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CASIRJ

Explore the theory and practice of community education

Kumud Ranjan

What actually is community education? How does it differ from education in the community, or education for community? We explore the theory of community education and some examples of practice using resources from the encyclopedia of informal education.

In England, and many other countries, 'community education' has tended to be wrapped up with the idea of community schooling and especially the pioneering work of Henry Morris around village colleges. More recently, however, there has been a growth of interest in the related idea of full-service schooling and of 'new community schools'. With this has come a deepening of community education theory and practice.

However, we can think about the theory and practice of community education as 'education for community within community'. In other words, something called 'community' is not just the 'place' in which education occurs, fostering community is also a central concern.

The process of becoming part of an existing social network in order to encourage learning is sometimes labelled as informal education in UK discussions or as community education or community learning in Scottish debates about theory and practice. For example, CeVe (Scotland) have defined community education as:

..a process designed to enrich the lives of individuals and groups by engaging with people living within a geographical area, or sharing a common interest, to develop voluntarily a range of learning, action and reflection opportunities, determined by their personal, social, economic and political needs. (CeVe 1990: 2)

However, this particular definition of community education does not put 'education for community' at the centre of the work. It is perhaps closer to the idea of education or learning *in* the community.

Community education in its stronger sense has parallels in the tradition of community organization in the USA, sozial pädagogik in Germany, animation in France and socio-cultural work in Belgium. Furthermore, this approach to community education links up with the theory and practice of those who have worked for community-based, and democratic schooling.

In many Southern countries, what is called 'community education' in Scotland might well be described as non-formal education or community participation. It could be seen as close to the Latin American tradition of popular education or the French tradition of la vie associative with its emphasis on association.

Over the years a distinctive body of literature has developed around 'community studies'. Individual contributions tend to fall across disciplinary boundaries - some are labelled as sociology, some as anthropology, and yet others as geography or urban studies. What follows is a quick guide to the literature and an attempt to bring out some key questions and themes.

I have divided the studies examined into three groups:

- North American studies
- African studies
- United Kingdom/Irish studies

There have also been a number of studies in South America and in India and other Southern societies - and some of these are reviewed.

A starting point

To help us sort our way through the material I am going use what Bell and Newby describe as a minimum definition. For them a community study is concerned:

with the study of the interrelationships of social institutions in a locality. This does not mean all social institutions locally present have to be studied but, unless these interrelations are considered they will not considered as community studies. (ibid: 19)

This way of defining community studies excludes research which focuses on a particular social institution in a locality. For example, the famous studies of the family undertaken in Bethnal Green (e.g. Young and Willmott 1957) would not be included. For the moment we are going to stay with this - but we do need to note that other commentators include these and similar studies within their definition of the area (see, for example, Frankenberg 1966).

As you will see from the use of locality in the definition, most of the studies we will be looking at are concerned with community as place. Within that the interest is in the inter-relationships of social institutions (hence our concern with networks). However, this does not mean that we do not recognize the importance of looking at a particular element or phenomenon in a neighbourhood.

Community studies as texts and as a method

In a literature review we are obviously concerned with texts - the reports and books produced by researchers as a result of their labours. However, we also need to note that many of those involved consider also to be a method - a particular process. It is true that community studies share a number of characteristics:

the researchers have usually lived in the community studied (or spent a considerable amount of time involved in everyday activities there). They have shared some of the experiences of some of the inhabitants. In other words they are field workers.

the researchers have tended to be not only physically close to what they are studying - but also emotionally close. 'This means that community studies are very sympathetic - critics would say, over sympathetic - portraits of a locality (Bell and Newby 1971: 55).

while the researchers may use large scale surveys and various forms of network analysis, they place a special emphasis on participant observation and sustained conversation with local people. They substantial use of 'key informants' (such as Whyte (1943; 1955) did of 'Doc' in Street Corner Society). They are, in other words, eclectic in their methods.

the books and articles that researchers produce, given the processes they have gone through, tend to be lively, full of graphic description (and sometimes a bit short on theory).

Just how distinctive a method it is is open to question. While the component parts of community studies are not unique in themselves - but are necessary elements of researchers' repertoires (see Bell 1987; 1993) - taken together there is something distinctive about the approach.

North American community studies

The North American literature is particularly strong. The first, classic, work in this genre is generally said to be Robert Lynd and Helen Merrell Lynd's (1929) *Middletown. A study in American Culture*. They had initially set out to examine religious provision in a small American town but found that this could not be done without a wider exploration.

The aim... was to study synchronously the interwoven trends that are the life of a small American city. A typical city, strictly speaking, does not exist, but the city studied was selected as having many features common to a wide group of communities. Neither field work nor report has attempted to prove any thesis; the aim has been, rather, to record observed phenomena, thereby raising questions and suggesting possible fresh points of departure in the study of group behaviour. (Lynd and Lynd 1929: 3)

This is the opening paragraph to the book and it contains a number of elements that have remained important to community studies (and a matter for some debate both within and without the tradition - see Bell and Newby 1971: 82-93). These include:

looking at a number of elements at any one time and seeing how they interconnect.

choosing some neighbourhood or community which appeared to have aspects that could have relevance for other places.

not seeking to prove a thesis but to gain data to stimulate debate and theorizing.

looking at group behaviour.

In 1929 the book created quite a stir. There hadn't been a study like it - it was the first 'scientific and objective' study of small town life. I put 'scientific and objective' in quotes because there are questions around this. Were the Lynds commendable in their concern to let the situation speak to them; could they be that unbiased and let the data speak for themselves? Questions like this are still asked today in debates concerning different approaches to research. In many respects the

Lynds' approach is very close to what Glaser and Strauss (1967) have described as 'grounded theorizing' (see Strauss and Corbin 1990: 21-28).

Having given a brief outline of why Middletown was chosen and the historical setting, the Lynds ordered their book around six key areas:

This was a significant approach in that it focuses on activities - the things that people do - and is drawn from anthropological work at the time (Lynd and Lynd 1929: 4).

Such was the success of their work that they returned to Muncie (the town in their study) in 1935 to conduct a follow-up study which sought to make explicit the elements of permanence and of change (Lynd and Lynd 1937: 487). They found that *Middletown* had met with four types of experience 'peculiarly conducive to cultural change: sudden and great strain on its institutions, widespread dislocation of individual habits, pressure for change from the larger culture surrounding it, and at some points the actual implementing from without of a changed line of action (op cit). There had been ten years of book and depression. The result was a tough exposure of the sources of power in the small town and for all the claims to neutrality, the study reveals the writers 'militant and evangelical feelings about what was wrong with American society' (Bell and Newby 1971: 84). Crucially, 'the two Middletown monographs illustrate well that it is relatively short step from the community study as empirical description to the community study as normative prescription' (op cit). This is a lesson we do well to heed.

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LEARNING THROUGH SYNCHRONOUS ELECTRONIC DISCUSSION

By ANITA PANDITA

This article reports a study examining university student pairs carrying out an electronic discussion task in a synchronous computer-mediated communication system (NetMeeting). The purpose of the assignment was to raise students' awareness concerning conceptions that characterise effective pedagogical interactions, by collaboratively comparing and discussing their analyses of a dialogue between a tutor and a student. To examine whether the use of synchronous CMC could meet this end, students' dialogues are characterised in terms of their constructive and argumentative contributions and by their focus on the meaning of concepts. In addition, we compare a control group in which no peer coach is available with two forms of peer coaching. We instruct peer coaches to be centred either on structuring arguments or on reflectively checking of arguments on strength and relevance. The results indicate that, first of all, the study of students' learning from electronic discussions requires analysis of focus in relation to argumentation. Secondly, the coaching instruction did not fulfil our expectations. In this study, students seem to need support to focus on meaning rather than on argumentation in general, but they also may need support to hold overview, to keep track of their discussion and to organise their interface. Text-based electronic communication seems to be sensitive to such issues that may cause meaningful interaction to be disturbed.

Introduction

An important issue in learning research is the construction of

knowledge through negotiation. Some of the ways in which students negotiate the meaning or interpretation of knowledge have been found to enhance their learning. Collaborative learning is regarded as an activity encouraging knowledge construction through mechanisms such as belief revision, conceptual change, externalising knowledge and opinions, self-explanations, co-construction of knowledge and reflection (Piaget, 1977; Doise & Mugny, 1984; Voss & Means, 1991; Johnson & Johnson, 1993; Chan, 1995; Dillenbourg & Schneider, 1995; Baker, 1996; Savery & Duffy, 1996; Petraglia, 1997; Littleton & Hakkinen, 1999; Baker,
1999). It is believed that learning is particularly effective when collaborating students encounter conflicts and manage through negotiation to produce a shared solution (e.g. Piaget, 1977; Doise & Mugny, 1984; Baker, 1996; Erkens, 1997; Savery & Duffy, 1996; Petraglia, 1997). In our research we focus on the relation between knowledge construction and argumentation in collaborative learning situations. The purpose of this contribution is to present results pertaining to argumentation and learning in a task that explicitly focuses on meaning negotiation.

We work with students of Educational Sciences. In this academic area, students have to deal with unclear, vague and abstract knowledge domains that are considered to be discussible' (Golder & Pouit, 1999). Social science domains are not characterised by the presence of many fixed or stable conceptions and statistical evidence and research results can be interpreted from various perspectives, allowing different interpretations and conclusions. Assignments involve problems with more than one acceptable solution and more acceptable ways to reach solutions. Also, many situational factors (e.g. learning context, task design, personal beliefs and values) affect the construction of knowledge and problem solving. To introduce students to dealing with this type of knowledge domain hefty negotiation is needed. Hence, critical discussion seems an appropriate instructional means. In argumentation students can check, challenge and counter each other's doubted or

disbelieved information. This can encourage them to produce *constructive activities*, in which they add, explain, evaluate, summarise or transform knowledge for better understanding or problem solving. We propose that these activities can be considered as signals of learning-in-progress as they seem to be connected with knowledge construction.

To support and optimise students' engagement in argumentative dialogues for learning purposes, computer-mediated communication systems (CMC) provide new educational opportunities. CMC systems are network-based computer systems offering electronic opportunities for group communication, such as newsgroups, e-mail conferencing systems, Internet relay chat and virtual classrooms. Through text-based communication, CMC offers an 'interpretative' zone that allows participants to share multiple perspectives or attitudes relative to a particular topic or issue. The permanence and explicitness of text together with time-delays in text-based CMC systems provide opportunities to reflect, scrutinise information and to 'think before talking'. Despite these possibilities, not much is known about learning in CMC.

Learning-in-process: the production of constructive activities

From a rhetorical perspective on academic learning, academic education can be framed as an ongoing argumentative process (Petraglia, 1997). It is the process of discovering and generating acceptable arguments and lines of reasoning underlying scientific assumptions and bodies of knowledge. The purpose of collaborative argumentation tasks is to have students externalise, articulate and negotiate alternative perspectives, inducing reflection on the meaning of arguments put forward by peers as well as experts. However, it is difficult to measure students' learning results in such tasks since it is hard to judge veracity or accuracy of 'discussible' information with respect to well established norms. There are not many well defined conceptions and problem solutions that can be used to define learning or understanding. One of the possible ways

to analyse learning is to study the process of negotiation or to investigate the articulation of information as it occurs during discussions. This can be done on many dimensions (Baker, 1999).

We propose to centre on forms of knowledge articulation that seems to be good for knowledge construction. During discussion, some interactions may lead to the construction of new knowledge (Baker, 1999), in which students *add*, *explain*, *evaluate*, *summarise* and even sometimes *transform* information. Adding information means that an input of new information is linked to the discussion. Explaining information means that earlier stated information is for example differentiated, specified, categorised, or made clear by examples. Evaluations are (personally) justified considerations of the strength or relevance of already added or explained information. In transforming knowledge, already stated information is evaluated and integrated into the collective knowledge base in such a way that a new insight or a new direction transpires that can be used to answer questions or to solve problems. Summarising means that already given information is reorganised or restated in such a way that the main points or (sub) conclusions reflect the discussion.

In this study, we propose to define learning as a set of such non-normative constructive activities. This means that we are not directly concerned with the construction of representations that are accepted as correct from a normative point of view (Baker,1999). Rather, our aim is to consider forms of knowledge articulation that seem to be good for knowledge construction during students' discussion.

Reference

http://tecfa.unige.ch/edu-comp/WWW-VL/eduVR-page.html for an extensive overview on MUD's, MOO's and educational 2D and 3D virtual reality systems

PROPER SELECTION OF REPAIR MATERIALS FOR OLD R.C.C. BLUIDINGS

BY ER. DR. KIRAN MANIKRAO PAWAR

PHD (STRUCTURAL ENGINEERING)

C M J UNIVERSITY

General

Selection of repair material is one of the most important tasks for ensuring durable and trust worthy repair. Though, the pre-requisite for a sound repair system is the detailed investigation and determining the exact cause of distress, yet an understanding of the process of deterioration of the repair materials (such as concrete and other auxiliary materials i.e. plastics, resins, etc) under service conditions is vital. Of course, availability of materials of relevance, equipment and skilled labour have to be explored before deciding upon the repair material.

The analogy for selection of repair material is similar to repairing of a torn garment with sound fibre/fabric but of similar performance characteristics (i.e. preshrunk and similar fibre/fabric) as that of the original garment. Had the patch repair been done with un-shrunk or dissimilar fibre/fabric, it would have inflicted a greater damage to the repaired garment due to its pulling away on a subsequent shrinking after washing. Exactly this is applicable to selection of materials for repair of concrete/plaster. Also the selection of the repair material has a chemical angle and the manufacturer's literature normally highlights the composition of the material rather than performance characteristics. Since, cementitious products have a tendency to shrink and hardening with age, it is essential that the repair material for repairing concrete or plaster should be of non shrink type and compatible with parent material.

Essential Parameters For Repair Materials

Besides being of compatible properties, repair materials for cement concrete/mortar shall also be easy to apply and require no attention after the repair has been applied. The essential parameters for deciding upon a repair material for concrete are :

1. Low Shrinkage

It is well known that the cementitious repair materials shrink with passage of time. Most of the shrinkage generally takes place in the initial period from the time of casting to 21 days. Therefore, cementitious repair material in its original form, if used for repair to concrete/mortar, is likely to get either delaminated due to de-bonding or develop shrinkage cracks on its surface due to shrinkage strains and stresses. Shrinkage cracks so developed in the repair patch would allow the easy access of atmospheric air and water, which could be harmful for concrete and reinforcement. It is, therefore, essential that the low shrinkage property of repair material shall be looked for while selecting a material for concrete repair. Cementitious materials need additional non-shrink compounds so as to be effective in achieving the desired property. Therefore, the formulation of the patch mortar incorporates, in the cement matrix, several special chemicals
to mitigate the shrinkage. Using low cement content and low water cement ratio will also reduce the drying shrinkage.

2. Requisite setting/hardening Properties

It is desirable that the repaired structure shall be put to use at the earliest possible to reduce the down time of plant, machinery, building or road. It is, therefore, essential that repaired patch shall harden in the minimum possible time. However, in exceptional cases, it could also be essential to have the slow setting property as a desirable property for repair material. Such situation could be where more working time is required to work on repair materials or the repair process is intricate that more working time is required.

3. Workability

The repair material is to be applied by the field workers and hence its acceptability by them is very important. The property desired by the field workers is good workability. Hence optimum workability is to be achieved without sacrificing the other desirable properties by use of suitable additives/admixtures.

4. Bond with the Substrate

The bond strength of repair patch with the substrate is essential to have a successful repair system.

If it is felt that the bond strength of the repair material with the base material is inadequate or less than the strength of the base material, then some other suitable means could be explored to improve bond strength between repair material and substrate. These could be use of: Adhesive, Surface interlocking system, and/or Mechanical bonding. A variety of adhesives, in the range of epoxies, polymer modified cement slurries including unmodified polymer applications are available. The selection depends upon available open time for bonding etc, which are being specified for different applications. Surface interlocking system and methods of mechanical bonding.

5. Compatible Coefficient of thermal Expansion:

The difference in volume change because of temperature variation can cause failure either at the bond line or within the section of lower strength material. Therefore, in the areas exposed to temperature variations, the patches of repair should have same coefficient of thermal expansion to ensure that no undue stresses are transferred to bonding interface or the substrate. Due to similar coefficient of thermal expansion, cementitious materials are preferred over

epoxy materials. Coefficients of thermal expansion of commonly used construction/repair

Coefficient of Thermal Expansions of Commonly Used Building Materials S. Material Co-eficient of thermal No. expansion in 10 /°C - 6

1. Stones

(i) Igneous rocks 8 to 10

(ii) Lime stones 2.4 to 9

(iii) Marbles 1.4 to 11

(iv) Sand & sand stones 7 to 16

(v) Slates 6 to 10

2. Metals

(i) Aluminium 25

(ii) Bronze 17.6

(iii) Copper 17.3

(iv) Lead 29

(v) Steel and iron 11 to 13

3. Bricks and brickwork 5 to 7

4. Cement mortar and concrete 10 to 14
5. General purpose non-shrink concentitious micro-concrete 10 to 12
   (Renderoc RG)
6. Polymers modified mortar/concrete 10-12
7. Epoxy mortar/concrete 20-25

6. Compatible Mechanical Properties & Strength

The hardened material shall have compatible mechanical properties or rather slightly better strength than that of base material. This property is desirable to ensure uniform flow of stresses and strains in loaded structures. It is well known that the elastic modulus of two concretes would be different for different crushing strength so if repair concrete is having strength much different than the base, it could lead to non-uniform flow of stresses and may result in an early failure of the repair patch. For example, if M-20 grade of concrete has been used in original construction, the grade of the repair material shall neither be less than M-20 nor higher than M-25.

7. Relative movement, if expected

Particularly in case of sealing of such cracks where movement is expected or at expansion joints, the repair material selected shall be resilient and elastic to be able to absorb the anticipated relative movements of the structure without any signs of distress or crack.

8. Minimal or no curing Requirement

It is desirable that the repair material shall not have any curing requirement after the repair has been applied or even if it is required, it should be minimal to ensure that the repair patch hardens and attains the desired strength without much post-repair-care. Only epoxies don't need any curing. Other material applications need nominal to moderate curing, which need to be specified. Such materials have several other merits, which are to be kept in view, while making a selection. Curing compound can be applied over cementitious materials used for repairs but after examining its compatibility.

9. Alkalinity

In case of RCC, it is important to maintain the alkalinity of concrete around reinforcement with its

pH above 11.5 from corrosion protection point of view. In this context, it is necessary for the repair material to have chemical characteristics such that it does not adversely affect the alkalinity of the base concrete at a later date. The chemical characteristics of the repair material and its after effect on the pH of RCC shall be examined beforehand. In addition, the

pH of reinforcement protection applications, bonding coats and that of the repair material must also be similarly alkaline. This would ensure inbuilt compatibility.

10. Low air & water permeability

Permeable material allows easy permeation of environmental chemicals including carbon dioxide, water, oxygen, industrial gases/vapours etc. It is essential that repair materials should have a very low air/water permeability to provide protection to the reinforced concrete against ingress of harmful environmental chemicals.

11. Aesthetics

It is desirable that colour and texture of the repair material should match with the structure and give aesthetically pleasant appearance. If need be, this could be achieved through appropriate finishes.

12. Cost

Economics is important while considering various options for repair materials but cheaper repair material should not be selected at the cost of performance characteristics.

13. Durability & Bio non-degradability:

The repair material selected should be durable under its exposure conditions during the service life against chemical attack, resistant to any form of energy like ultra violet rays, infra red rays, heat etc and should be bio non-degradable.

14. Non-Hazardous / Non –Polluting :

The repair materials should not be hazardous to field workers. However adequate Safety measures are required to be taken for repair Materials, which are hazardous to workers involved with their

application, etc. These should also be environment friendly.

Materials For Repair

Wide range of materials for repair of concrete is available differing in cost and their performance. Their application range covers:

Materials for Surface Preparation

1.Chemical Rust removers for corroded reinforcement

2.Passivators for reinforcement protection

3.Bonding Agents

4.Structural Repair Materials,

5.Non-structural Repair Materials,

6.Injection grouts,

7.Joint sealants,

8.Surface coatings for protection of RCC

Products available in the market are generally in pre-proportioned and in pre-weighed packs together with accompanying instructions regarding mixing procedure, pot life, dosage and application procedure etc. It is desirable that the manufacturer indicates the generic name and proportion of the components in the products on the packs. Though, these materials are being marketed under their brand names, yet these could be classified in the following categories:

Premixed Cement concrete/mortars (modified with non-polymeric admixtures/additives). Polymers/latex modified cement additives for mortars/concrete/cement slurry [styrene butadiene rubber (SBR) latex, Poly (Vinylidene Chloride-Vinyl Chloride) (PVDC), acrylics and modified acrylics)]

Epoxy resins, Chemicals for corrosion inhibitor, removal of rust.

1. Premixed Cement concrete/mortars

Though, the cement concrete and mortars are most natural repair materials for carrying out the repairs to RCC. Yet, they are not favoured as a repair material due to its inherent undesirable properties like drying shrinkage, slow setting, low workability, prolonged curing requirement, permeability, etc.

Ordinary Portland Cements (OPCs)

The IS:456 allows use of 33, 43 and 53 grade of OPC, where figures indicate the 28 days strength in N/mm . Grade 33 and 43 may be used for most of the repair purposes, if necessary with modification by suitable admixtures or additives. Whereas Grade 53 cement or a cement having still higher fineness could be more suited for injection grouting of cracks or honey combed concrete preferably with non-shrink admixture in suitable proportion.

Rapid Hardening Portland Cements

gains strength more rapidly at early ages but has its ultimate strength comparable to OPCs. It is used where early strength is required.

Portland Slag Cements and Portland Pozzolana Cements:

Generally, such cements have low heat of hydration, better sulphate and chloride resistance and have low permeability. These are more suited for use in marine structures and in structures having contact with soils and water containing high percentages of sulphates and acids. These consist of OPC clinker and gypsum ground together with blast furnace Slag (Ground Granulated Blast Furnace Slag) or other pozzolanic material e.g. ground calcinated clay or fly ash conforming to IS: 3812. Ground slag or pozzolana, which by themselves do not possess any cementitious properties, but these, when in finely ground state, Chemically react with free lime available in OPC cement paste in presence of moisture at ordinary

temperature to form compounds possessing cementitious properties. This chemical reaction is initiated due to generation of free lime as a result of hydration of OPC. Substantial part of the free lime i.e. Ca(OH) available in cement paste, which does not contribute towards strength development, is used up in hydration of ground slag or pozzolana present in finely divided form in cement. This results into a stable pore sealing product and contributes to delayed strength development even though the pattern of gain of strength is similar to that of OPC. Therefore, pozzolanas are being used as additives as partial substitute of OPC clinker from 20 to 35%. Presence of moisture is necessary for pozzolanic reaction, which is a delayed process. Therefore, adequate extended curing is required. Loss of free lime in pozzolanic reaction causes the pH of hydrated gel of cement paste to be lower than OPC, which is generally not more than in such cements. There is evidenced that the blended cements with substantial contents of pozzolanic materials or blast furnace slag have reduced permeability to chlorides. On the other hand, the advantage of reduced permeability of such cement paste is not generally available in micro-

cracked tension zones of flexural members, accommodating active steel reinforcement. So, from corrosion point of view of reinforcing steel, in flexural members, use of such cements may prove to reduce durability and in compression members with compression loads less than 0.2f and also for concretes of grades up to at least M30.

Shrinkage Compensating Expansive Cements :

Shrinkage compensating expansive cements are used to minimize cracking caused by drying shrinkage in repair concrete in addition to its use in concrete structures. Drying shrinkage is the contraction caused by moisture loss from concrete. It does not include plastic volume changes that occur due to temperature change, structural loads, other chemical reactions or those before setting of concrete/mortar, when surface evaporation exceeds the concrete bleeding rate. These cements are designed to expand by small extent during the first few days of hydration.

The extent of expansion intended is to approximately offset the amount of drying shrinkage anticipated in the concrete or mortar. The expansion is brought about by incorporating some specific compounds such as calcium sulphoaluminate, calcium aluminate and calcium silicate or other phases that, in presence of water, react to produce larger quantity of ettringite than is normally produced by Portland cements. The production of ettringite in the hardened concrete/mortar causes the concrete to expand. The expansive reaction essentially gets completed in first seven days. The value of expansion between 7 and 28 days is limited to be not more than 15% of the 7 day expansion. To achieve proper performance of shrinkage compensating expansive cements, inclusion of appropriate amount of reinforcing steel in concrete is necessary. For maximum expansion, additional moisture beyond that added as mixing water must be supplied during curing of the concrete to ensure that the desired amount of ettringite will be produced.

All other special cements should be used for special purposes intended as per specialist's recommendations.

2. Mineral Additives

Fly Ash (FA), Silica Fume (SF), Rice Husk Ash (RHA), Ground Granulated Blast Furnace Slag (GGBS) and metakaoline, which have good pozzolanic properties are being used as mineral

additives in concrete and mortars with certain advantages in regard to their impermeability, resistance to leaching, resistance to chloride & sulphate attack and better crushing strength. As already explained, the pozzolanic reaction results in reduction of free lime and pH of hydrated cement paste. Such additives are to be used with caution, while repairing flexural structural members requiring protection of reinforcement against corrosion.

3. Chemical Admixtures

It is a material, other than water, aggregates, hydraulic cement, mineral additives and fibre reinforcement, used as ingredients of concrete or mortar and added to the batch immediately before or during its mixing to modify one or more properties of the repair concrete/mortar/ slurry in plastic or hardened state. As per IS: 9103, the admixtures are classified

as under:—

1.Retarding admixtures

2.Water reducing admixtures

3.Air entraining admixtures, and

4.Super-plasticising admixtures

D*osage & Compatibility of Chemical Admixtures:*

It is important to note that the dosage of admixture varies depending upon the type & source of cement, aggregate and environmental conditions. It is, therefore, desirable to always determine compatibility of the admixture and

its dosage experimentally before using the same in any work, to achieve the desired properties of repair mortar/concrete.. The manufacturer's literature, may however render preliminary guidance and should be treated as starting point for carrying out the test exercise for determining the optimum dosage of admixture.

4.Water Cement Ratio:

Water cement ratio plays a vital role in controlling shrinkage, water permeability, percentage of capillary pores and enhancing strength. As it is very difficult to control water cement ratio while producing concrete or mortars in scattered works, a mechanical control of quantity of water is essential to ensure consistently uniform quality of concrete/mortar batch after batch with the use

of Mechanical Water Dozer. The plasticizers and super plasticizers can be gainfully used to control water/cement ratio without any compromise on the workability.

5.Polymer Modified Mortars and Concrete (PMM/PMC)

The process technology of making the latex-modified mortar and concrete is similar to that of the conventional binding systems. Most polymers, such as latexes, are in the dispersed form. These are initially mixed in water in required proportion and then added to the cement mortar or concrete. The latex-modified mortar or concrete, are placed similar to normal concreting and cured under optimum conditions.

Materials:

The materials used in polymer modified systems are the same as those employed in normal mortar and concreting operations but for the latex/polymers, which is used as a modifier.

However these are briefly described as under:

A. Cements

: OPC is widely used for polymer modified mortars and concrete including all other portland cements depending upon their applications. However, air entraining cement are not used because air entrainment occurs due to latex addition.

B. Aggregates:

The aggregates used for normal concreting operations are recommended for latex mixes. The aggregates should be clean, sound and of proper grading.

C. Other Materials:

Alkali- resistant glass, steel polyamide, polypropylene, polyvinyl alcohol, acramide, and carbon fibers are used as reinforcements. Production of coloured latex mortars needs inclusion of pigments that are alkali resistant and weatherproof. They should also not interfere with the stability of latexes and hydration of cements.

D. Polymers:

Polymers are long molecules, built by combination of single units called monomers. Polymers are essentially hydrocarbons. The process of conversion of monomers into polymer is called polymerization. In civil engineering, polymers

obtained from monomer at ambient temperature are important from practical point of view.

Polymer Latexes:

Polymer Latexes consisting of very small diameter particles (0.05 – 5 mm) emulsified in water. Most of the commercially available polymer latexes for cement modification are based on elastomeric and thermoplastic polymers,

which form continuous polymer films when dried. Out of the several types of PMM/PMCs produced, the latex modified mortars and concretes are by far the most widely used cement modifiers. It is important to note that the cement hydration is a continuous process. Latex modification of cement mortar and concrete is governed by both cement hydration and polymer film formation process in their binder phase. The cement hydration process generally precedes

the polymer formation process. In due course, a co-matrix phase is formed by both cement and polymer film formation processes. This yields a monolithic interwoven matrix of solidified polymer and its continuous film with hydrated cement and this binds the aggregates strongly. Consequently, the properties of hardened cement mortar/concrete are improved.

: SBR latexes for cement modifiers

Redispersible Polymer Powders:

The principles of modification of cement mortars/ concretes is almost the same as that of the polymer latex modification except that it involves addition of redispersible polymer powders. Mostly these are used by dry mixing with

cement and aggregate pre-mixtures followed by wet mixing with water.

Water Soluble polymers:

These, being water soluble, are mainly used for improving

workability of cement mortars and concretes and prevents “dry out” phenomenon due to increased viscosity of water phase in the modified cement mortar/concrete and a sealing effect due to formation of a very thin impervious film in them. In general these do not contribute to any improvement in strength of modified system. These are normally used at polymer: cement ratio less than 3% by weight. When added in powder form, , it is advisable to dry blend the polymer with cement aggregate mixture before adding water.

***Liquid Resins**:*

Liquid thermosetting resins are polymerizable low molecular weight polymers and pre-polymers. These are added to cement mortars/ concrete in a liquid

form. Polymer content in cement mortars/concrete is generally higher than the latex system. In this modification, polymerization is initiated in presence of water to form a polymer phase and simultaneously the cement hydration occurs. As a result a co-matrix phase similar to latex modified systems is formed and this binds the aggregates strongly. Consequently, the properties of hardened cement mortar/concrete are improved.

Monomers:

Principles of modification of cement composites remain the same as that of the

liquid resins detailed above except that here monomers are added instead of liquid resins. In such a case of modification, polymerization and cement hydration takes place simultaneously at the same time during or after curing to make it a monolithic matrix, which binds aggregates. Generally, such a system of modification is not successful because of degradation of monomers by alkalis present in cement paste and interference of cement hydration and difficulty in

uniformly dispersing monomers and other components during mixing..

cement hydrates and aggregates. Very good water, alkali and weather resistance

Available Product Guide on Construction and Repair Chemicals Contents

1 Injection Grouts

2 Rust Convertors/Removers for Reinforcements

3 Corrosion Inhibitors as admixture in Concrete/Mortar

4 Passivating/Protective/Bond Coats on Reinforcement

5 Bonding Coats

6 Plasticizers

7 Super Plasticizers

8 Shrinkage Reducing/Compensating Compounds

9 Free Flow Self Compacting Micro Concrete

10 Polymer/Epoxies in Repair Mortar/Concrete

11 Quick Setting Compounds

12 Retarders

13 Curing Compounds

14 De-Shuttering Oils

15 Floor Hardners

16 Water Proofing Compounds

17 Air Entraining Agents

18 Anti Carbonation Protective Coating on Concrete

19 Protective Coat on Steel Structures

20 Acid Résistance Enhancer

21 Mechanical/Chemical Anchors concrete of Gola is provided after .

Linear Programming As An Academic Discipline And Tool For Decision Support

By Deepika Devi

Decision making essentially involves choosing a particular course of action, after considering the possible alternatives scientific decision-making rests upon organized principles of knowledge and depends largely upon the collection of empirical data and analysis of the data in a way that repeatable results will be obtained.

The association of management with the scientific method involves drawing objective conclusions from the facts. Facts come from the analysis of data, which must be gathered, compiled and digested into meaningful form, such as graphs and summary statistics.

Management as a science is characterized by

- Organized principle of knowledge.
- Use of empirical data.
- Systematic analysis of data.
- Repeatable results.

Operations decision range from simple judgments to complex analyses. Decision incorporates basic knowledge, experience, and common sense. They enable to blend objectives and sub-objective data to arrive at a choice.

The appropriateness of a given type of analysis depends on

- The significant or long lasting decisions,
- The time availability and the cost of analysis, and
- The degree of complexity of the decision.

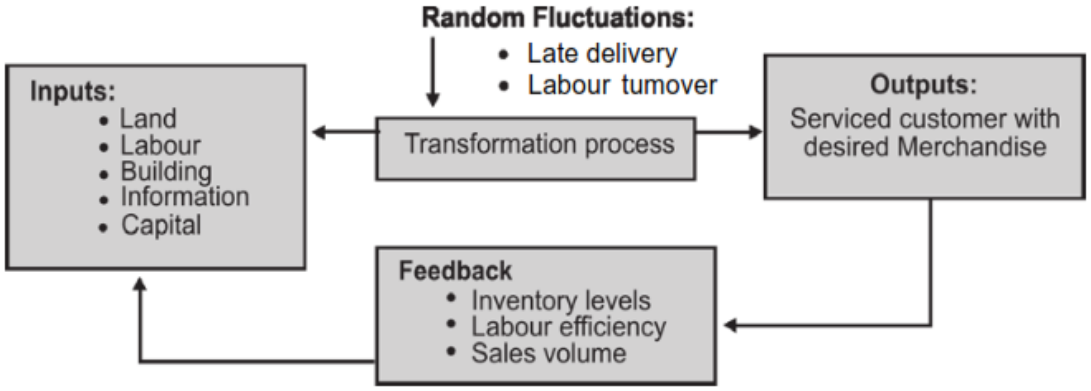
The significant or long lasting decisions deserve more considerations than routine ones. Plant investment, which is a long-range decision, may deserve more thorough analysis. The time availability and the cost of analysis also influence the amount of analysis. The degree of

complexity of the decision increases when many variables are involved, variables are highly independent and the data describing the variables are uncertain.

In 1911 Frederick Taylor published his "The Principles of Scientific Management", in which he characterized scientific management as:

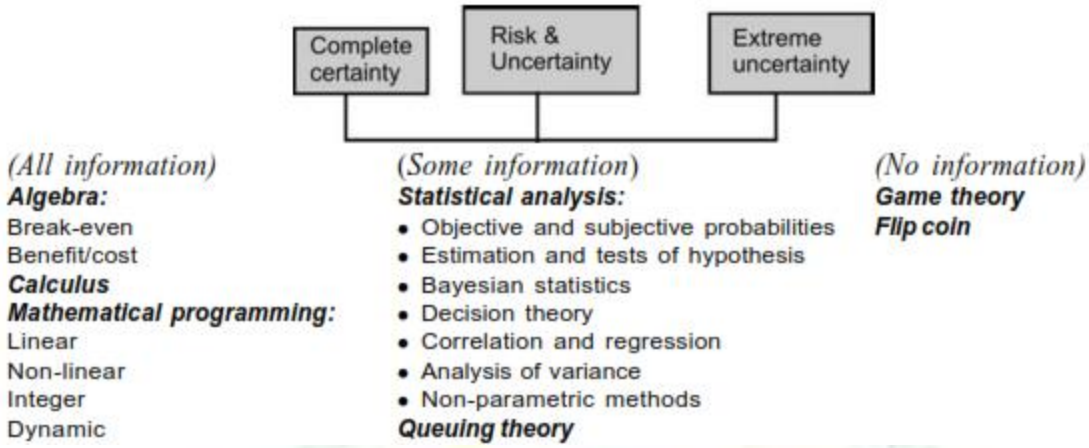
1. The development of a true science
2. The scientific selection of the worker
3. Their scientific education and development
4. Intimate friendly cooperation between management and the workers

Taylor is also credited for developing stopwatch time study, this combined with Frank and Lillian Gilbreth motion study gave way to time and motion study which is centered on the concepts of standard method and standard time.



Steps involved in decision making

- Defining the problem.
- Establish the decision criteria.
- Formulation of a model.
- Generating alternatives .
- Evaluation of the alternatives.
- Implementation and monitoring.



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जनसंख्या वृद्धि – नियंत्रण

MANJU

CMJ University Scholar

जनसंख्या वृद्धि के परिणामस्वरूप नगरो के आकार मे वृद्धि हुई है और शहरो मे भीड़ बढ़ती जा रही है । इधर तीन चार दषको मे भारत मे जनसंख्या का विसफोट सा हो रहा है जिसके कारण देश को लाभ की अपेक्षा नुकसान अधिक हो रहा है । जिस परिवार में बच्चे अधिक होते है , उनमें उनकी देखभाल ,लालन –पालन ,शिक्षा आदि की ओर माता – पिता का ध्यान नजाकर उन्हे भोजन वस्त्र जुटाने मे लगा रहता है बच्चे दुबले , पतले अस्वस्थ और अशिक्षित रहने से पीड़ी दरिद्र और निस्तेज दिखाई देती है यदि हम देश की गरीबी और अशिक्षा को कम करना चाहते हैं तथा देश की प्रगति चाहते हैं तो हमे जनसंख्या की बाढ़ पर रोक लगानी होगी ।

अस्तु समय की माँग है कि जनसंख्या नियंत्रण हेतु कारगर कदम उठायें जाये और यह तभी संभव है जब जन – जन तक जनसंख्या वृद्धि व उसके परिणामो से लाभ हानि का ज्ञान पहुँचाया जाय । इसके लिए जनसंख्या शिक्षा की महती आवश्यकता है ।

भारत के पूर्व राष्ट्रपति श्री वंकटरमन ने अपने भाषण मे कहा था कि – ''बढ़ती हुई बेरोजगारी और मनुष्य का दुःख बढ़ती जनसंख्या के ही दुष्परिणाम हैं।''

यद्यपि हमारी सरकार ने जनसंख्या वृद्धि , अशिक्षा के कारण देश में बढ़ रहे दुर्भिक्ष व संकट से मुक्ति पाने हेतु कई बार प्रभावी कदम उठाकर जनसख्या नियंत्रण की चेष्टा की किन्तु इसके उचित ज्ञान के अभाव और साधारण जनता के दृष्टिकोण मे साम्य स्थापित न हो पाने के कारण सरकार को इसके बुरे परिणाम भुगतने पड़े । अतएव जनसंख्या नियंत्रण के पूर्व जनता की भावनाओं से अवगत होना अत्यावश्यक हो गया है ।

भारत को स्वतंत्र हुए लगभग 56 वर्ष व्यतीत हो गये । इस लम्बे समय मे देश ने सम्पूर्ण समस्याओ को हल करने के लिए अधिक प्रयत्न किये हैं। इन सभी समस्याओ मे भोजन , वस्त्र तथा आवास की समस्याओ को हल करने पर विशेष बल दिया गया है । खाद्य समस्या को हल करने के लिए कृषि योग्य भूमि का विस्तार किया गया है । सिंचाई का प्रबन्ध किया गया है । उत्तम कोटि के बीजो के प्रयोग पर बलदिया गया है । और रासायनिक खाद के निर्माण के लिए विशाल फैक्ट्रियो की स्थापना की गयी है। वस्त्र की समस्या को हल करने के लिए हथकरघा उद्योग का विकास किया गया है और कपड़ा मिलो मे स्वचालित यंत्रो को लगाया गया है । गृह समस्या के हल के लिए नवीन प्रकार के कम खर्च मे बनने वाले मकानों को बनाने का प्रबन्ध किया गया है और मकान बनवाने के लिए कम ब्याज तथा सुविधाजनक शर्तो पर ऋण की व्यवस्था की गयी है । यद्यपि इन प्रयासों के फलस्वरूप समस्याओ की भीषणता तो कम हो गयी है पर वे पूर्णतया हल नही हो पायी हैं । कुछ समय के लिए तो ऐसा ज्ञात होता है कि समस्या दूर हो गयी है पर थोड़े समय बाद उनका भयंकर रूप पुनः हमारे सामने आ जाता है । कारण यह है कि तीन चार दर्षको मे भारत मे जनसंख्या का विष्फोट सा हो रहा है । हमारी जनसंख्या तेजी से बढ़ रही

है । जैसे ही हम कुछ प्रयत्न करके अपनी उपज आदि को बढ़ा पाते है । हमारी जनसंख्या आगे को बढ़ जाती है ओर हम जहाँ के तहाँ फिर दिखाई देते हैं ।

भारत में निरंतर जनसंख्या की वृद्धि हो रही है । इसका प्रमाण है नगरो और गाँवो के आकार मे वृद्धि । नगरो मे लोागे की भीड़ – भाड़ बढ़ती जा रही है । उनमे कई – कई मंजिल । या दो कमरे वाले मकानो में 5–6 सदस्यो के परिवार ऐसे रह रहे है जैसे कीड़े – मकोड़े । नगरों मे लोगो को न तो खुली धूप ही मिलती है न पूरी तरह से साफ हवा और पानी ही उपलब्ध हो पाता है । छोटे – छोटे बच्चो की भीड़ सड़कों और गलियो मे सुबह ओर शाम इतनी अधिक हो जाती है कि ऐसा प्रतीत होता है मानो किसी सिनेमा गृह से भीड़ बाहर निकल रही हो । लोगों को नगारों मे आवास उपलब्ध नही है , फलस्वरूप जाड़ हो या बरसात उन्हें फुटपात पर ही रात गुजारनी पड़ती है ।

भारत पहले से ही पर्याप्त जनसंख्या वाला देश रहा है फिर लगभग 900 वर्षो की पराधीनता ने इसे अशिक्षा , दरिद्रता ,रूढ़िवादिता आदि की जंजीरो मे जकड़ दिया । इसके फलस्वरूप देश मे बहुत ही अनियंत्रित ढ़ंग से जनसंख्या बढ़ती रही और भारत प्रगति के पथपर संसार के अन्य देशो से बहुत पीछे रह गया । भारत की स्वतंत्रता के बाद हमारी लोकप्रिय सरकार ने देश की जनसंख्या वृद्धि को रोकने के लिए अनेक योजनाएं बनायीं , उन्हे व्यवहार मे भी लाया गया । परन्तु स्थिति मे कोई विशेष संतोषजनक सुधार नही हुआ । सन् 1947 में भारत की आबादी करोड़ थी जबकि सन् 1971 मे यह 55 करोड़ तक पहुँची । इस समय हमारे देश की जनसंख्या लगभग 1 अरब से अधिक है। जनसंख्या की दृष्टि से

संसार मे यह चीन के बाद सबसे विशाल राष्ट्र है । निश्चय ही जनसंख्या वृद्धि की यह स्थिति भयावह है यदि यही स्थिति रही तो सन् 2010 तक हमारे देश की जनसंख्या डेढ़ अरब तक पहुँच जायेगी ।

माल्थस के अनुसार जनसंख्या मे जीवन के साधनो से कही अधिक तेजी से बढ़ने की प्रवृत्ति होती है इसलिए उसकी वृद्धि मे प्राकृतिक व दमनात्मक निरोध बाधक होते है । तथ्यो के अध्ययन द्वारा माल्थस ठीक ही इस निष्कर्श तक पहुँचा था कि जन समूहो मे बड़ी तेजी से बढ़ने की प्रवृत्ति होती है और यदि बीमारी , युद्ध , शिषु – हत्या या यौन सम्बन्धो में समझदारी के द्वारा नियंत्रण न होता तो जनसंख्या मे अत्यधिकं वृद्धि हो जाती । प्रकृति ने मनुष्य को एक शक्तिशाली यौन प्रेरणा दी है और यदि इसकी तृप्ति पर कोई नियंत्रण न रखा जाय तो इससे दुराचार और दुर्गति मे वृद्धि होती है । यह यौन प्रेरणा इतनी शक्तिशाली होती है जब जीवनयापन के साधन बढ़ते है तब मनुष्य नासमझ होकर अपनी संख्या मे बढ़ी तेजी से वृद्धि करने लगता है । जब जनसंख्या मे बृद्धि होती है तब जीनवयापन के साधनो पर बहुत भार पड़ता है । वे बढ़ी हुई जनसंख्या के लिए पर्याप्त आहार प्रदान करने मे असमर्थ होते है । फलस्वरूप यह जनसंख्या क्षुधा पीड़िता रहती है और इसका पर्याप्त पोषण नही हो पाता । यह भूखी जनसंख्या बीमारी का शिकार होने लगती है । या फिर भोजन प्राप्ति के लिए भयानक युद्ध भी हो सकते हैं। दोनो ही हालातो में बड़े पैमाने पर मौतें होती है । अथवा हो सकता है कि अपनी संतान के आहार के लिए पर्याप्त भोजन न पा सकने के कारण माता – पिता शिषु हत्या जैसा अमानवीय कार्य करने को विवश हो जायँ । यह भी संभव है कि वे अपने यौन सम्बन्धो मे अधिक समझदारी से

काम लें और अपनी यौनेच्छा पर नियंत्रण रखें । इन सब हालातो मे जनसंख्या मे कमी होगी और इस प्रकार जीवनयापन के साधन पर्याप्त सिद्ध होगें ।

इस प्रकार विपत्ति व दुःख के काल के बाद अपेक्षाकृत सुविधा और सुख का समय आता है । यदि इस समय सुखमय समय को दीर्घ बनाने के सचेत प्रयत्न नही किये जाते जो इसके बाद फिर विपत्ति का काल आयेगा । उत्पादन पद्धति मे वैज्ञानिक या संगठन सम्बन्धी उन्नति करके ऐसा किया जा सकता है क्योकि यदि फिर से जनसंख्या बढ़ती है तो भी जीवनयापन के साधन कम न होगें और तब परिणामस्वरूप भूख से मृत्यु या अपर्याप्त पोषण का प्रश्न ही नही उठेगा । किन्तु ऐसा करने से केवल अस्थायी सहायता ही मिलेगी । दूसरा तरीका यह है कि लोग यौन – सम्बन्धो मे समझदारी से काम लें । वे नैतिक निरोधो द्वारा या विवाह करने की आयु को बढ़ाकर जन्मदर को कम कर सकते है अथवा यह भी किया जा सकता है कि रहन –सहन के स्तर को स्थायी रूप से ऊँचा करें उसे रूढ़ बना दिया जाये । यदि ऐसा हो जाय तो जब तक आय बढ़े तब तक लोग सन्तानोत्पत्ति न करना चाहेंगे क्योकि इससे रहन – सहन का स्तर अवष्य नीचा होता है । जनसंख्या मे खाद्य सामग्री से अधिक बढ़ने की प्रवृत्ति रहती तो है किन्तु ऊपर दिये गये उपायो से उस पर नियंत्रण रखा जा सकता है परन्तु जनसंख्य की वृद्धि को नियंत्रित करने की पर्याप्त प्रेरणा सिर्फ इस बात से नही मिल सकती कि सन्तानोत्पत्ति मे माता – पिता का खर्चा बढ़ जाता है ।

प्रत्येक 25 वर्षों की अवधि में जनसंख्या तो दुगनी हो जाती है किनतु जीवनयापन के साधन प्रत्येक अवधि मेसमान अन्तर से बढ़ते है । पहले क्रम को तो सही माना जा सकता है क्योकि वह एक प्राणिशास्त्रीय नियम पर आधारित है । जनसंख्या के 25 वर्षो मे केवल दुगनी होने का अर्थ केवल यह है कि प्रत्येक दम्पति के इतनी सन्ताने होती है कि उनमे से कम से कम चार विवाह योग्य आयु तक पहुँच जाते हैं यदि हम स्वीकार कर ले कि हर तीन बच्चो मे से एक शिषु अवस्था ही में मृत्यु हो जाती है तो प्रत्येक दम्पति के वैवाहिक जीवन मे केवल छः बच्चो की उत्पत्ति होने पर भी जनसंख्या दुगनी हो जायेगी क्योकि इनमे से चार विवाह योग्य आयु तक पहुँच जायेगें । माता – पिता अपनी यौनेच्छा पर कोई रोक न लगाये तो छः बच्चो का होना बहुत नही है । यह सच है कि अधिकांश पष्चिमी देशो मे बहुत से माता – पिता इतने बच्चो को जन्म नही देते किन्तु इसका कारण यह होता है कि वे जानबूझकर संतति निरोध का प्रयत्न करते है कोई प्रतिबन्ध न होने पर एक परिवार मे बच्चों की संख्या छः से अधिक होगी , कम नही । भारत और चीन आदि की बात तो जाने दीजिये , पष्चिमी देशो तक में एक दर्जन से ऊपर बच्चो को जन्म देने वाले माता – पिता पाये जाते है । माल्थस का यह कथन कि यदि बन्धन न हो तो जनसंख्या 25 वर्षो मे दुगनी हो जाती है । किसी प्रकार की अतिशयोक्ति नही है । यदि माल्थय ने कुछ गलती की ही है तो वह अति अनुमान की नहीं वरन् अनेमान की हो सकती है । इस प्रकार आपत्ति की जा सकती है कि एक पीड़ी की अवधि 25 वर्ष नही बल्कि 30 या 33 वर्ष माननी चाहिये । किन्तु यह एक मामूली सी बात है और उससे उसके तर्को की सबलता पर कोई प्रभाव नही पड़ता ।

यदि निश्चित है कि समय रहते हुए यदि जनसंख्या वृद्धि पर अंकुश न लगाया जा सका तो वह भयावह स्थिति उत्पन्न हो जायेगी कि जीवन की बुनियादी आवश्यकताओ की पूर्ति हो पाना कठिन हो जायेगा । अस्तु जनसंख्या शिक्षा के प्रचार या प्रसार की आवश्यकता है ।

जनसंख्या के तीव्र गति से बढ़ने का मुख्य कारण उच्च जन्मदर है स्वतंत्रता प्राप्ति के बाद भारत मे मृत्यु दा मे तेजी से कमी आयी है । विज्ञान की प्रगति और चिकित्सकीय सुविधाओ मे सुधार से बहुत ही जानलेवा बीमारियों पर नियंत्रण पा लिया गया । नतीजा है मृत्यु दर मे कमी । परन्तु हम इसकी तुलना मे जन्मदर कम नही कर पाये । हमारी जन्मदर जो 1951 –61में 41.7 प्रति हजार थी , वह घटकर 28.5 प्रति हजार हो गयी है। और वह 22.8 प्रति हजार से घटकर 9.2 प्रति हजार रह गई है ।

जनसंख्या शिक्षा

जनसंख्या शिक्षा एक ऐसी शैक्षिक प्रक्रिया है जिससे शिक्षार्थियो मे जनसंख्या की समस्याओ के सम्बन्ध मे मूलभूत जानकारी तथा लघु परिवारो के प्रति रूचि उत्पन्न होती है। सन् 1970 में बैंकाक मे जनसंख्या शिक्षा तथा परिवार शिक्षा पर विचार विमर्ष करने हेतु एक गोश्ठी आयोजित की गयी थी। इस गोष्ठी मे जनसंख्या शिक्षा को इस प्रकार परिभाशित किया गया – '' जनसंख्या शिक्षा एक ऐसी शैक्षिक कार्यक्रम है , जो शिक्षार्थियों मे जनसंख्या की स्थिति सम्बन्धी परिवार,समाज एवं देश के संदर्भ में उचित और उत्तरदायी दृष्टिकोण एवं व्यवहार विकसित करने का प्रयत्न करता है ''

डॉ0 चन्द्रशेखर के अनुसार – '' जनसंख्या शिक्षा जनसंख्या वृद्धि के विभिन्न आयामो तथा आर्थिक ,सामाजिक व सांख्यिकीय जनसंख्या वितरण और जीवनस्तर से सम्बन्ध तथा न्यायकारी राज्य अर्थव्यवस्था में इसके आर्थिक एवं सामाजिक क्षेत्रो मे अन्तिम परिणाम के सम्बन्ध मे जानकारी प्रदान करती है ।

यूनेस्को द्वारा प्रतिपादित परिभाषा के अनुसार – ''जनसंख्या शिक्षा एक शैक्षिक कार्यक्रम है जो परिवार, समूह ,राष्ट्र ,तथा विश्व की जनसंख्या स्थिति के सन्दर्भ मे विद्यार्थियो मे आदर्श एवं जिम्मेदारी , अभिवृत्ति तथा व्यवहार विकसित करता है ।

राज्य शिक्षा संस्थान उत्तरप्रदेश के विचारानुसार – '' यह एक ऐसा प्रयत्न है , जिसके माध्यम से भिन्न – भिन्न वर्ग विशेंषतः छात्र – छात्राओ को विश्व के परिपेक्ष्य मे देश , प्रदेश और क्षेत्र की जनसंख्या की स्थिति जनांकिकी के प्रमुख तत्वो , जनसंख्या तथा पर्यावरण के परस्पर सम्बन्धों , जनसंख्या वृद्धि के आर्थिक एवं सामाजिक विकास आदि के सम्बनध मे जानकारी प्रदान की जा सकती है''

उपरोक्त परिभाशाओ के आधार पर निश्कर्ष रूप मे यह कहा जा सकता है कि जनसंख्या शिक्षा, शिक्षार्थियों मे जनसंख्या वृद्धि के दुष्परिणामों तथा जनसंख्या वृद्धि नियंत्रण के लिए तक्रयुक्त व न्यायसंगत दृष्टिकोण अपनाने की चेतना उत्पन्न करने की शिक्षा है । इस शिक्षा का सर्वप्रमुख लक्षण है – '' सर्वे भवन्तु सुखिनः ।''

साराश

जनसंख्या शिक्षा का तात्पर्य ''परिवार नियोजन नही है अपितु यह एक ऐसा कार्यक्रम है जो कि जन साधारण को सीमित व असीमित परिवारो में घटित नित्यप्रति की घटनाओ से सावधानी बरतने की चेतना उत्पन्न करता है जिस प्रकार एक स्थान पर उगे हुए घने पौद्यो को खाद्य पदार्थ , वायु, धूप और पानी अपेक्षित अनुपात में मिल पाना कठिन होता है । उसी तरह अधिक घनी आबादी वाले क्षेत्रों में तथा सामर्थ्य से अधिक संख्या में परिवारजनो की गणना व्यक्ति को आवश्यकतानुरूप भोजन , पानी , वस्त्र , सिर ढ़कने के लिए स्थान चिकित्सा हेतु दवाइयाँ , शैक्षिक खर्च , प्रदूषण से बचाव शान्ति मय वातावरण प्रदान करने में सर्वथा निष्प्रभावी रहता है ।

Hydrogen storage as storage for Renewable energy

By Jagdish Pati (CMJ University Scholar)

Introduction

Renewable energy sources are fundamental for an environment-friendly energy supply. Today, the most important renewable energy sources are hydro power and bio energy. Moreover, the installed wind power capacity was over 30 GW worldwide by the end of 2002, and wind power is today the fastest growing electricity generation technology.

However, the intermittent nature of wind makes power system operation especially challenging. Rapid and flexible control of other generators is required to balance wind power generation with demand. In addition, the best wind resources are often found in rural areas far from existing high- capacity transmission lines.

Energy Storage issues

Energy storage is a potential solution to the integration issues that are described above. Appropriate operation of energy storage could increase the value of wind power in the power system by ensuring a closer match between wind power generation and demand. In weak networks, storage of wind energy could also be used as a means for avoiding overloading of lines or undesirable voltage increase in periods with high wind speed. Storage of wind energy in the form of hydrogen has received especial attention. Hydrogen produced from electrolysis of water is the link between wind energy and a "hydrogen economy". Hydrogen is a flexible fuel that can be used for stationary energy supply and as a fuel for transportation. There also exists a range of other energy storage solutions that could be applied for energy management in connection with wind power, such as secondary batteries, pumped hydro, redox flow cells and compressed air storage.

The idea of using hydrogen storage and other storage solutions to balance wind power fluctuations is not new. Although the field has received increasing attention as the share of wind power in power systems increases and as the development of storage technologies continues, published studies on energy management of such systems are few. The main contributions of this work are the development of new methods for evaluating three principal opportunities for energy

storage and hydrogen in connection with wind power:

- Wind is intermittent and difficult to predict. Energy storage could be valuable for balancing wind power generation with demand and for reducing generation uncertainty. It is shown that energy storage systems with relatively low power rating and storage capacity provides substantial operational benefits for wind power in electricity markets with moderate to high price variations and imbalance costs. Optimization of generation scheduling and on-line operation by the use of wind power forecasts is crucial to obtain these benefits.

- Good wind sites are often located in remote areas. Storage of wind energy could defer grid upgrades in weak grids and reduce the dependency of fossil fuels in isolated power systems. However, this will prove to be a costly alternative if seasonal storage of wind energy is necessary. In the case of hydrogen, reduction of hydrogen storage costs would be more important than obtaining low-cost and high-efficient fuel cells and electrolyzers.

- Hydrogen as a storage medium for wind energy could provide clean fuel for transportation. Operation strategies for electrolytic hydrogen production as a flexible load for wind energy have been developed. Through simulations, it is shown how the electrolyzer can be operated to exploit excess wind energy and to take advantage of electricity price variations. Moreover, considerable cost savings could be obtained by using the same hydrogen storage system for providing energy for stationary use and for transportation.

Wind integration

Many electricity grids have been constructed for supplying dispersed loads with power generated at large, centralized plants. Power losses from source to end-use can be high at both transmission level and distribution level, depending on the grid layout and the distance between the power plants and load centers. In the Nordic power system for example, there is a considerable net power export from the northern parts with large hydro power plants to the much denser populated areas in the south. Furthermore, in the sparsely populated parts of Norway, the distribution grids consist of long, radial feeders. These feeders often have an R/X-ratio (resistance/reactance) that gives rise to high grid losses. Thus, installation of small, distributed generating units near the loads will reduce power flow from the central plants and thus reduces losses. In

fact, a study of a 6 kV rural network in New Zealand has shown that dispersed and properly sized wind turbines will not only have a positive effect on losses, but could also improve voltage quality . Simulations of regional grids at 66 kV level at Vikna in Mid-Norway and 132 kV level in Italy have also concluded that distributed wind power plants reduce losses . The Italian case study also showed how wind power could defer grid upgrades due to expected increase in the electricity demand. However, since wind is a highly intermittent energy source, it is claimed that any such benefit is likely to be small and will be site-specific . Installation of energy storage could enhance the wind farm performance and thus delay or even avoid grid upgrades. A study by the Oak Ridge National Laboratory on a 25 kV distribution network near Eastsound, USA showed that an MW-scale wind farm with battery storage could be an economic viable alternative to upgrading distribution facilities . Another example is the remote island Røst in the northern part of Norway. The island is today connected to the mainland via a sea cable that should be replaced by 2008 to maintain a secure power supply . The municipal and the local energy company have evaluated different alternatives to a new cable, including a MW-sized wind- hydrogen system.

Local and regional voltage rise problems are likely to occur as more wind power is integrated in the grid, . It is now common to build large wind farms, which give high concentration of wind power at a regional level. For instance, the wind power potential is especially good along the coastline in the northern part of Norway, which has led to a large interest for development of wind farms. Figure 1 shows a map of wind farms that are considered to be built in the area. Studies have shown that it is not possible to realize all the wind farm projects east of Balsfjord (near Kvaløya shown in the map), without reinforcements of the existing 132 kV grid [11]. Upgrading to a new 420 kV line will make it possible to install up to 900MW. However, the potential is probably far larger than the capacity of the proposed new line. Since the study concluded that the wind power integration is limited by voltage stability and not the thermal limit of the new line, it is not possible to increase the wind penetration by further upgrade of the grid inside the area. It would then be necessary to build another strong connection out of the area, for instance southwards to Finland .

This example is characteristic for wind power integration in weak grids, namely that problems associated with voltage rise and voltage stability occurs before the thermal limits of the lines are reached . Traditional grid planning procedures would in this case recommend upgrading of existing lines or building of new lines, either locally or regionally, or both. However, the relatively low utilization factor of wind power may give lower utilization of the grid capacity than

desirable for expensive grid investments. Furthermore, geographical and environmental constraints obstacle grid upgrades in some areas. However, there are other alternatives that can overcome voltage-quality constraints :

- Dissipation of wind energy
- Reactive power regulation
- Control of tap changing transformers
- Load management
- Application of energy storage

These alternatives can be defined as *active* control actions in contrast to the grid upgrade alternative, which is *passive* in the sense that wind turbines are regarded as uncontrollable power generating units.

Conclusion

Hydrogen storage could also be applied in windy areas with no electrical infrastructure. Wind power will in that case be used exclusively for hydrogen production, which requires special solutions for the electrical connection between the generator and the electrolyzer. In addition, the electrolyzer must be able to handle fluctuating operating condition with minimal electrochemical degradation. Because of the low volumetric density, the hydrogen gas must be compressed or liquefied and then transported to load centers by pipelines, trucks, ships, or railway.

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