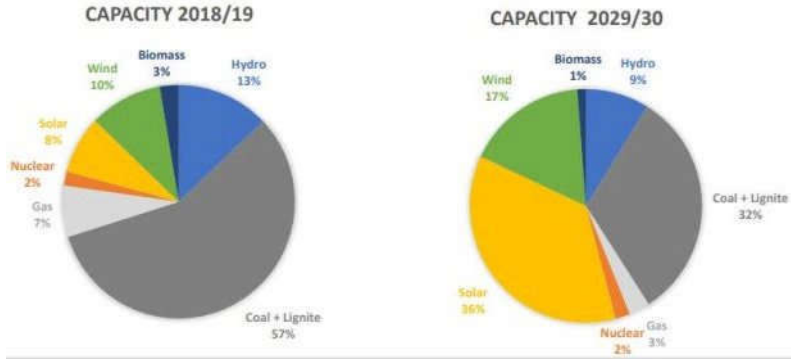
5) To review whether Non-conventional sources of energy can be the alternatives to save the fuel in future.

7.1 INTRODUCTION

Energy is the primary and most universal measure of all kinds of work by human beings and nature. Energy is the major input that drives the life cycle and improves it. Whatever happens in the world is the expression of flow of energy in one or the other form. Progress of mankind is closely related the energy consumption. Energy resources have a greater significance in the development process. It is necessary for agricultural processes, transport, in industries, cooking process, for domestic use. In India traditional sources of energy are used to fulfill the need for energy. This includes wood, coal, cow-dung, kerosene, diesel andpetrol. As these sources of energy are available naturally, they are limited. The unlimited use of these natural resources (i.e. non-renewable source of energy) by human beings is on the verge of extinction. As a result an imbalance in the nature has been created. A solution to this problem is to find an

alternative source of energy. In other words we can say we have to use renewable source of energy like solar energy, wind energy, hydroelectricity, nuclear power for peaceful purpose.

In rural areas the proportion of animals is more compared to the urban areas, as a result their waste is collected on large scale. In the same way waste from agricultural products, human excreta are also available which can be used in the biogas plant. The methane gas produced in this is used for fuel purpose and the slurry produced from this is used as fertilizer for crops. The use of slurry increases the fertility of soil and increases the productivity. Biogas has solved the problem of fuel in the rural areas. Cutting of wood for fuel has stopped to a great extent and the environmental has been maintained in the rural areas. Human brain and human power is also a natural resource that has to be utilized with the help of science and technology. But while doing this balance in the environment has to be maintained which will lead to a better future for the human beings on earth. Energy consumption and the progress of mankind are closely related. With the growing population there will be an increasing demand in the improvement in the living standard of the mankind, industrialization of the developing countries and the global demand for energy.

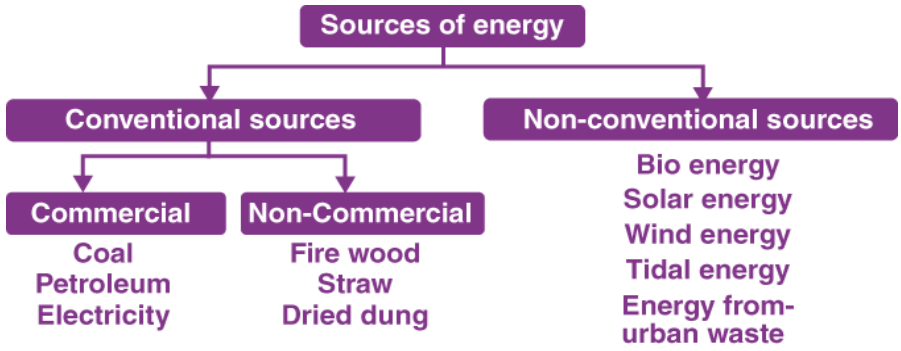


India to achieve 63% of power capacity from Renewable Energy: CEA:

Infrastructural development plays a significant role to sustain economic growth. India has abundant non-conventional sources of energy in the form of sunlight, water, wind and biomass.

7.2 CONCEPT OF RENEWABLE SOURCE OFENERGY

Renewable sources of energy are those sources that are continuously replenished by natural processes and they are also called as non-conventional energy sources. Solar energy, wind energy, bio-energy, and hydroelectricity are some of the examples of renewable sources of energy. The energy obtained from sunlight, wind, falling water, sea waves, tides, geothermal heat or biomass is converted by renewable energy in theform of heat or electricity.



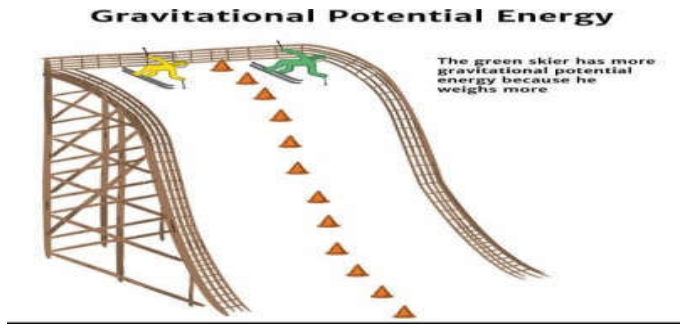
As most of the renewable energy comes either directly or indirectly from sun and wind, which is inexhaustible it is called renewable or Non-conventional sources of energy. But much of the world's energy sources are derived from conventional sources or fossil fuels like coal, oil and natural gases which are non-renewable or conventional energy sources. Though they are extremely large in number, they are finite and will get exhausted, so renewable energy sources are the best alternative sources of energy.

7.3 TYPES OF ENERGY SOURCES

1) Potential energy:

Potential energy is the energy which is stored or conserved in an object or a substance and is based on the position, arrangement or state of the object or a substance. When the position, arrangement or state of the object changes, the stored energy is released. Energy cannot be created or destroyed, but can be converted from one form to another. The two main types of potential energy are –

a) Gravitational Potential Energy:



The heaviest of 2 objects at the same height has the greatest gravitational potential energy.

It is the energy in an object that is held in a vertical position, due to the force of gravity working to pull it down and depends on the height and mass of the object. It increases as weight and height increases.

b) Elastic Potential Energy –

A spring stores elastic potential energy because it can be stretched or compressed.

It is the energy stored in objects that can be stretched or compressed. For example rubber bands, bungee cords or trampolines. The more an object can stretch , the more elastic potential energy it has.

2) Kinetic energy:

Kinetic energy is the energy of motion or is the energy of mass (an object) in motion (moving). The faster an object is moving, the more kinetic energy it has. In other words any object that is moving has kinetic energy – the moving object has energy because of its motion.

A falling house of cards has kinetic energy.

All movable things and objects have kinetic energy be the motion vertical or horizontal. The object will always hold the same amount of kinetic energy unless it speeds up or slows down.

3) Chemical energy:

When a chemical reaction takes place, the stored chemical energy is released. This energy is stored in the bonds that connect atoms with other atoms and molecules with other molecules. As it is seen chemical energy is stored, it is a form of potential energy.

Humans consume chemical energy contained in food.

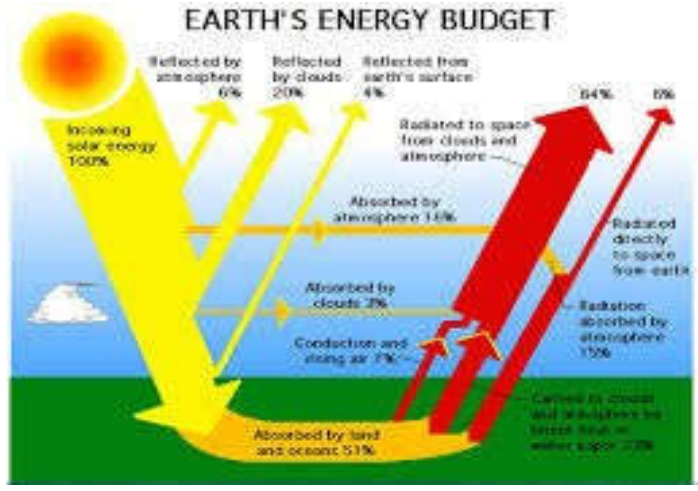
When a chemical reaction takes place heat is produced as a by- product. This is also called an exothermic reaction. Chemical energy is widely used all around the world, as it is crucial for the existence of humans and the natural world.

7.4 VARIOUS FORMS OF RENEWABLE ENERGY SOURCES ARE

1) Solar energy:

India is endowed with vast solar energy potential. Solar energy is an inexhaustible energy collected from the sunlight and is clear and basic source of all other energy. It can be utilized through two different routes Solar Thermal Route and Solar Photovoltaic Route. In Solar Thermal Route solar energy is converted into Thermal energy with the help of devices like solar water heaters, solar cookers, etc. while Solar Photovoltaic Route also called solar electric route which is made of semiconductor silicon converting solar energy into electrical energy. Off-grid decentralized and low-temperature applications are advantageous from the point of rural electrification. Solar energy has benefitted millions of rural people by meeting their cooking, lighting and other needs in an environment friendly manner.

National Solar Mission (NSM) launched on 11th January, 2010 is a major initiative to promote ecological sustainable growth with active participation from states.



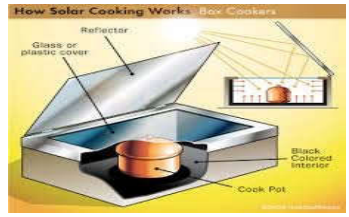
The Mission targets installing 100 GW grid-connected solar power plants by the year 2022. To achieve the target the Indian Government launched various schemes to encourage generation of solar power in the country like Solar Park Scheme, VGF Schemes, CPSU Scheme, Defence Scheme, Canal bank & Canal top Scheme, Bundling Scheme, Grid Connected Solar Rooftop Scheme etc.

NON TRADITIONAL ENERGY SOURCES:

Solar powered equipment's:

a. Solar Cooker:

A solar cooker is a device to cook and heat food faster and conveniently with the help of solar energy. The three components of the solar cooker are absorption, concentration and retention. The reflective panels ensure the concentration of UV rays on a certain point. Black interior panels absorb the solar energy and the retention is executed by ensuring that the solar cooker is insulated in a proper manner. Solar cookers do not require frequent supervision, are portable, they are easy to clean and devoid of maintenance costs. Solar cookers are fire-free not causing any harm to the environment.



b. Solar water heater:

Solar water heater is a heating system device that uses solar energyto heat water for domestic, commercial and industrial needs. A typical solar water heating system saves up to 1500 units of electricity for every 100 litres per day of solar water heating capacity every year. Solar water heaters are pollution free and are safer than electric geysers as theyare located on the roof.

c. Solar lamp:

A solar lamp is a lighting system composed of LED lamp, solar panels, battery, charge controller and an inverter. Solar lamp is also called as solar light or solar lantern. It operates on electricity from batteries, charged through the use of solar photovoltaic panel. Solar lamps have low operating costs than the kerosene lamps as renewable energy from the sun is free. No indoor pollution is produced as of kerosene lamps.

However, solar lamps generally have a higher initial cost, and are weather dependent.

d. Public solar lighting system:

A modern street light relies on innovative sources of energy. A solar powered street light (solar street light) is the perfect illustration of modern light. The street light consists of a solar panel, a light pole, a battery, light and expansion components and smart modules. It works by converting the energy received from the sun through the panel to the actual light and emitted through the corresponding LED and CFL diodes on which the street lights are based.

e. Domestic solar system (Off-grid solar systems):

Off-grid solar systems work independently of the grid having batteries that can store the solar power generated by the system. This system consists of solar panels, battery, charge controller, grid box, inverter, mounting structure and the balance of systems. The sunlight stored by the panels is quite enough that can be used in the night. These domestic or off-grid solar systems are self-sustaining and can provide power for critical loads in areas where power grid is not available. Grid failures and shutdowns will not affect the power supply.

f. Solar mobile charger:

Solar panels are used in the solar cell phone chargers to charge cellphone batteries. These chargers can be used when there is no electricity supply. Some chargers can also be used as a conventional charger by plugging into an electrical outlet. While some chargers have an internal rechargeable battery which is charged in the sunlight and then is used to charge a cell phone and others charge the phone directly.

g. Solar water pump:

Solar powered water pumping system is composed of several photovoltaic panels. Solar cells are the building block for solar panels and each solar cell has two or more specially prepared layers of semi conducting material generally made of silicon which produces direct current (DC) electricity when it is exposed to sunlight. The DC current is collected by the wiring in the panel and is converted to AC current by using an inverter. This converted AC current is used to run an AC pump which pumps water whenever the sun shines and the excess water is stored in the overhead water tank for the later usage. This system is a suitable solution for grid-isolated rural areas where there are high levels of solar radiation. Solar powered water pumping systems provide drinking water without the need for any kind of fuel or the extensive maintenance required by diesel pumps. Solar water pumps may be especially useful in small scale or community based irrigation.

h. Rural electrification (single power house):

Rural electrification is the process of bringing electrical power to the rural and remote areas. Rural communities will be able to reap considerable amounts of economic and social

development if the countries are able to overcome the obstacles and are able to reach nationwide electrification. Rural areas in India are electrified non-uniformly, as richer states are able to provide power to majority of villages, while the poorer states struggle to do so. The Rural Electrification Corporation Limited was formed specially to address the issue of providing electricity in all the villages across the country. The major reasons behind the villages without electricity are poverty, lack of resources, lack of political will, poor planning and electricity theft.

The Indian government has set the target of 175GW of installed renewable energy by 2022 to increase electrification rates. The government is trying hard to improve the extreme conditions by investing heavily in biogas, solar and wind energy. Lots of work is being carried outto reduce wastage, to provide better equipment and improve the overall infrastructure for electrical transmissions in villages. programs like The JNN Solar Mission and Pradhan Mantri Gram Vidyut Yojana also known as Saubhagya Scheme are being implemented to increase the speed of electrification and to diversify the procedure.

i. Solar torch:

Solar powered torches or flashlights are powered by solar energy stored in rechargeable batteries. Most of these torches or flashlights use light emitting diodes lamps as they have lower energy consumption compared to incandescent light bulbs. These torches vary in features and their capabilities. A solar powered flashlight may give several hours of light after it is charged during the day. A typical solar torch can give illumination on objects up to 50 metres away, and the beam may be visible for much longer distances. The solar cells that are used for battery charging have an indefinite life expectancy.

j. Pico PV Systems:

Pico solar PV systems or Pico Solar are the smallest, often portable photovoltaic systems mostly combining a rechargeable battery and charge controller along with a small PV panel. Music players, fans, portable lamps, security lights, solar lighting kits, solar lanterns and street lights, phone chargers, radios, 7 inches LCD televisions that run on less than ten watts can be solar powered by using Pico Solar PV Systems. This system is more useful in small, rural communities that require a small amount of electricity. Pico solar has become an affordable alternative since the efficiency of many appliances has improved considerably, due to the use of LED lights and efficient rechargeable batteries.

k)- Solar Photovoltaic Energy or PV solar energy:

PV solar energy directly converts sunlight into electricity which uses a technology based on the photovoltaic effect. When radiation fallson the surface of photoelectric cell on the solar panel produces an electric voltage making the electrons flow between one to the other generating an electric current. There are three types of solar panels – **a)photovoltaic**, generators of electricity to be supplied to homes; **b) thermal**, installed on houses to receive the sun directly; and **c) thermodynamic**, which operate in varying weather conditions, i.e. at night, when it's raining or cloudy.

Electricity generated by solar photovoltaic panels contributes to sustainable development and favours local employment, as it is inexhaustible and does not pollute. It is a very effective system for remote and rural areas, where electric power line cannot reach, or are difficult or costly to be installed. Once the photovoltaic system is installed, the fuel is free and available lifelong.

TRADITIONAL ENERGY SOURCES:

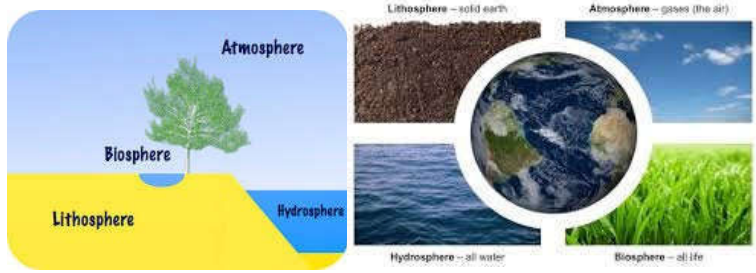
1. Wind energy:

Wind energy is basically harnessing of wind power to produce electricity. The kinetic energy of the wind is converted to electrical energy.When solar radiation enters the earth's atmosphere, different regions of the atmosphere are heated to different degrees because of earth curvature. This heating is higher at the equator and lowest at the poles.

Since air tends to flow from warmer to cooler regions, this causes what we call winds, and it is these airflows that are harnessed in windmillsand wind turbines to produce power. Wind power is not a new development as this power, in the form of traditional windmills -for grinding corn, pumping water, sailing ships - have been used for centuries. Now wind power is harnessed to generate electricity in a larger scale with better technology. India now ranks as a "wind super power" in the world and the largest wind farm cluster is in Tamil Nadu. Andhra Pradesh, Karnataka, Gujarat, Kerala, Maharashtra and Lakshadweep have important wind farms.

2) Bio energy:

Biomass a renewable energy resource is derived from the carbonaceous waste of various human and natural activities including the by-products from the wood industry, raw material from the forest, agricultural crops, household wastes, etc. Biomass is an integral part of the earth's carbon cycle – the process by which carbon is exchanged between all the spheres of the earth – Atmosphere (gases – the air), Hydrosphere – (all water), biosphere - (all life) and Lithosphere – (solid earth).



Many functions are performed in a carbon cycle. Carbon regulates the amount of sunlight which enters the earth's atmosphere through photosynthesis, decomposition, respiration and human activity. After decomposition the carbon that is absorbed by the soil is released by the plants through photosynthesis in the biosphere. Carbon is sequestered or stored in fossil fuels for millions of years. Fossil fuels are extracted and burnt for energy and they release sequestered carbon in the atmosphere. Fossil fuels do not re-absorb carbon.

Biomass comes from recently living organisms and the carbon in it continue to be exchanged in the carbon cycle.

Biomass materials like plants and forests have to be sustainably farmed to effectively allow the earth to continue the carbon cycle process. It takes decades to re-absorb and sequester or store carbon for plants and trees. Disturbing the soil or uprooting will disrupt the process of carbon cycle. To maintain a healthy environment; a steady and varied supply of trees, crops and other plants is imperative.

Biomass is the most important fuel and accounts for about one- third of the total fuel used in the country. it is used in over 90%of the rural households. Energy and manure is derived using only locally available resources i.e. cattle waste and other organic wastes. Thus we can say biogas plants are the cheap sources of energy used in rural areas.

Biogas Plants:

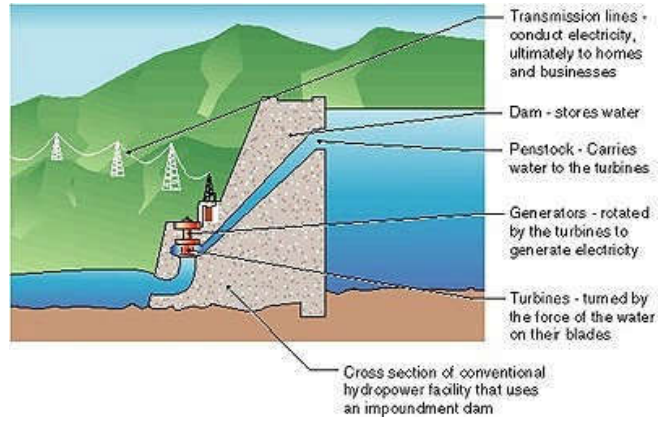
Biogas is a clean and efficient fuel, generated from cow-dung, human waste or any kind of biological materials derived through anaerobic fermentation process. It consists of 60% methane while the remaining is mainly carbon-di-oxide. Biogas is safe for cooking and lighting. By-product from the biogas plant is used as a high-grade manure.Components of biogas plant:

1) A digester in which the mixture (dung mixed with water) is fermented
2) An inlet tank in which the feed is mixed and let into the digester
3) Gas holder/dome in which the gas that is generated is collected
4) Outlet tank to remove the slurry
5) Distribution pipeline (s) to transport the gas into the kitchen
6) A manure pit, where the slurry is stored.

Biomass Briquetting:

Biomass Briquetting is the process of densifying loose agro-waste into solid biomass of high density and which can be conveniently used as a fuel. Biomass Briquette is also called as Bio-coal and is pollution free and eco-friendly. After suitable pre-treatment some of the agricultural and forestry residues can be briquetted.

4) Hydro energy:



Hydro energy is generated by using water to power machinery or make electricity. Water steadily moves through a vast global cycle –evaporating from the oceans and lakes, forming clouds, precipitation in theform of rain or snow, and again flowing back down to the ocean. Hydropower uses water as fuel as the water cycle is an endless, constantly recharging system. Therefore, hydropower is considered as a renewable energy. When flowing water is captured and turned into electricity, it is called as hydroelectric power or hydropower. There are many types of hydroelectric facilities all powered by the kinetic energy of flowing water as it moves downstream. Turbines and generators convert the energy into electricity, which is fed into the electrical grid that is supplied to homes, business and in the industries.

5) Geothermal Energy:

Geo means earth and thermal means heat and geothermal energy isthermal energy which is generated and stored on earth. The temperature of the matter is determined by the thermal energy. The geothermal energy is sustainable, cost-effective, and environment friendly. Geothermal pipe buried 4 feet deep in the earth pumps a liquid to absorb the heat and bring it indoors. The heat exchanger carries heat from the liquid to use it to warm the house. In the same way geothermal energy can be used to cool our houses in summers. It works reverse of the heating system and makes our homes cool in summers.

Merits of geothermal energy:

i) Geothermal energy is renewable energy like solar and wind. Hot reservoirs extract the geothermal energy from the earth naturally.

ii) Geothermal energy is a good source of green energy therefore it is also called as environment - friendly energy. Its production neither creates any of the harmful substances nor any pollution. Geothermal energy's advancement will be a better option for global warming and will be a long-term energy solution.

iii) It requires no fuel - Like solar and wind energy, geothermal energy is also a natural process. It is not produced but is harnessed and converted into electricity. There is no requirement of large amount of fuel and therefore no pollution.

iv) A good option for homeowners - The climatic change created an increase in demand for the geothermal heater and cooler for homes. Geothermal energy proves to be the topmost priority for many homeowners as it renewable form of energy. Though in the initial stage it seems to be expensive but in a year; savings can be seen on cooling and heating costs.

v) An Evolving Technology - With the advancement in technology, geothermal energy is in the arena for exploration. The production process is improved with the help of new technology, which makes it the first choice for many people.

Demerits of geothermal energy:

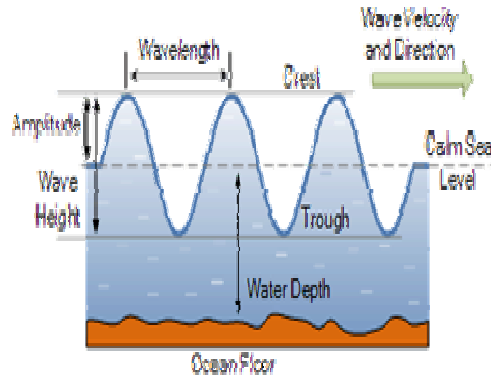
i) **Side effects for the environment -** The production of geothermal energy does not release greenhouse gases but during digging some gases is released and they become part of the atmosphere. Even though it is not because of human interference still, it is treated as a demerit for our surroundings and environment.

ii) **Cause of Earthquakes -** While digging the earth, there are high chances that earth structure may be altered, which may result in earthquakes and natural disasters usually occur with life-threatening incidents.

iii) **Sustainability Issues -** Geothermal energy is produced by taking extremely hot water from the reservoir of the earth. If the reservoirs are used too fast then the supply of energy will be stopped. As a result if geothermal energy is not managed effectively, there would arise sustainable issues.

iv) **High Investment Cost -** Harnessing geothermal energy system requireshigh investment cost.

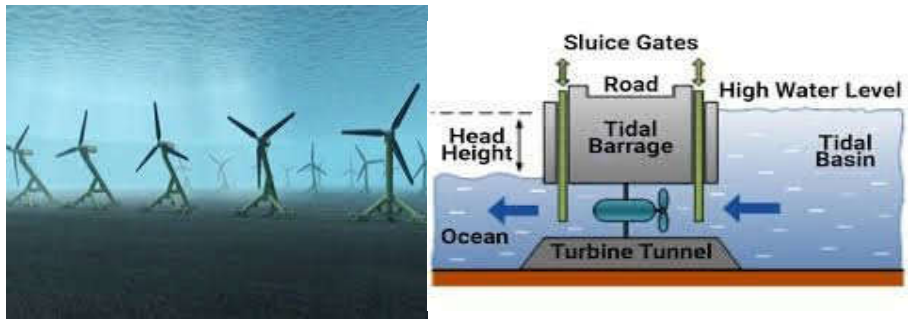
v) **The Requirement of Land for the Geothermal Installation system** - The main disadvantage of geothermal installation system is the specific requirement of land and a particular area on earth. There are a few zones or places on earth where geothermal power plants can be installed.



6) Wave energy:

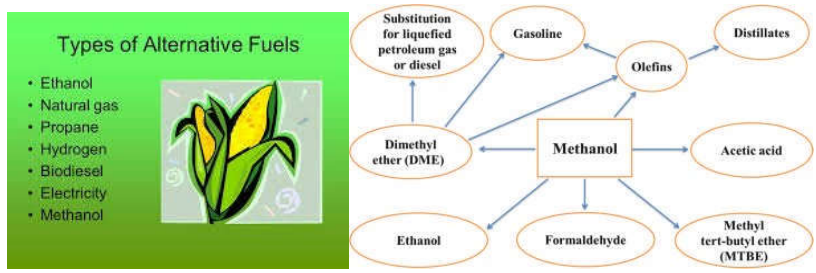
Wave energy or ocean Wave Energy, is ocean based renewable energy source which uses the power of waves to generate electricity. Wave energy uses the vertical movement of the surface water that produces tidal waves. Wave energy converts the recurring up-and-down movement of the oceans waves into electricity. By placing the equipment on the surface of the oceans it captures the energy produced by the wave movement and converts this mechanical energy into electrical power. Actually wave energy is a concentrated form of solar power generated by the action of the wind blowing across the surface of the oceans water which is used as a renewable source of energy.

Tidal Energy:



Tidal energy or Tidal power is an alternate energy or better known as the renewable source of energy. It is one of the forms of hydropower energy that utilizes the tidal energy to generate electricity. The motion of water is transformed into energy. As the celestial bodies earth, sun and moon change their positions throughout the year with these changes in position the gravitational pull exerted by these celestial bodies result in the water movements and thus the energy created can be harnessed to generate electricity.

7) Alternative Fuel:



This fuel is derived from non-crude oil sources such as bio alcohol (methanol, ethanol and butanol), hydrogen fuel cell, Bio-CNG, Drop-In fuels, Bio Hydrogen, biodiesel, etc. These are the future renewable sources of energy which are available indigenously. The alternate fuels are both environmentally and economically beneficial.

8) Smokeless chulas:

Smokless **chulha** doesn't mean cooking without smoke. It generates smoke but is vented out of the room using pipe. A smokeless chulha saves fuel and keeps the cooking area free from smoke. It can be made up of native clay, mud. It burns, wood, coal or charcoal. It gives good heat and also saves fuel. Few layers of fine red clay mixed with cow dung prevent the chulha from cracking. Energy efficient smokeless chulha reduces

a) Firewood consumption substantially,

b) Pressure on CPR/forest

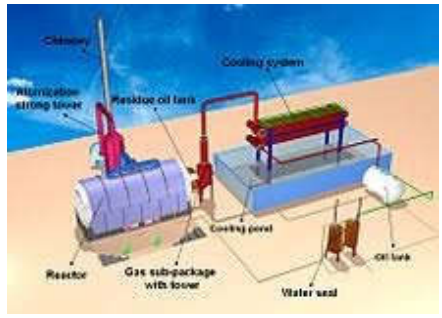
c) Time and effort on collection of firewood

d) Smoke related health hazard as women are at high risk due to long exposure to smoke

e) Environmental hazard, and thereby make their utility economical &

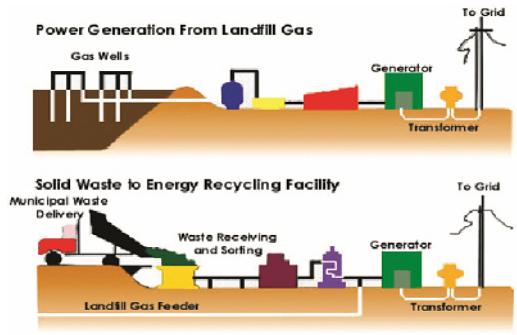
efficient.

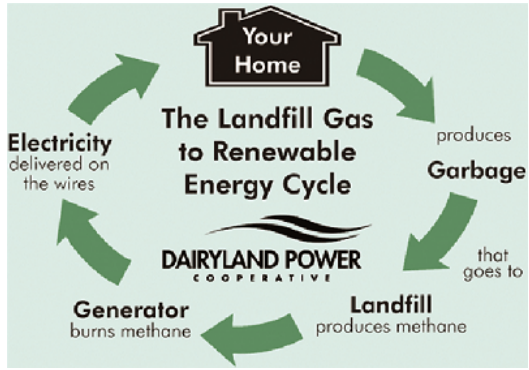
9) Energy from Waste:



Most of the solid waste is dumped to landfills or in water bodies, causing serious pollution with methane and CO^2. Permanent and eco- friendly solution is the need of the hour by utilization of the garbage into energy, by processing and treating the waste before final disposal. This will reduce the waste by 90%, and recover fuel gas for cooking, lighting and electricity. Waste-to-energy conversion is possible in many ways. Refuse-

Derived Fuel (RDF) processes the MSW prior to direct combustion involving the shredding of the MSW, and removal of metals and other bulky items. There is no pollutant released or carbon emission that will increase and speedup global warming and waste to energy plants can be very cost efficient. India ranks second in the world in biomass utilization.





When garbage decomposes, methane gas is produced and natural gas is made up of methane. Pipelines fitted into the landfills collect methane gas, which is then used in power plants to generate electricity called landfill gas. Landfill gas is gathered from landfills through extraction wells depending on the size of the landfill. This gas is then used to produce electricity, heat, fuels and chemical compounds.

7.5 SUMMARY

There is close relation between human development and cleanenergy use. Serious planning is necessary to select appropriate technologies suitable in local context to be successful in clean energy technologies adoption. The technology has to be need based, easy to adopt and be capable of generating employment and income, leading to sustainable livelihood. Technology should be launched as part of the on- going development programs, by involving efficient agricultural extension network to ensure the backward and forward linkages. To overcome the initial hurdles before wider replication financial and technical supportshould be available.

Energy is the primary and most universal measure of all kinds of work by human beings and nature. Energy is the major input that drives the life cycle and improves it. Whatever happens in the world is the expression of

flow of energy in one or the other form. Progress of mankind is closely related the energy consumption. Energy resources have a greater significance in the development process. The unlimited use of the natural resources (i.e non-renewable source of energy) by human beings is on the verge of extinction. As a result an imbalance in the nature has been created. A solution to this problem is to find an alternative source of energy. In other words we can say we have to use renewable source of energy like solar energy, wind energy, hydroelectricity, nuclear power for peaceful purpose. Renewable sources of energy are those sources that are continuously replenished by natural processes and they are also called as non-conventional energy sources. Solar energy, wind energy, bioenergy, and hydroelectricity are some of the examples of renewable sources of energy. The energy obtained from sunlight, wind, falling water, sea waves, tides, geothermal heat or biomass is converted by renewable energy in the form of heat or electricity.

7.6 SELF-STUDY

Q-1 What do mean by renewable or non-conventional source of energy?

Q-2 Write short note on concept of renewable source of energy.

Q-3 What are the different types of energy sources?

Q-4 What are the various forms of renewable energy sources?

Q-5 Explain in detail Geothermal Energy.

Q-6 What are the different solar powered equipments?

Q-7 Write short note on:

a) Solar Energy;

b) Wind Energy;

c) Bio-energy;

d) Hydro energy;

e) Geothermal energy;

f) Wave energy;

g) Tidal energy;

h) Alternative fuels;

i) Smokeless Chulha

j) Energy from Waste;

k) Biogas Plant;

l) Solar Photovoltaic Energy or PV solar energy.

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Magtapp Application.

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[Time: Three Hours] **[Marks:100]**

Please check whether you have got the right question paper

N. B:- 1) All questions are compulsory.

2) All questions carry equal marks.

3) Figures to the right indicate marks to a sub-question.

Q.1) Describe the various factors of human resource development **14 Marks**

OR

Q.1) Suggest the remedial measures to control the population **14 Marks**

Q.2) State the nature of transport and communication **14 Marks**

OR

Q.2) State the need of rural electrification **14 Marks**

Q.3) State the consequences of extension education in rural area **14 Marks**

OR

Q.3) State the role of KVK in rural development **14 Marks**

Q.4) Describe the traditional sources of energy **14 Marks**

OR

Q.4) Describe the non-traditional sources of energy **14 Marks**

Q.5) Write short notes on any two of the following **14 Marks**

a) Problems of rural health

b) Problems of rural electrification

c) Bio gas Unit

d) Solar powered devices