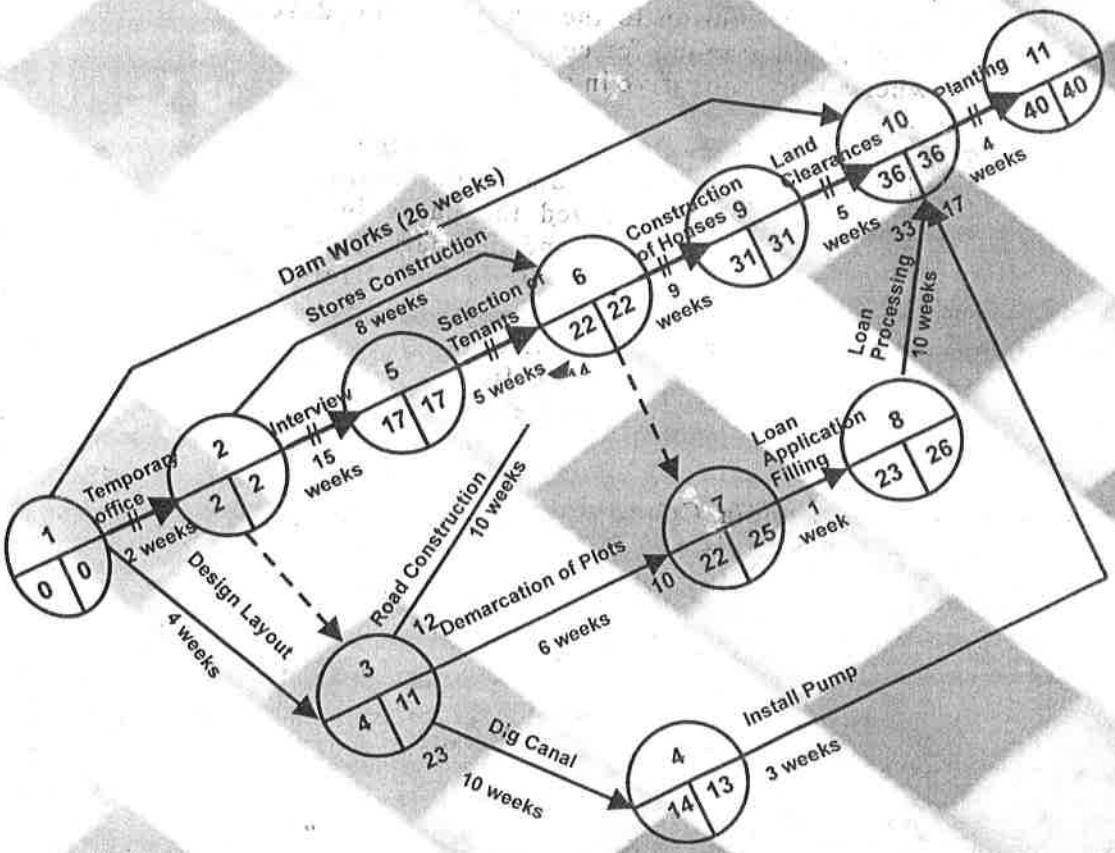
Dimensions In Development

Topical Discussions

Shreeranjan



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TOPICAL DISCUSSIONS

Shreeranjan

NORTH- EAST INDIA COUNCIL
FOR
SOCIAL SCIENCES RESEARCH,
SHILLONG, MEGHALAYA.

Dedicated to the calls and cause of development

Praise be to THE ALMIGHTY

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Contents

The author, Dr. Shreeranjan, is a member of the Assam - Meghalaya cadre of the Indian Administrative Service (IAS). Before joining the administrative service, the author was a lecturer in Ranchi University (now in Jharkhand). The author has also been awarded the degree of doctor of philosophy (Ph.D) from Department of Biotechnology, Gauhati University, Guwahati, Assam, India, in 2004. The author has served the cadre in the state of Meghalaya with distinction and dedication for more than eighteen years.

North East India Council for Social Sciences Research (N.E.I.C.S.S.R.) is a highly scholistic body devoted to the cause of development studies of Northeastern India and has organised various conferences, seminars, workshops on contemporary and relevant topics. NEICSSR has continuously been publishing a journal since 1974. It has also published more than 60 (sixty) books. Prof. B. Datta Ray is the Founder Secretary of this organisation.

PREFACE

There is a need to accelerate economic progress in North East India to make up for the lost time. Economic backwardness is the main reason for political instability and unrest in North East India. Troubles are entirely due to the neglect. The problem of economic backwardness is common to all the States of North East India. The piece-meal aids have not reached the grassroots. They go to the urban educated classes. There must be a comprehensive development plan for the entire region, particularly for the hills which are rural in character. The economic discontent can only be removed by genuine rural development.

Rural development in most of the developing region has remained as illusive agenda. The urban bias inherent in the process of liberalisation and globalisation demand state activism to counter the failures to the growth of rural economics.

Since 1950s India has evolved an elaborates institutional framework to shape the developmental needs of rural economics. But the institutional structures for rural development have undergone changes overtime, from the Community Development Block approach during 1950s and 1960s, to Panchayati Raj mechanism since 1990s. Not only there has been shifts in implementing institutional units, more more contents have been added to the programme. This book attempts to assess the skills and plans for handling the basic rural economic development issues, mechanism and planning process of rural economics be it of Meghalaya, Nagaland and distant Lesotho in Africa.

The materials presented in the book were prepared by Dr Shreeranjan in 1998-99 during his stay in the University of Manchester, Manchester, U.K. as a visiting scholar. Each of this chapter is self

contained and suggestive in nature in the preparation of rural plan project It raises basic debate of top down or bottom up approach. Here lies the main philosophy of rural construction debate which is a continuous process

Dr Shreeranjan clearly lays emphasis on issues for reducing inequality and restoring environmental health in development planning by resorting to the concept of Environmental Impact Assessment which should be a continuous process as a short term and long term tool. It includes the study of physical, ecological, socio-economic consultation and people-involvement in measuring environmental assessment.

There is an important study on water and sanitation which should form the basis of any rural construction scheme. It is an economic issue of sociological dimension for the hill states of North East India

Dr. Shreeranjan has rightly pointed out that the hard facts, show that some 1.3 billion people still lack access to safe water and some 2.5 billion access to sanitation. The crisis is more exacerbated by growing water scarcity, already affecting 132 million people in 20 countries and pollution being a major cause of diarrhoea disease 1998). Providing a minimum standard of safe water and sanitation would mean 2 million fewer deaths from diarrhoea each year in children under 5 years, 200 million fewer episodes of diarrhoea illness and debilitations (World Development Report 1992). The Nature has potentiality to renew water resource through an interlinked chain of hyrdological cycle can threaten the processes of life systems. Water resources are unevenly distributed, over the globe and this can be a possible cause for conflicts. Increasing wasteful abuse, contamination and pollution is making availability of good quality water an increasingly difficult costly and complex task. Water is needed for physiology, psychology, ecology, sustenance, survival and productivity. This touches all aspects of life including the socio-economic fabric of life.

Of all lending by World Bank during the Decade, 1980-1990, water projects consumed 20% of all lending-amounting $35 billion of which $21 billion was allocated to irrigation and hydropower. Rural water supply projects received only 5% ($1 billion) whereas for urban areas $5 billion was lent. Less than 4% of water lending during the decade went towards 'alternatives', 0.4% for small scale irrigation, 0.6% for watershed development and 2.7% for water conservation and efficiency, 76% went for new infrastructure, 11% for maintenance and up-gradation and 9% for Institutional development and technical assistance. (World Bank, 1994). These clearly indicated deviation from the goal.

Development planning and implementation involve human involvement at every stage of preparation and application. There must be a clear understanding of human mind and group behaviour. We must understand human motivation to know what makes the people move to do something good for the community. Dr. Shreeranjan gives an instance from his experience from the tribal community in West Garo Hills in the matter of District Blindness Control Programme. There is a need to understand social action promotion programme in welfare society. The planner and the people concerned must have a clear vision of social and economic philosophy and content of the programme for equitable development of the community in rural North East India to avoid the widening rich and poor disparity. This book is an important contribution to the study of rural development mechanism programme for economically backward groups anywhere. It is innovative in its approach.

Let this small effort sub-serve that quest for a better understanding of Development Dimensions and help the cause of development studies.

B. Dutta Ray

INTRODUCTION :

IN PURSUIT OF DEVELOPMENT STUDIES

Development is actualisation of human capabilities and potential in the given context. Man, a rational animal, attempts to be part of this development process in order to attain such actualisation through endeavours in related fields of knowledge, experiences and logic. Understanding the contours of such knowledge, experiences and logic in development study therefore assumes the significance. Given the interrelationships, which exist in the development process, this pursuit is often conceptualised and consolidated in the form of projects. In planning the developmental goal, a project becomes a means for bringing about supplemental and incremental change in human well being and consequently in economy and in society. This in turn predicates an in-depth understanding of set of factors and production relations that act as a barrier to the productive forces. Developmental interventions therefore need to take into account these stimuli in the operating environment. Thus, major efforts in planning the developmental goal must relate to the understanding of the complexity of planned development and their inherent unpredictability.

I. The sheer challenge posed by the task of catalysing development incorporating social relationships has led to the debate of top down or bottom-up approach. Since the 1980s, planned development has witnessed shifts in project related concerns. The shifting sands of development paradigms have seen a participative and lively discussion. In recent years, such shifts are becoming more perceptible in respect of :

i) Project centred concerns to organisation centred and systemic concerns,

ii) Technology led to sectoral and cross-sectoral issues,

iii) Externally planned, technically and managerially prescripti (blueprint approach) to more flexible, iterative process approa in which neither means nor ends can be fully anticipated in advanc

iv) Compartmentalised and unorganised efforts to proacti participation of multiple stakeholders in various development sectors leading to building up institutions, networking, a capacities,

v) Government/ State funding to opening up of stakes for publi private participation often across boundaries and multi-ownersh module, and

vi) Power and decision making shifts from Government to Mark to Civil Society in redefining roles in a continued search of a acceptable equilibrium in the transformation process.

Despite such a shift taking greater strides in many places, th mechanistic approach of formulating and implementing plan closer hom sub serve the wish-list orientation towards power play than the rigou and meticulousness required for sustainable development culture.

A project is an investment of resources (both human and capita for bringing desired change (objective). In order to seek 'value for money invested; the investor/ stakeholders would like it to be measurable. A few of the questions are how much, why, what for, for whom, to wha avail, how much returns etc, often Impinging upon the core concept o 'value' itself. It is no longer about money but about livelihoods environment, ethnicity, identity and even existence. The rigour of drill in formulation, consultation, implementation, review and learning fron experiences in the given range of socio-economic context is sought to b arranged objectively and expressed in the phases and evolution of projec cycle, with the benefit of hindsight becoming available in the end-phas

of a project namely during Evaluation. This in truth can be made to be seen as 'a continuous learning process' reflected in development thought and actions.

For ease of understanding, this learning must be segmented. Three topical essays in Section I attempt to examine the pros and cons of approaches in Project Cycle and enlist good practices in evaluation in a thematic perspective. An example of a Project Planning Matrix (log-frame) with a project advisory note to encapsulate some contextual aspects in developmental pursuit relevant to the state of Meghalaya has also been provided.

II. Acknowledging concerns and enlightened philosophy of development are prescribed as ways of avoiding the pitfalls of misdirected development. Such prescriptions emphasise focus on the integrated development of the rural areas stressing on self-reliance at all levels of society. They also emphasise gradual evolution taking the needs and capacities of people, rather than production of goods as its departure point. Other factors such as technology play an equally important role. World Employment Programme of ILO in 1992 grouped 10 (ten) major related themes in respect of technology such as institutional factors, sectoral technology choice, the impact on employment, innovations and labour intensive technical change, infrastructure and employment generation, strengthening endogenous (technological) capacity etc. Choice of technology and its appropriateness in any development project is an important component. This is more relevant in developing countries where unemployment and livelihoods needs continued policy and actionable attention of Governments. Labour intensive methods or machine led or other models of a suitable mix becomes an important aspect in project formulation and implementation. The topic in the Section

II attempts to encapsulate, in a limited manner, the promotion of the use of Intermediate Technology and Labour intensive methods in the construction and construction related industry and to discuss what may be in the best long-term interest of poor developing countries.

III. Current concerns in sustainable development include reducing inequality and restoring environmental health for human survival. Project formulation and implementation must therefore grapple with its impact on environment, aspects of environmental sustainability and its assessment of real cost and benefits. Environmental Impact Assessment (EIA) is increasingly being adopted for this purpose. EIA facilitates weighing the pros and cons from amongst various alternatives in decision-making process towards implementation or otherwise of a project. Implementation of certain development projects, for instance Water Resources Projects/ hydroelectric projects/ large projects cause beneficial as well as adverse impacts during both the construction and operational phases. For example during the 'Construction Phase' beneficial impacts are employment, infrastructure development, compensatory afforestation, green belt etc; and adverse impacts are displacement of people, submergence of forest area, effect on bio-diversity etc. An EIA exercise looks into various aspects including the Physical, Ecological, Socio-economic etc. Consultation and public participation is an integral aspect of environmental impact assessment. Almost all EIA systems and regimes provide for consultation and public participation during project formulation and either require or encourage consultation and participation even at early stages of the EIA process, for example during scoping. However, others do so after publication of the EIA report, prior to the decision on the project. Participation in the evaluation of proposals by offering advice, expressing opinions, providing insights of local knowledge, indicating alternatives and suggesting needs or changes

to modify a proposal in order to better protect the environment can be taken on board. Consultation brings benefits of increased transparency and commitment with improved quality of decision-making, reduction in costs and delays and avoidance of public controversy and confrontations. From the perspective of a decision maker, there may be different kind of stakeholders and accordingly EIA consultation may take different approaches. EIA, thus, is complex activity involving iterative processes. A case study, in Section III, illustrates some aspects of Environmental Impact Assessment of the Lesotho Highlands Water Project. Due to certain similarities of hill area, tribal traditional societies and implementation of a large hydroelectric and water resources dam projects, the case of Lesotho is considered relevant to Meghalaya.

IV. In a state like Meghalaya, where water is an abundant resource provided by Nature, its inadequacy or non-availability of access for developmental pursuits could be construed as a stark failure of both the government and the civil society. Absence of a holistic perspective on natural resources, water, sanitation and its attendant linkages with health, environment and well-being are issues that are more worrisome closer home. Access to adequate water supply and sanitation facilities are fundamental need and human right with profound health and economic gains implications. Lack of access to safe and adequate water and sanitation causes death and diseases, especially in children and reflects socioeconomic backwardness. Thus, improvement in access to water and sanitation means a crucial reduction of under-five mortality and morbidity, saving of time for women and children for fetching water, improvement in their economic productivity and supplementing poverty alleviation efforts.

WHO estimated that the economic gains per $1 invested in water supply and sanitation range from $5 to $28 depending on the level of

services offered and the region. Some aspects of water and sanitation discussed in Section IV touch upon the socioeconomic dimensions of Water and sanitation and in passing briefly juxtapose the status in Meghalaya. The Post mortem of the International Water and Sanitation Decade (1980-90) presented in this chapter examines in a snapshot the achievements and failures of the decade and underpins the challenges that lie ahead. The discussion in the chapter also attempts to analyse on a broad canvass the global commitment of the water decade (1980-1990). Since 1990, concerns have been voiced and commitments reiterated. However, the situation has improved only marginally and that too in some of the countries. Decades pass by; it may reflect systemic failure or decay or may be seen as the 'perpetual struggle of mankind'. Another case study as a topic is a presentation of the facets in cost estimation of a water and sanitation project in hilly settings as an exercise so as to highlight the complexities that are required in developmental projects and efforts.

V. Development is meant to be for people and therefore have human involvement in all its aspects. Effective implementation involves participation and calls for understanding various aspects of human behaviour. One facet of this quest may be what enthuses, pumps-up, and energises man? The Topical essay narrating and dissecting the case in Section V attempts to understand a few strands of thoughts and theories in respect of motivation. A case of small action-group in the shape of District Blindness Control Society of West Garo Hills district in a remote tribal hilly state of Meghalaya in India is discussed from personal knowledge. Various theories have been interpreted with focus on the need theory in social action programmes in the case cited. The case brings out the process of synergy in collective action for growth and achievement of human and social potential. It also depicts that even within a bureaucratic set-up, the search for public service and social responsibility

can find expression in actions and innovations, which is accentuated with people's participation.

Each of the above aspect is complete in it-self as subjects of further serious studies and can form the basis for several books. The materials presented here were prepared as assignments in University of Manchester, UK, during 1998-99. Although they have remained buried for long, the topics kept knocking as mild reminders whenever some related aspects of developmental issues in policy domain, interactions, and public debates emerged. The work intends to aid understanding of certain steps, facets and processes in formulation and implementation of development projects. The materials have been sequenced to reflect a logical flow of thought. If this book can trigger some interest and thought in pursuit of development closer home, it would be most gratifying.

Development efforts call for a continued understanding of its various facets, meticulous and rigorous planning and implementation fuelled by commitment, powered, and refreshed by motivation to make society a place to allow expressions of full potentials. It also calls for a continued learning and corrective process. An intellectually alive, vibrant and vigilant society of which enlightened government machinery is a responsive part can be an effective check and balance to many developmental efforts where the rich and more powerful in society are not allowed to realiocate and usurp the natural resources in their favour and where modern technology does not become a tool to sub-serve the creation of disparity.

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December 2005. Shillong. ***Shreeranjan***

SECTION - I
PROJECT APPROACHES, EVALUATION AND PROJECT PLANNING MATRIX

PROJECT PLANNING CYCLE: BLUEPRINT VS. PROCESS APPROACH

1. **INTRODUCTION**: The concept of Development has been the main concern and endeavour of the world in the last 50 years.The 1960s and 1970s saw consolidation and conflicts in world order. Failures of the 1980s have seen a growing disparity in the world economic development. The shift in policy leading to structural adjustment and withdrawal of subsidies and support system, exposed the weaknesses of developmental regime and brought to the fore the significance of non- economic issues in development such as environment, gender and community aspects for sustainability. 'The emergent paradigm for human living on and with Earth brings decentralisation, democracy, and diversity; reductionism and linear thinking give way to an inclusive holism, open systems and diverse options and actions' (Chambers, R.1997).

In planning the developmental goal, project becomes a means for bringing about supplemental and incremental change in economy and in society. Two primary concerns in this respect have surfaced in recent years . The first deals with the an understanding of the complexity and unpredictability of planned development. The second looks to find ways in which project managers can deal with social relationships keeping in mind the institutional context in which they operate (David Mosse, 1998).

2. **THE PROJECT CONCEPT:** Project can be defined as *"A discrete package of investments, inputs and activities designed to remove or alleviate various developmental constraints in order to achieve one or more outputs/ benefits in terms of increasing productivity and improving the quality of a group of a target beneficiaries over a given time-span i.e. it is time bound."* (J. Mullen's handout, 1998 .IDPM) Franks and Cussworth define it *as -" A project is the investment of capital in a time- bound intervention to create productive assets" and elaborated capital as both human and physical; and assets as human, institutional or physical.* The definition given by BSI and by Rodney Turner is also relevant. Project is thus a holistic expression of interactions and interdependencies that exist in socio- cultural, economic,

technological, spatial, organisational, and managerial milieu pertinent to development administration. 'It is only at the project level- and through this medium alone that the development comes to terms with reality' (Mullen and Sen, IDPM handout). Through project design the innateness of society, locality, polity, potentialities, and policies reflect themselves.In order to sustain the process of development, the project design must capture the context, referred to, as "medium". Rondinelli (1983) termed development projects as policy experiments, which can survive and express on the efficacy of such a medium. Once conceptualised, the project lives its life as a living organism, in such a medium (Mullen and Sen, IDPM handout); reacting, interacting and effecting change in achieving its objectives. Like an organism, project is in constant interaction with the internal and external environment, both affecting each other.

3. PROJECT CYCLE And APPROACHES: Project has a clear objective. There also exists organisation, collaboration and a team of people. An investment is made and a time scale is fixed taking into account the attendant risks and uncertainties; which results in effecting a change .The logical lay out of sequential steps involved in the phasing and planning of project has unfolded in the concept of project cycle. Two main source of project cycle emerge-1. Baum (1982) in cyclic form (figure 2) and, 2. UNIDO (1979)(figure 1.) in linear form. There are 5 stages in Baum's project cycle-1.Project Identification,2.Project preparation and Selection, 3.Project Appraisal and Approval,4. Project Implementation and Supervision, and 5. Project Evaluation as stages in project cycle.

The UNIDO version has separated Approval as a separate step and inserted Negotiation before it. Cussworth and Franks (1993) modified both the versions and listed 1.Identification2 Formulation, 3.Implementation, 4. Commissioning, 5.Operation and Evaluation as Stages in Project Cycle.

Mullen and Sen (IDPM handout, 1998) has modified Baum's cyle (figure 2). The levels of analysis involved and the stages of project planning (J.Mullen handout) clearly depicts the intricacies and iterative aspects of project planning and project cycle in brief . In recent days as various activities overlap and reinforce the stages of outline design, appraisal, and detailed design have been termed as Formulation.

Project Cycle	Activities	Documents available to the public
Identification	JOINT BORROWER/BANK INVOLVEMENT - Sources of Project Ideas - Bank/Economic work - Prior Projects - Other Agencies - Initial Summary of Project approved by country department	*Project Information Document (PID)*
Preparation	RESPONSIBILITY OF BORROWER - Technical/Financial assistance available from - Borrower, Bank, Other agencies - Studies (Technical, Economic, Institutional & Financial) - Study of impact on environment - Project summary revised by the Bank	*Technical Information* *Environment Assessment (EA)* *Revised PID*
Appraisal	RESPONSIBILITY OF BANK - Evaluation of project viability - Economic, Technical, Institutional, Financial & Environmental appraisal	
Negotiations	JOINT BORROWER/BANK INVOLVEMENT - Borrower reviews final documents - Terms and conditions of loans agreed	
Approval	- Board of Directors of the Bank approves the loan - Signing of loan agreement by both parties	*Staff Appraisal Report (SAR); or Technical Annexe (TA)*
Implementation / Supervision	- Loan declared ready for disbursement - Implementation by borrower - Supervision by Bank	*Legal Agreement*
Ex-post Evaluation	- Completion and Audit reports - Analysis used for future project design	*Impact studies*

Figure 1 - Project Cycle : UNIDO, 1979 (source IDPM handout)

"The different stages in the cycle are interlinked and have multiti timeline; and through its cycle a project continuously refines itself, in sea of a true definition, through continuous evaluation of its performan alternating between feedbacks and feedforwards" (Mullen and Sen, IDP handout). A person engaged in a project has to be conscious of its dynamis and interactions both at the Content (the "what" of the plan) and Process lev (the "how "of the plan). In evolving the design of project cycle, environme in its real and metaphorical sense plays an important interactive role.

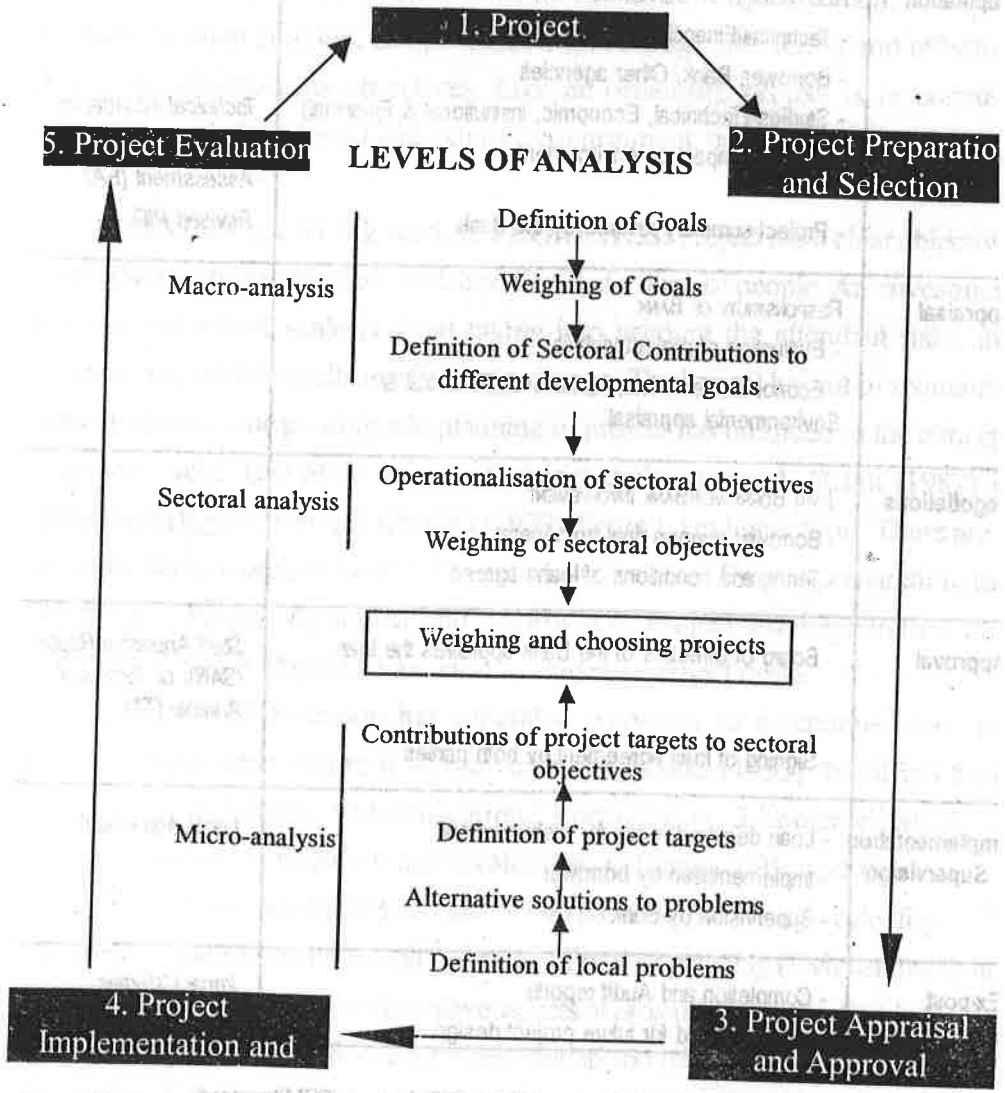

Figure 2: The Project Cycle (Baum, 1982; modified Mullen & Sen - IDPM handout)

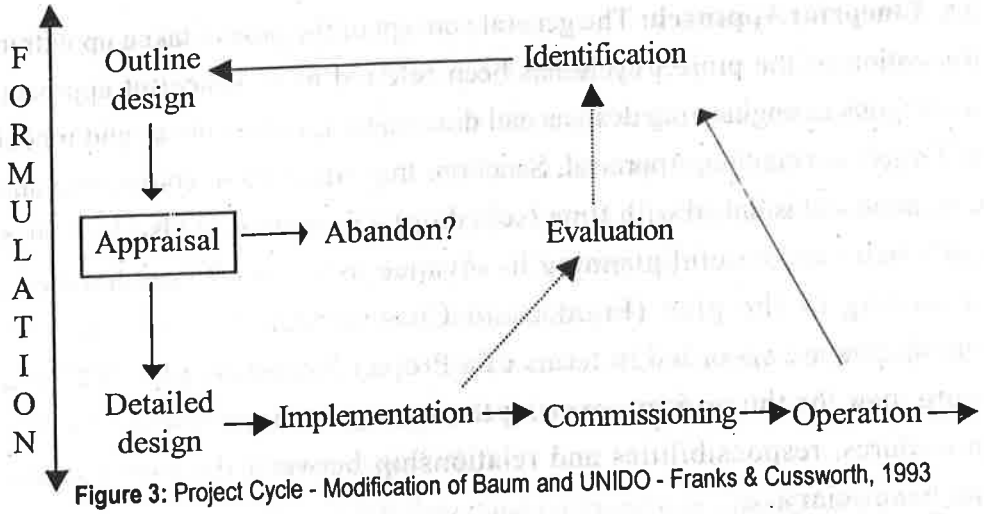

Figure 3: Project Cycle - Modification of Baum and UNIDO - Franks & Cussworth, 1993

Planning has been an effective tool in both local and global strategies. Hence more and more players driven by their own concerns of historical, geopolitical, humanitarian, economic and other contexts have entered into developmental ventures of bilateral, unilateral, and multilateral aid regimes, with or without conditionalities and understanding of realities that unfold. "Planning will have a major part to play in rectifying the unsatisfactory conditions of many rural communities"(Cairncross et. al.1980, cited by Ole Thirkildsen, 1988). However, the problem arises in consideration and adoption of different approaches. The conventional approach is typified by the **Blueprint approach**, having a clear objective, detialed pre-implementation planning and adherence to a chartered and laid out course; and, a new process to decipher the expression of meaning of development through project, represented by **Process approach** being less rigid, more amenable, flexible and interactive.

Project Task	Environment	Design of Project Cycle
Known	Stable and predictable	Simple
Unknown	Stable and predictable	Less simple
Known	Unstable and unpredictable	Complex
Unknown	Unstable and unpredictable	More complex

Figure 4: Project task, environment and design (Ita. O' Donovan, 1997)

3A. Blueprint Approach: The general concept of the project taken up within the notion of the project cycle has been referred to as Blueprint approach (analogous to engineering designs and drawings). It represents a rigid model of Project conception, Appraisal, Sanction, Implementation, completion and Operation and is linked with time (schedule) and money. It also indicates systematic and careful planning in advance to be strictly implemented according to the plan (Franks and Cussworth,1993). The project parameters are specified in terms of a Project Execution plan (PEP)- a route map for the project covering the strategies, organisation, control procedures, responsibilities and relationship between the investor and the beneficiary.

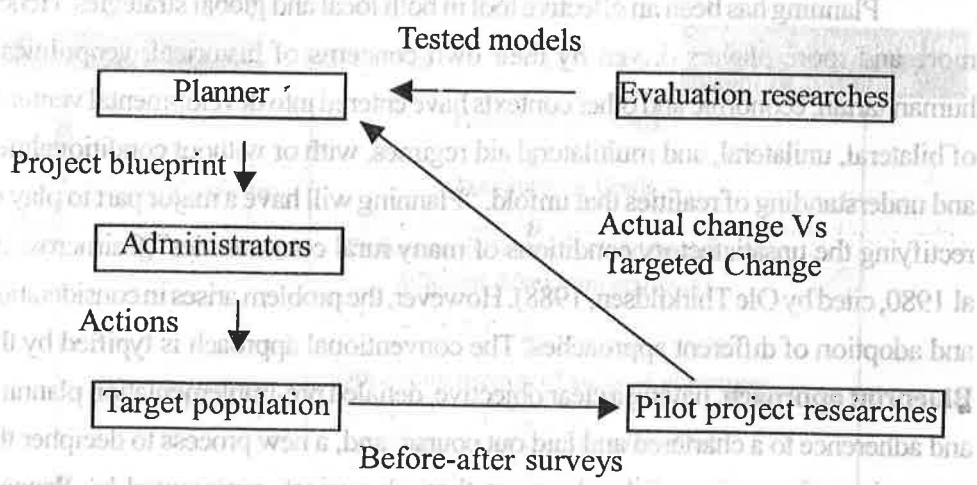

Figure 5: The Blueprint Approach to Development Programming (Korten 1980)

Characteristics of Blue Print Approach:

- The focal point being, the Plan itself (Faludi,1973-quoted-Ole therkildsen,1988);
- Focus on project preparation prior to implementation; typically detailing -objectives, targets, outputs, predetermined timeframe, level of resources required and an implementation schedule(Korten,1980);
- A blueprint for designed-in advance solution to the problem identified. (Brinkerhoff & Ingle, 1989).
- It is strongly oriented towards 'structure' and 'control' to enable managers to make; minor adjustments in the course of implementation to maintain projects on target;

- Researchers are supposed to provide data from pilot projects and other studies, which allows planners to chose the most cost effective project design and to reduce it to a blue print for action (Korten, 1980).
- Centralised decision- making; Donor driven; Top- down.
- Gaps between what is planned and what is actually produced seen as requiring corrections (Honadale & Rosengard, 1983; Rondinelli, 1983, Stout, 1980, quoted-Brinkerhoff and Ingle).
- An evaluation study to assess the extent of achievement of target and deviations is used for revision of blueprint at the end or in between, of the project cycle (Korten, 1980).
- The relationship between donor and recipient is of classical contract type.
- The role of beneficiary is limited and prescribed.

Advantages of Blue print approach

- The blueprint approach has methodical and objective advantages in projects relating to large infrastructure, capital intensive projects (Frank & Cussworth, 1993), for example, industrial plants and construction where it is still a dominant approach.
- It has a long operational history (Ita O'Donovan, 1997) and is a Dominant approach in development concept so far where experts, technicians, and auditors feel at ease.
- It has clearly laid down objectives, inputs, activities, costs and timeframes. Hence, the confusion in execution is minimised.
- The approach is oriented towards analysis, planning and specificity with the objective of efficient and effective attainment of pre-stated goals and targets. Brinkerhoff & Ingle has mentioned that it has a short-term emphasis.
- The product achieved is a visible structure or a 'thing' (Chambers 1997).
- It meets the requirement of timeframe, budget control and regulations. It emphasises on procedure and process of bureaucracy such as audit and evaluation.
- In its application to infrastructural projects, risks are identifiable or describable.
- It has a formal leadership, clear line of authority and division of labour.
- Communication within the organisation involved in the project is imperative.

- In purist form donor/investor is owner and controller.
- In its problem solving it is pro-active and curative rather then leaving it to 'other forces'.
- There is no long-term stake of the donor/ agency; in case of investor reasonable pre-mediation takes place to maximise profit.
- In its stages accountability can be fixed/determined.
- Relatively straightforward and structured design (Eyben, R., 1991).

Comments:

With the changing perception and direction of development in the world order directing the need to re-orient the developmental projects closer to the people and treating beneficiaries as the 'first client' (Mullen, IFAD document); decentralisation and participation has attained a centre stage. Apparently the blue print model shows chinks in its armour. During the 1970s and the 1980s experiences gained from developing countries becoming available, views emerged that the blue print approach of project planning does not achieve 'fit' and is an 'inadequate response to the rural development problems' (Korten 1980). The findings of Ole Therkildsen, in studies of donors funded (Denmark, Holland, Finland, Sweden and World Bank) planning and implementation of rural water supplies in Tanzania brought out that control- oriented programme with the features of a) Focus on medium and long term construction targets, b) detailed pre-implementation planning, c) prior collection of data for specific plans, d) specification in plans on the role of beneficiary and e) bypassing of recipient national, regional and district level organisation by technical assistance team, resulted in failures and unsustainable development. The study revealed that in control-oriented planning and implementation (Read Blueprint Approach) problems arise owing to five wrong assumptions, which do not fully or partially hold:

i. Beneficiaries share the objective and are committed.
ii. Assumption of the existence of powerful decision making and authoritative and compliance enforcing agency.
iii. Pre-determined plans presupposing future of the economy, the stable politico-institutional conditions; knowledge and operational information.

iv. Less thrust on participation – supply driven top down approach and assumed user acceptance, resource commitment and mobilisation.

v. Bypassing local institution.

It was also revealed that the control oriented approach itself was at fault and the negative impact has been amplified by economic conditions in Tanzania. Korten(1980), termed "blueprint approach more a hindrance than aid" in programming of rural development action where the need is adaptive, bottom up. The blueprint approach is considered as rigid, with too much reliance on prior and comprehensive data gathering, meticulous planning and controls acting in vicious circle.

'Ideas change or new ideas gain wider currency when the existing dominant ideas do not appear to explain insistent problems which require resolution.'(Kuhn1970; Hunt1989, cited, Franks & Cussworth, 1993) Two insistent problems in respect of project and its management have been 1.the problem of estimated delivery of benefits to concerned beneficiaries, and 2.the sustainability of the project beyond its estimated life.

ODA's post evaluation tryst of Evaluation process and perspective derived from experiences within and outside, brought the following home:

- Project appraisals have been too optimistic about project costs.
- Desire to engage in policy area rushed the sectoral analysis and project preparation time
- Project were schedule driven, thereby impeding the learning process
- Consultants sometimes get too involved in project development
- Improved project procedures could deal with most of the above concerns (Ita O' Donovan,1997).

3B. The (Learning) Process Approach: In response to the failures of blueprint approach to achieve 'fit' in rural developmental context, an alternative was developed called process mode (Sweet & Weisel, 1979 cited Brinkerhoff & Ingle,1989).Study of five successful cases of participatory form of development in Asia viz. N.D.D.B.(National Dairy Development Board, India) ,C.B.F.P.S.(community based family planning services); B.R.A.C.(Bangladesh

rural advancement committee, S.S.M.(Sarvodaya shramdan movement ,Srilanka) and N.I.A.P.(Pakistan) –indicated bottom-up, capacity building process on first hand knowledge coupled with leadership and teamwork (Korten ,1980).

The word 'process' is three dimensionally linked to developmental projects- 1.Learning process as contrasted to blueprint, 2.Process, referring to relationship and contextual reference, and 3. Process-refers to dynamic, unpredictable, and idiosyncratic elements in development programme (David Mosse, 1998). Ita O' Donovon ,1997, mentioned four essential requirement for the process approach to projects:

1. Clear specification of the totality of project: project framework;
2. Participation, commitment, ownership, learning among and between different stake holders;
3. To get things done- action on the ground; flexible response from ODA's (donors) procedures, and
4. To manage the project effectively and efficiently.

Characteristics

a) Precise outputs, immediate objectives and how to achieve them with overall objectives are not defined over the entire duration of the project but are instead revised and developed as the project proceeds.

b) Local participants play key roles in the design, appraisal and implementation of the project; sometimes the roles and degree of commitment of local participants cannot be gauged until the project is underway (a,b- ODA – HMSO – 1995; R.Eyben, 1991).

c) Identification, appraisal, design, implementation, monitoring and evaluation becomes more interwoven.

d) Continual information is gathered over a period of programme work. Project cycle is seen as an interactive process (Mullen, J.).

e) Dynamism with relationships, transactions, decision making or conflicts and their resolution.

f) Inductive and open ended. Flexible design for adjustments, and a systematic feedback for evaluation and supervision activities (Mullen, J.).

g) Monitoring and research is situated outside project structures; not a substitute to other forms of monitoring, logical framework or stakeholders analysis but reinforces and help the concerns of developing the process (e to g – David Mosse, 1998).

h) Decentralised, people oriented, participatory, bottom up approach.

i) Leadership and good communication, supportive political climate emergence.

Advantages of Process Approach:

The characteristic itself throws up the benefit and advantage of the process approach more relevant to developmental projects.

1. General objective and direction of project intervention is broadly defined; provides flexibility in respect of design, specific action and services.
2. Operates simultaneously on several time horizons (Faludi, 1973); hence, suited to dynamic systems.
3. Multiple decision maker – bargains, adjustments, response to opportunities, information through a network of channels, continuous dialogue with beneficiaries enhances the capability of the approach.
4. It enables learning from errors and deviations ,hence providing opportunity to rectify the discripancies.
5. Good for long term policies and strategies (2-5 Ole Therkildsen, 1988).
6. Ownership, partnership and commitment from stakeholders becomes imperative leading to Institutonal development (Eyben,1991).
7. Joint learning process expected to build capacity and contribute to sustainability (5-7 Ita O' Donovan, 1997).
8. Achieves higher 'fit' in respect of rural development and beneficiary oriented projects (Korten, 1980).
9. Scope for more innovation and experimentation which encourages grass root wisdom and lateral thinking – emergence of new technologies, better design to do the project.
10. Working relationship between various actors are enhanced leading to evolution of a relational contract which results in a win-win situation between parties.
11. No fixed target and expectations.

12. Monitoring is action oriented and the entire approach relates to the present with focus on sustainability.
13. Provides good medium for growth of the project as a living organism.
14. Encourages the local community to think about problems, organise and work out solutions.(Eyben,1991)
15. Constant interaction between technical experts, developmental administrators and people.
16. With the involvement of people, there is pressure on policy shifts leading to more conducive and responsive political climate.

Comments

There could be criticism about the approach being vague, ill defined, time consuming, with too many stakeholders. The process projects of forestry schemes in India and land privatisation project in Russia indicate process approach being generalised, under examined and uncertain (Alan Rew & Angelica Brustinov, 1998). One criticism may also be that 'the process' may itself be hijacked by local elite/ mafia/ powerful (Blair 1978- Comilla Project, Bangladesh cited Guygran, 1983).

The importance of external ,internal and working relationships have emerged in the process approach.Both external and internal factors need to be addressed to facilitate development of the approach(Ita O' Donovan,1997) Mullen, in 'New Operational Procedures for the project cycle' stresses the need for

1. A simpler and flexible selection.
2. Intense, participatory and cumulative approach to project formulation, and
3. Appraisal-is the shape of focussed, use of log frame, innovative, strategic and adaptive of other tools in the development of the project cycle.

4. Search for a Middle Path

In continuous search for alternatives it will be imprudent to consider that blue print and process approach emerge as clear alternatives. In practice, projects may be a mixture of the two (R. Eyben 1991). In such cases it would be necessary to provide linkages.

Brinkerhoff and Ingle,1989 have attempted 'integrating blue print and process approaches as – **Structured Flexibility Approach**'. The approach takes the essence of both the blue print approach in its analysis, planning and specificity, as well as the flexibility of the process model with participation and stress on social aspects. Its structural skeleton consists of five inter related elements : a) Management improvement conceptual framework, b) Reconnaissance/Analysis of organisation and external environments, c) Detailed design of a solution to the problem, d) Implementation of design, and e) continuous monitoring and feed back leading to redesign and adaptation.

Brinkerhoff and Ingle have dealt with the comparison of three approaches in detail, which are avilable for reference. However, the approach works when : 1) facilitative conditions are in place, 2) Incentives to play critical role in promoting changes exist and 3) Management as set of activities leads to creating performance capacity. Further ,a caveat has been given that the approach takes too much time and personnel; institutional development agenda and complexity of participation increases vulnerability and may cause delay in the project. The cost effectiveness is also open-ended. However, the same can also be ascribed by sceptics to the process approach.

Adaptive Approach

Rondinelli, 1983 made successive stages of experimentation, pilot, demonstration, replication or production as distinct stages of development projects. As particular methods are found to be successful on experimental scale, wider coverage is attempted through pilot and comprehensively extended to reach a greater number of beneficiaries. More cautious and gradual approach can be assimilated with iterative aspect and learning in the process approach.

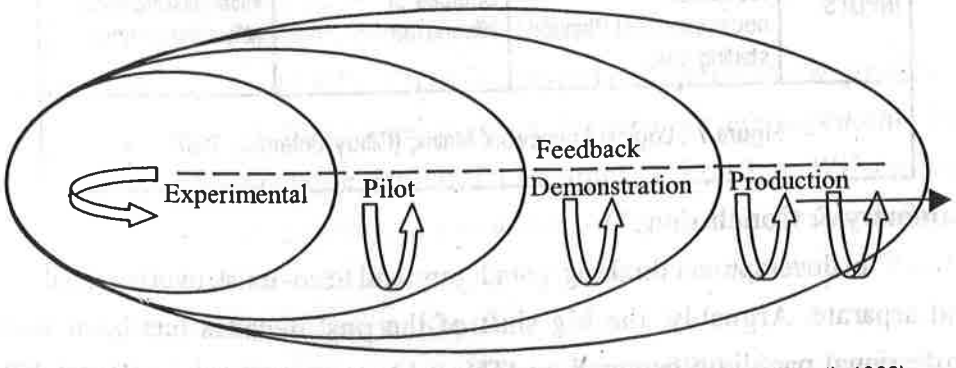

Figure 6 : The Adaptive Approach (Rondinelli 1983; Source: Franks & Cissworth 1993)

Learning Process Approach

Korten, 1980 having studied five success stories of Asia indicated in the opening remarks, of process approach , has detailed three stages: 1) Learning to be effective, 2) Learning to be efficient and 3) Learning to expand. There is distinct emphasis on bureaucratic re-orientation. There are various views, which indicate that, *learning process and adaptive approach is the progenitor of process approach.*

Logical Framework Approach

The concept emerged in 1960s, with an effort to combine the aspects of both blue print and process approach. Despite being in use by UK's ODA/DIFID, the criticism is that it is more biased towards the blue print approach (Steve Wiggings & Demot Shields, 1995). Coleman (1987) has termed the approach as an 'aid to thinking' rather than a set of procedures and mentions that it should be utilised as such.

Narrative Summary	Objectively verifiable indicators	Means of verification	Important Assumptions
GOAL	Measures of goal achievement	Sources of information methods used	Assumptions affecting purpose-goal linkage
PURPOSE	End of project status	Sources of information methods used	Assumptions affecting output-purpose linkage
OUTPUTS	Magnitudes of outputsPlanned completion date	Sources of information methods used	Assumptions affecting inputs-Outputs linkage
INPUTS	Nature and level of resources necessaryCost Planned starting date	Sources of information	Initial assumptions about the project

Figure 7 : Logical Framework Matrix; (Gilroy Coleman, 1987)

Summary & Conclusion:

"In development thinking, paradigms tend to co- exist, overlap, coalesce and separate. Arguably, the big shift of the past decades has been from professional paradigm centered on 'Things' to one centered on 'People'(R.

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ɔy Coleman, 1987)

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one centered on 'People'(R.

Chambers, 1995). Blueprint approach has its methodical advantage in the spheres of construction, large infrastructure(thing), whereas the process approach transcends the permeability of project in its interactions with all that concerns and affect people ,including "thing". It is clear that the process approach is most suited to the developmental projects relating to the people.

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MAJOR CHARACTERISTICS OF GOOD PRACTICES IN EVALUATION SYSTEM

Definition and Dimensions: Evaluation, unlike Monitoring which in essence is the continuous managemental internal assessment/ review of the implementation, attempts to assess value or worth, and 'is a discontinuous function, concerned with ascertaining the degree to which objectives have been achieved through the activities' (Mullen, J., 1988). Carlson, Kohlin and Ekborn (1994 cited, R. Dale, 1998), consider it 'as an activity for finding out the value or result of something.....answer (ing) the information needs of various actors...'. UN ACC Task Force on R.D., 1984 defined Evaluation as a process for determining systematically and objectively, the relevance, efficiency, effectiveness, and impact of activities in the light of their objectives.'

Evaluation can be done, as considered necessary by the parties and exigencies of requirements: -

1. At the end of the project-
    a. Final or Terminal evaluation;
    b. Ex-post evaluation,
2. Mid-term (Ongoing) evaluation

1.a. **Terminal or Final evaluation** is done at the end of the project and within1-2 years of completion. The project is generally rated / compared in quantitative terms to assess effects and extent of attainment of the objective of the project.

1.b. **Ex-post evaluation** is done after 2-3 years of completion of the project and is comprehensive towards assessing, the extent of objective of the project attained, effects and impact of the project on its beneficiaries; level of participation in the project and community level organisation, leading to institutional development, performance of delivery system and organisation involved (Mullen, J.1988). It also looks into the aspects of sustainability and broader policy issue (Rubin, 1995). Base-line information prior to the implementation is a *priori*.

2. Mid-term or Ongoing evaluation is undertaken by an independent agency, during the implementation phase using information and output collected during monitoring. It is more extensive examining in detail and applying evaluation criteria to the project to ascertain the operational problems encountered, and the overall course of direction of project. It picks up any danger signal which might have been unnoticed during monitoring (Mullen, 1988). It reflects by pointing out for instance, that the activity was on time and/or within costs but planned effect has not appeared and desired impact may be otherwise/ or not achievable. In essence it provides feedback to point out change in the objective and lay down its prescriptions and proscriptions.

Dimensions in evaluation: Evaluation should be pragmatic, simple, useful, manageable, analysable and must address the basic purport, direction and needs. Role of funding agency (ies), relationships and control to assess dominance or keenness or genuineness in undertaking evaluation requires scrutiny. The focus of evaluation concentrates on the project outline and objective including underlying objective and may also include- a geographical area, groups of beneficiaries, types of activities and time period. Besides, evaluation also attempts to analyse effectiveness of a particular kind of activity over a group of projects all working in the same area to see how they interact with each other (Rubin, F.1995).

Schematic presentation of Evaluation of Rural Development projects: modified to include only Evaluation: is presented at figure 1.

Objective / Purpose of Evaluation: The purpose of evaluation is to assess and improve performance. There can be more than one reason to conduct evaluation such as to make choices and decisions, to learn, to assess, to increase accountability etc.It hinges upon appropriate indicators, methodologies both qualitative and quantitative, participatory process, role, position and assessment of the evaluator (Marsden, Oakley and Pratt, 1994). It must be ensured that there is harmony between design, purpose, uses and methodologies (Pratt and Lozois1993, cited). The two objectives of evaluation enlisted by Honadle and Cooper, 1990, mentioned in the Introductory Remarks can be achieved possibly by closing the learning loop by ensuring participation, cumulative and

PURPOSE	Monitoring Ongoing Evaluation Terminal and Ex-post Evaluation
BASIC PURPOSE	Determination of continuing relevance and present and likely future outputs; effectiveness and impact of an activity during implementation; major corrections, if required Assessment of the overall outputs, effects and impact and drawing lessons for future planning
SOURCES OF INFORMATION	In-depth studies; participation, Observation; sample survey; rapid reconnaissance. Socio-economic surveys
LOCATION OF M &E UNIT	Parent department/ministry and /or central planning agency (usually small and compact, but can be large and interdisciplinary for relatively large projects, depending on availability of resources for full fledged surveys, or assistance of external agencies or institutions may be secured)
REPORTING TO	Project management; policy makers; beneficiaries; funding agencies ditto-M&E may be independently carried out by beneficiaries and /or their representative bodies. (A good evaluation should encourage their participation)
MAIN FOCUS	Assessment of continuing validity and relevance of project/ programme design and targets and assessment of effects and review of cost effectiveness; target orientation. Maximum and long term objectives, differential effects and impacts on project beneficiaries (beneficiary orientation). Drawing lesson for the future on critical factors affecting success or failure of project or programme.
PERIODICITY	Concurrent. Baseline survey prior to or during first year of project implementation. Repeat surveys at mid-point, completion and full development of project (desirable annually or even seasonally with a limited number of key indicators)

Figure 1: Schematic presentation of Evaluation of Rural Development projects: modified to include only Evaluation: Source-UN ACC Task Force on R.D.1984, IDPM, handout by Mullen, J.

continuous linkage with knowledge, and action on continuum basis. Evaluation ,thus becomes a learning and empowering process in which institution building, negotiation and clarification of objective is important, (Marsden, Oakley and Pratt, 1994) and has to relate to economic, socio-cultural, political and organisational context. It would encompass all those having varying interests in the project, the actors involved in planning, implementation and operation of the project, stakeholders- beneficiaries, women and other vulnerable groups, the funding agencies, advisory units in an agency, individuals or groups carrying out similar work, government departments, and policy makers (Rubin, F.1995).

Major Concerns and Issues which needs addressing in the evaluation may be:-

- a consumer /user orientation;
- development of quality control measures;
- changing organisational requirements ;
- a balance between qualitative and quantitative measurement ;
- relevant ,timely and accurate information;
- setting clear objectives, achieving realistic targets; (above mostly from Marsden ,Oakley and Pratt,1994; Mullen, J. IDPM handout,1998) .
- seasonal and climatic factors , customary practices, cropping season , working habits
- anticipation of any key events of political, social, traditional and administrative kind (Rubin,F.1995) etc.

The Criteria (to be used) for evaluation: -- It is here that the characteristics unfold and show performance during formulation and operationalisation. It would address level of efficiency, effectiveness in the process and consequential impact of the project. The evaluation has to also address the external and internal factors and their causal relationship in effecting the outcome (Mullen, J 1988). Further it has to address the dimensions of relevance, replicability and concerns of sustainability. Besides, special performance issues and factors influencing performance will have to be addressed (Cassley and Kumar, 1987; cited Binnendijk, 1990). In negotiating the indicators, it is essential and desirable to have consensus with the stakeholders. It is better to focus on critical indicators which decisively indicate change or interpretation of change. Some (Rubin,

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F.1995) have adopted and suggested ranking/ marking system in order to make it faster and rapid (Feinstein, N.O., 1993). There is always a tendency to incorporate too many and long list of indicators. In such eventualities there is either fatigue, ritualism or abandonment. The management of information system becomes a critical aspect.

Use of Information: Evaluation system generally uses 3 kinds of information (Mullen, 1988)-**1. Primary data**-such as field information on project progress available from monitoring, budgeting, reports, inspections etc,These may require modification at times to suit and conform to evaluation, **2.Secondary data**- from census office, statistical office, or other developmental monitoring office: these require to be checked regarding adequacy, timeliness and possible dis-aggregation; **3.Custom-made surveys**-to meet specific requirements of the project. The tools for such methodology can be *Logical- Framework* (Coleman, 1987) or *FRAMES* (Feinstein, N. O., 1993) or *Other kinds* which can be a P*articipatory Approach* (Uphoff, 1992, Chambers, 1994). The other format which deserves treatment can be questionnaire design, other methods of collecting information and data analysis (Mullen, 1989). Honadle and Cooper, 1990, have mentioned 'Workshop' as an effective but under-utilised tool for information system. The process of data collection, arrangements of indicators needs elaboration, specification, and overall harmonisation with the MIS. Detailed design requires to be put in place with a distinct idea whether this is to be done internally, externally, or both. It is important to ensure, only significant collection, analysis and reporting appropriate for the purpose is captured. The data coverage mode and modalities of presentation format needs to be evolved including cross checking the complementarities (Mullen, J. 1998, IDPM handout.) with the monitoring process. Analysis of Project Objectives, logical breakdown to disaggregate important inputs/ activities, outputs, effects/ impacts and assumptions and the causal relationship between input and output with dimensions of implementation and management. (Mullen, J. IDPM handout, 1998) comes out effectively in Logical Framework (Project Planning Matrix).

For example: -

Narrative Summary	Verifiable Indiactors	Means of Verification	Important Assumptions
GOAL	-Increased income and well being for vulnerable group; -improved and sustainable resource management-income /well being of target group	-incidence of asset accumulation etc.- Quarterly monitoring reports;- baseline survey and interim evaluation -final impact study	Security situation does not deteriorate;
PURPOSE	Develop institutional capacity to promote participatory and sustainable rural development .....- around 460 VDCs;920 SHGs formed number of people trained/number of skill imparted etc...._	1.project records and quarterly monitoring. 2.Concurrent evaluation.3.VDC's records	-equity issue addressed by community - political-will; - sensitisation of support agencies
OUTPUTS	Efficiently managed VDCs and viable SHGs demonstrating sound financial management_Accounts maintained by VDCS are sound, -Volume and regularity of savings. - regular repayment exceeds 90%.... etc..	-concurrent evaluation;through Management Information Service - detailed data-etc...	Farmers are more willing to adopt technologies
INPUTS	-Hire NGOS to form... - plantation/ labour etc... Budget 2.7 million US $,15.5 million US $- Contracts	Financial report	Adequate number of competent and motivated NGOs can be found to undertake mobilisation__

Figure 2: Logframe format (Source: IFAD's NorthEast Region Community Resource Management Programme for Upland Areas, India -reports and recommendation of the President, IDPM handout)

Execution and choices of information methodologies: -The strategy and approach would conform to objectives, dimensions and modalities of the information system towards agreed direction. The method could be time consuming and spread over a

cation	Important Assumptions
set - ing : n npact	Security situation does not deteriorate;
and ng. s	-equity issue addressed by community - political-will; - sensitisation of support agencies
e -	Farmers are more willing to adopt technologies
	Adequate number of competent and motivated NGOs can be found to undertake mobilisation__
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period of time or it could be snapshot/Rapid, and has to relate to the expectations of the stakeholders.

Quantitative and qualitative aspects (the variables)-

The quantitative aspect is verified on the basis of data collected in accordance with the predetermined indicators and has to relate to the information system of the project (Mullen, J. 1988). The relationship between the monetised output (effects and impact) in relation to the costs incurred in creating such outcomes discounting time-lags and shadow pricing for subsidies and inflation, is reflected in the Cost-Benefit analysis. This methodology is best for infrastructure and production promoting projects (Dale, R. 1998). Rossi and Freeman, (1993, cited Dale, R., 1998) mentions **5 means of assessing Cost-Effectiveness** (monetised benefits)-* direct measurement; *market valuation; *Hypothetical questions; *econometric estimation; and *observing political choices.

The qualitative aspect is much more difficult, but most essential and critical in developmental projects. The indicators and variables can be like in Human Development Report (UNDP) pertaining to living standard, education, literacy, health- care etc. There is a need to involve stakeholders for spelling assigning and sorting out indicators. These indicators can also be deciphered from the gap between effect and impact (Mullen, J.1989)of the project ; lesser the gap higher the efficiency and effectiveness of the project .

Finsterbusch and Wolf, 1977 have indicated impact on individuals, organisation and communities of the internal and external environmental aspect including the physical environment which can not be wished away. The World Bank guidelines on social aspects indicate socio-cultural and demographic character of the People, social organisation and their productive activities, acceptability of interventions, acceptable strategy and consideration for any special and vulnerable groups (Ingersoll, J.1990).

Core variables- These can be listed as- *efficiency;* effectiveness;*Relevance (complementary to efficiency and impact); * impacts; *sustainability; *replicability. Nerve-pulse regarding such variables can emerge from (Dale, R.1998):-experiences from the same type of development work in the same area or even elsewhere; -experiences from other comparable types of

development work in similar environment/setting; -some substantiated theoretical reasoning referable; relevance can compare similar interventions, or can see the overlaps; -long-term, indirect consequences. The aspect of sustainability would look into continued maintenance of physical facilities', constant use, ability to plan and manage similar works, continued production and outputs, cumulative accumulation and momentum gathering of impact resulting in multiplier effect (Dale, R. 1998). Replicability looks into wider application in similar or different context, and is not related to the evaluation, with the exception of the learning aspect for future use.

Examples of Evaluation variables	
e.g. Water supply and Sanitation	Industrial Development Fund
Efficiency	
Cost per well; cost per sanitation training hour .	Administrative cost per unit of lent out money .
Effectiveness	
Number of latrines of good quality.	Change in profit of supported firm
Change in use of well water.	Change in employment.
Impacts	
Positive : Better health through fewer Incidence of diarrhoea	Positive: Increased consumption in target areas
Negative Conflicts regarding access to wells	Negative Reduced employment in surrounding areas
Sustainability	
Maintenance of the wells; Continued	Maintenance of the fund through repayment.
Functioning of water users' association	Continued demand on loans.

Figure 3: Examples of Evaluation variables(Negative factors would come under Effects as directly linked) (Source: Dale, R. 1998)

Participatory techniques: A variety of such tools and techniques have emerged. Some of them are -Rapid Rural Appraisal (RRA-Cernea, 1985), Participatory Learning Methods (PALM), Rapid Assessment Procedures (RAP), Rapid Rural System Analysis (RRSA), Agro-ecosystem Analysis (AEA),

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ools and techniques have
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osystem Analysis (AEA),

Participatory Rural Appraisal (PRA)(Chambers, 1994) etc. The above techniques employ drawing, flow charts, task actor role diagrams, aerial photographs, livelihood analysis –livelihood, food security, indebtedness; time-use analysis; mobility analysis; life-histories, personal life quality accounts; wealth grouping and ranking, group exploration of specific phenomena; looking towards future from group and individual angle. This approach incorporates Focussed group discussion and workshops etc. 'Evaluation is a form of enquiry where the end is information. Information is power and evaluation is powerful' (Search News April/ June, 1991;Cited Marsden et. al.1994). Formal Social Surveys which can be structured , semi-structured or informal , depending on the wisdom and expertise of interviewer , require skill-impartation and ' modesty from the experts from the outset' (Uphoff, 1991). Uphoff has cited the example of Nepal (Rasuwa-Nuwakot development project), Ghana (Upper region agriculture development project) and Mexico (PIDER-1, 2, &3) to emphasise 'participatory necessity for efficiency, equity and empowerment ', but also cautioned against pseudo participation. Scoones and Thompson (1994) have summed-up the major frontiers for methodological development as - 1. A balanced marriage between quantitative and qualitative approach and appropriate criteria for trustworthiness for each. 2. to bring local level perspective into mainstream, and 3. the mode and method of empowerment. Unfortunately the valuation system of these broad aspects are divergent and the search for a fine marriage may be as elusive as of marriage itself, so long illusions remain regarding what constitutes mainstream, it will be illusionary.

Formal reporting- Observations; participant's observation; Technical method (GIS, Health indicators); methods for analysing information are compiled, presented, discussed and finalised and reported as feedback. Reflection on entire exercise before submission may be a good practice.

EXAMPLE: of an Evaluation scheme for a Regional Integrated Area Development Project, based on Village tract level programmes and projects (Source: Training Handbook on I.R.D. – J. Mullen, 1988 IDPM,)

Objectives-

1.Strengthen planning capacity at regional level.

2.Strengthen project implementation capacity.

3.Improve quality of life of the inhabitants at village tract level.

Information System: - basic ' blocks' of information relating to objectives.

1.A comprehensive Data Base: necessary to measure the impact of the project on the target population. Should relate to 3 distinct administrative levels. :-a. Village tract level-7 quality of life indicators ; b.District level- 23 economic, social, and ecological variables; c. Regional level-23 economic, social and ecological variables

2.Information on Project Implementation: -measure project inputs (financial, technical and human resources) and outputs against planned inputs and outputs and objective achievement. (can be provided by the technical personnel of ministries concerned)

3.Data Gathering by Following Methods: - special surveys; -observation; - regular reporting

Indicators	Characteristics
1. Per capita income	Productivity
2. Yield per hectare	Productivity
3. Percentage of unemployment	Economic Opportunities
4. Rate of illiteracy	Education level
5. Level of infant mortality	Quality of health
6. Rate of population to medical personnel	Health coverage
7. Percentage of houses with access to water	Level of public service provision

Figure 4: Quality of Life Indicators:

Key Social-economic and Ecological Variables

1. Total population 2. Male and female active population from 15-60 years old 3. Total population dispersed 4. Number Of households 5. Rate of infant mortality 6. Number of health centres 7. Number Of medical and paramedical personnel 8. Principal diseases registered and number of cases 9. Population with access to clean water supply 10. Rate of illiteracy 11. Number of schools 12. Number of pupils 13. Annual rainfall 14. Total area 15. Total cultivable area 16. Total area with irrigation facilities 17. Cropping pattern and output 18. Number of

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ılation from 15-60 years old
lds 5. Rate of infant mortality
l and paramedical personnel
es 9. Population with access
mber of schools 12. Number
otal cultivable area 16. Total
n and output 18. Number of

animals and kinds 19. Number of people living on land without registered titles 20. Approximate income per household 21. Number of employed in off farm occupation 22. Number And frequency of markets 23. Number of Kms. All weather roads and rural feeder road etc.
(Glossary should define the terms used)

Summary

The Preparation of evaluation looks into conceptual framework, history, social, political, economic, organisational context, defining purpose and negotiation which is the most crucial aspect and where interplay of interests, sensitivities and sensibilities need to be appreciated, understood and incorporated. The Planning would go into the terms of reference, contents and context of T.O.R. which will detail purpose, ownership, use, objective, operationalisation based on logical-breakdown of objectives, and areas of concern. It would also detail the methodologies involved, skill required, formation and constitution of team, site visits, time-frame, budget, follow up and presentation etc. (mainly from Marsden et al 1994, Rubin, 1995.) Execution will operationalise the content and context of TOR and bring all minimum requisites into play. After analysis using appropriate tools,their will be presentation and submission of report with explicit findings and recommendation.

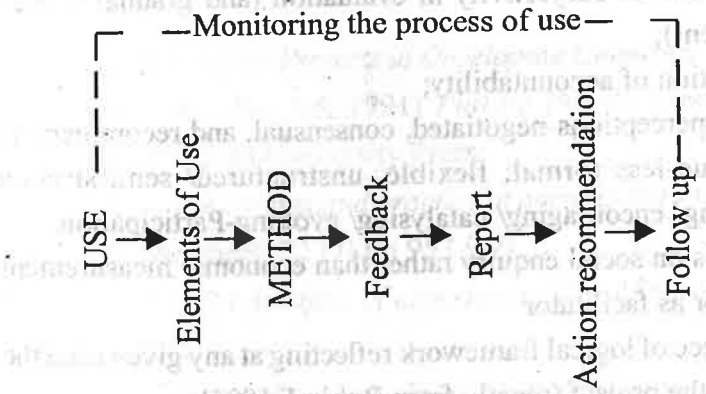

Figure 5: The Progress of EVALUATION (Source: Marsden, et.al.1994)

In general good practices in evaluation process will have following elements (partly from Marsden et. al. 1994) :-

- Clarity of objective;
- User / Controller

- Focussed and Clarity
- Maximum degree of transparency
- Consultations; Participation; Communication
- Appropriate and suitable methodologies
- Logical sequence; Flexibility
- Anticipation of conflicts
- Suitable evaluation team
- Underlying assumptions specified
- Good and integrated information system
- Timely and periodic feedback
- Mechanism for using and receiving the feedback
- Various types of evaluation process
- Honesty (free from biases)

Thus the major characteristics of good practices in evaluation system would encompass:

- Evaluation as an integral part of development or change process- 'reflection-action'
- An understanding of evaluation as 'empowering process';-enhancement of core skills; need to manage internal and external interface;
- Recognition of subjectivity in evaluation (and gradual move towards refinement);
- Recognition of accountability;
- Varying perceptions-negotiated, consensual, and recommendatory
- Technique-less formal; flexible, unstructured/ semi-structured and promoting/ encouraging/ catalysing/ evoking-Participation;
- Emphasis on social enquiry rather than economic measurements
- Evaluator as facilitator
- Importance of logical framework reflecting at any given time the current focus of the project (mostly from Rubin,F,1995)
- Need to clarify team-up approach to reflect the complexity of the project
- Evaluation to feed back into the project or future project or policy (Ita, O' Donovon. 1998) ('M & E- has been slow to learn from its own experiences; Coleman,1992; also exemplified amply in Kenya's Portfolio review ,IFAD-IDPM handout-Mullen,J,1998)

Conclusion: There has been 'a new convergence of interests and approach between social research and development practice' (veneraction1989; Uphoff1992). Since the 1960s the concept of evaluation has seen changing methodologies and since the 1980s it is continuously under refinement. It would be inappropriate ' to treat the aspects of cultural identity and popular participation' (Norton, A cited Rew, A, 1996) as 'residual part of evaluation' (Meir et al 1994 cited Rew A, 1996). Logically gaps still remain-what value a value-system will attach to a particular benefit, gain or loss is highly contextual and may vary from case to case. Besides, the Ecology also manifests and expresses itself in a dynamic fashion making the measurement further notional. No wonder in such a dynamic situation, evaluation bocomes 'as much an art as a craft.' The process, therefore, has to ensure that it does not become 'extractive and stressful'. Good practice in evaluation would then become responsive and facilitative towards capacity and institution building underscoring prominently the participation and people-centred and 'process centred' shifts. This will enable the stakeholders and beneficiaries to dream and work together and infuse a process of symbiosis in functions. Such partnership has potential to energise the liberation of human potential.

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PROJECT PLANNING MATRIX (Logical Framework)

Project Title: Marketing and Processing Support to SM Group Members,
Hypothetical settings: West Garo Hills, Meghalaya, India.
Hypothetical IFAD(International Funding And Development) Funding: Rs. 2.00 Million (est.).
Dated: 3. 3. '99

Narrative Summary	Indicators (including means of verification)	External Factors (Assumptions)
1. Development Objective. Improved economic security and incomes of S.M.Group members through organised market orientation of produce and training.	-Increased income of poor farmers and youth; diversification of income sources, incidence of asset accumulation; -Improved general well-being; housing condition, level of consumption and items in food, dress and clothing of children and women, number of consumer items; -Higher level of Organisational group dynamism; knowledge and skills absorption; -Quarterly monitoring reports, baseline surveys, ongoing evaluation, supervision visits, Progress reports, Gross production (tonnes) in relation to area (ha), House roofing, savings, consumption expenditure, number of consumer durable. -Final impact study evaluation.	1.Continued political support for development reflected in particular in agricultural and industrial (Pricing, trade, and incentives) policy of commodities favour investment in agricultural activity. 2. Security situation in the state/ district remains normal and does not impede enterprises. 3. Environmental impact aspect of agricultural waste disposal is addressed sincerely and early. 4. Effective recycling of fund, servicing and broad-basing activity to micro-financing; thrift and credit society adopt banking professionalism rooted to farmers development.
2.Immediate objectives: 1.Better prices on produce to farmers. 2. Assured and secure market by organised and informed marketing of farmer's produce.	1.Comparision of prices and margin of profit prior and after; Savings generated and deposit in the credit and thrift institution. Higher product/produce quality, Baseline data, inspection reports, M&E reports, Society and Financial institutions ledger. Market	1.increased investment in the farming activity energised by incentives and pricing and quality maintenance 2.Effective role by govt agencies, agricultural

3.Effective reduction in post harvest losses. 4.Increased openings for enterprise development and employment opportunities.	prices. 2. - Increased resorting to holding/ preserving the crop and timing according to market demand. - Intensity and frequency of group purchase and marketing; -Regular subscription and use of newsletter, -articulation in the farmers/ group meeting referring to the issues relating to timing, market conditions rates etc. and follow up.- Progress reports, Audit reports, supervision visits, Newsletter register, meeting minutes and attendance, Items and quantity and quality procured as inputs and brought for selling, gross figures and turnover of commodities, baseline data and M& E reports. 3. Increased staggering of production, time of harvest according to market information; use of appropriate harvesting/ storage techniques;- .Increase in non -farm activities;Increased use of farm tools and post harvest devices;Base line data, supervision visits, progress reports, Warehouse/ cold storage registers;M& E Reports. 4.Number of agro-processing and micro enterprise set up; number of consumer shops, number of ancillary units/shops related to tools, spares, packaging, planting material, nursery etc.Increase in employment man-days; increase in number of women in household processing.Number of registered small- scale unit; Loans / credit / employment oriented schemes of govt. availed; Baseline data, progress report, M & E reports; Financial institutions/society's small business ledger and loan disbursement; industry department records.	credit, extension, research, symbiotic linkage with national and regional marketing organisations and agro-processing enterprise counselling. 3.Farmers/ youth adopted diversification of farming/ income sources and adopted new technologies/ ideas. 4. Farmers form Farmer's emergency fund out of savings in order to meet emergent expenses.
3.Outputs: 1.Increased application of skill, bargaining-power shown by Social mobiliser group members.	1. -Some 6000 poorest farmers joins the thrift, credit and marketing society; detailed farmer-wise ledger maintained; farmer card issued for field monitoring. -Number and frequency of workshop/	1.Farmers acquires organisational capabilities, showing democratic functioning involving women and

2. Effective extension works of selected and trained SM group members result in spread and adoption of post harvest and food processing technology. 3.Reports and advice by consultant acted upon and further action set in motion. 4.Efficient and integrated functioning of Market intelligence and information centre; and regular publication and circulation of bi-monthly newsletter established; 5. Trained entrepreneurs received credit support and established micro-enterprise leading to increased employment opportunities.	group meetings for crops and horticulture held ;-stability of membership; election held, representation of women and youth and minorities-Expenditure of budget/ Project register/ number of participants in briefing, meeting. Society registers at PTCCS. Inspection report, M & E reports 2. Around 25 SM group trainers received one month training; around 800 youth and women exposed to post harvest and food processing technology-Expenditure for training, Project report, inspection report, M&E reports 3.One man month consultancy; contract signed, copy of the study report. 4. Regular publication of Newsletter; number of copies printed and circulated; number of advertisement from govt agencies ,private business; Concurrent evaluation by M &E; number of enquiries received and responses sent and causal link of group marketing through information centre; revenue generated; 5.Around 500 micro-enterprise set up. Number of employment generated 750; 250 applications under process for credit and registration- increased demand for power /; register of society /financial institutions/ industries department, power consumption records. Project reports, M&E reports, inspection reports	weaker sections in the committees. 2.Good recommended germ-plasm/ planting material available for better quality produce; 3. Prompt decisions on loan/ investment applications. 4.Market-information and intelligence linkage with national and regional marketing federations including chambers of commerce forged on symbiotic basis. 5. Other actions of market consultancy recommendations for warehousing, post-harvest grading centre, cold storage; and other infrastructural set up required are worked to be in place;
4. Activities: 1.Presentation and briefing of objectives/activities/ opportunities at one day introductory workshop. 2.Training of trainers in appropriate post harvest and food processing technologies in Home Science College.	**5. Inputs:** 1.Five, one day introductory workshop for social mobilisers for briefing at SIRD. Budget Rs.50, 000/, @ Rs.10000/ workshop. 2.Training of 20 trainers (SM group members) for 1(one) month at a budget of Rs.40, 000/ in the Home Science College of CAU to act as extension workers.	External factors 1. Rural road connectivity taken up and improved; 2. SM group mobilised; Farmers agree for group formation and group purchase and marketing. 4.Credit available for

3.Market research consultancy, report and advice on market intelligence network to selected consultant (A.F.C.) 4.Establishment of small wholesale /retail and market information centre in commercial place (Super market complex). 5.Support for Market information Newsletter publication for first 3 years. 6.Enterprise and Market management training for S.M. group energising steps towards enterprise development. 7.Additional activities: obtaining long term lease on concessional revenue rates for information centre from government;-computer with Tele and internet facility provided from savings;- concessional newsprint paper obtained from government for increased circulation.-Capacity building measures in leadership, motivation, team spirit and group dynamics, democratic functioning.	3.Concurrently, engagement of suitable consultant (AFC/ NEITCO) for Market research and submission of report within one month on market potential and setting up of market information system and publication of a Newsletter at a budget of RS. 40,000/ 4.Establishment of market information centre and recurring cost for running the centre for 3 years, including personnel and other expenditure at a budget of Rs.350,000/ 5.Bi-monthly publication of 2000 copies of Newsletter and circulation from the information centre at an initial budget of 160,000/ 6.20x2 days workshop of about 750 selected youths from SM group members spread over 3 years at a budget of Rs.30,000/	enterprise development from financial organisations in the area including MIDC/ SIDBI./KVIB 5.Selected and trained youth are given preference in employment generation programmes under the govt (PMRY, IRDP); 6.Support measures from govt such as concessional lease, Paper for newsletter, release of advertisements, information related to prices and other technical releases by making institutional arrangement and overall support from line departments of govt and other agencies.

Glossary: AFC= Agricultural Finance Corporation; PMRY= Prime Minister's Rojgar (employment) Yojna (plan); IRDP= Integrated Rural Development Programme; CAU= Central Agricultural University; PTCCS= Primary Thrift and Credit Co-operative Society; MIDC = Meghalaya Industrial Development Corporation; KVIC= Khadi and Village Development Board.

Project Advisory Note

Background: Marketing and Processing Support to SM Group Members in West Garo Hills of Meghalaya (India) is a hypothetical IFAD funded project for estimated cost of Rs. 2.00 Millions. The project aims to increase income and create opportunities through training and organised marketing. The project duration is 3 years. The population of 5 lakhs (0.5 million), predominantly (85%) tribal, live in rural area and majority are dependent on agriculture (97%).

of suitable Market eport otential mation lewsletter ormation running ng ture at a 00 copies rom the budget of out 750 up rs at a	enterprise development from financial organisations in the area including MIDC/ SIDBI./KVIB 5.Selected and trained youth are given preference in employment generation programmes under the govt (PMRY, IRDP); 6.Support measures from govt such as concessional lease, Paper for newsletter, release of advertisements, information related to prices and other technical releases by making institutional arrangement and overall support from line departments of govt and other agencies.

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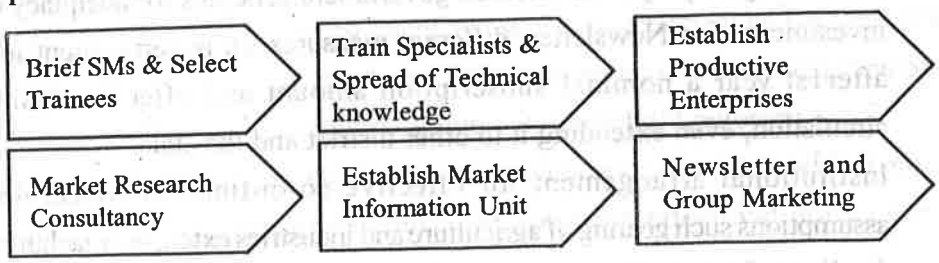
The area has good productivity potential with remarkable agro-climatic variations.

Problem: Farmers do not get remunerative returns on account of low quality produce, isolated and unorganised marketing, absence of value addition, considerable post harvest losses and lack of information for harvesting. A deep sense of market insecurity has affected crop diversification attempts resulting in lack of opportunities. Underemployment has generated a sense of frustration and signs of unrest having implications on law and order are surfacing.

The Project Planning Matrix has depicted inputs, activities, output, immediate objectives (purpose), developmental objectives (goal). The indicators and means of verification have been mentioned against each level (as in NORAD) alongwith assumptions for achieving and effecting higher level.

The project activities will follow 2 main parallel sequence of activities as depicted below:



Main Project Strategies are:

1. Providing timely and relevant information, on harvesting, marketing and price.
2. Garner better prices on produce and remove sense of insecurity.
3. Enhanced capabilities through organised group, training and investment.

This will be achieved by fine tuning the PPM with full participation and as an iterative process approach in all phases of project cycle. The Logical framework should function like 'chameleon' (Gasper, 1997) and show dynamic response to the environment and context by use of ingenuity. District Implementation Unit under the Chairmanship of the District Collector and Project Manager as the chief executive will implement the project. The Primary Thrift and Credit Co-operative Society (PTCCS) has already mobilised SM group to a great extent. The Co-operative hierarchy, existing market and organised market is shown diagrammatically at figure 1, 2, &3.

Stakeholder analysis will be desirable and Traders will have to be consulted. SWOT analysis and Resource management Chart will have to be kept in mind for strategic planning and implementation (Cordingley, D., 1995). For effective management CPM/PERT techniques will be helpful alongwith.

Certain desirables are:

a) More focus on marginalised and vulnerable groups;

b) greater accountability, transparency and involvement in action and capacity building;

c) Training ,extension and strengthening backward and forward linkages;

d) Innovative ideas such as government lease on concessional revenue rent for space in Supermarket complex; savings on this count may be utilised for computer and Internet access for speedy and timely information. Harnessing employment oriented government schemes for adequacy of investment. For Newsletter, different measures on advertisement and after1st year a nominal subscription amount and after increasing circulation, even extending it to other district and the state.

e) Institutional arrangement for effective co-ordination concerning assumptions such gearing of agriculture and industries extension machinery for diversification of agriculture and income sources and follow up.

f) Establishment of a farmer's emergency fund, for non- diversion of loan and for consumption or emergencies.

g) Prompt decision on loan applications by the PTCCS / FIs; Open forum and publishing details of list; and the trappings of approval culture may be desisted.

h) Political, socio-cultural, gender, environmental, institutional and financial and economic viability will have to have positive interplay in decision making.

The indicators are illustrative and not exhaustive which needs to be decided in consensus with the stakeholders. A panel needs to be constituted for effective monitoring where random sampling of beneficiaries can be resorted to ; testing the understanding and absorption of technology, professional functioning of Group/ Information centre and credit and thrift society may be desirable.

Benefits, and quantification of value: No definite figure has been given for success, but 80% farmers income increasing by 100-200% within 3 years can

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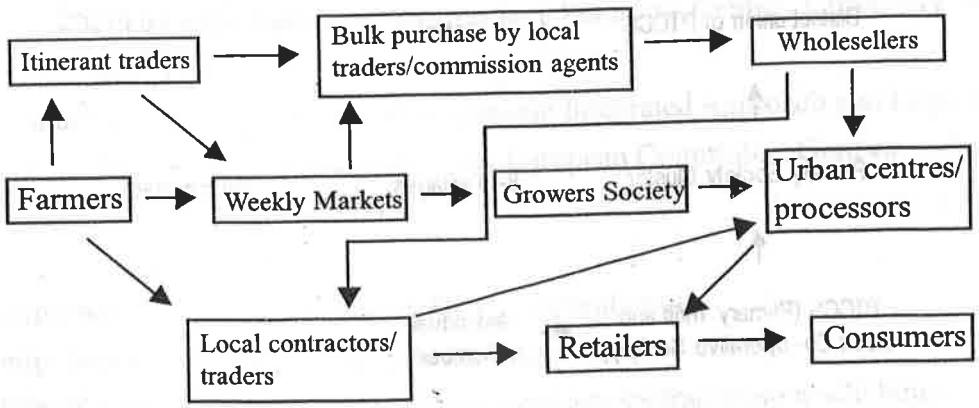
be considered reasonable. Similarly, 10% increase in production is likely to be absorbed in local market; hence 50% and above increase will be reasonable expectation. 90-100% achievement of beneficiary for training and enterprise and membership would be desirable. Some other quantitative indicators could be –100 % recovery; 100% attendance in the training and workshop; 80% flow of information to and fro the SM group and 80%use and response to such information translating in action and follow up; 5000 Newsletters within 2 years and by the end of 3rd year, about 6500. About 1000 jobs created in micro-enterprise / small business and petty shops; vending etc. About 80-90% trained youth and women establish and adopt post harvest technology and food processing methodology. Mostly qualitative and numerical indicators have been indicated which requires to be quantified in consultation. Further, increased area, production and diversification of crops data. investment in agricultural machinery; procurement and sale transaction related to agriculture and finished/ value added products. Effective and positive participation of all stakeholders. Women participate actively in household enterprise.
There is a necessity to establish a control area outside the catchment of project having similar socio-economic level for assessing effect and impact during evaluation.

Figure 1: Better Positioning and enabling the rural poor through organisation and training under the Project.



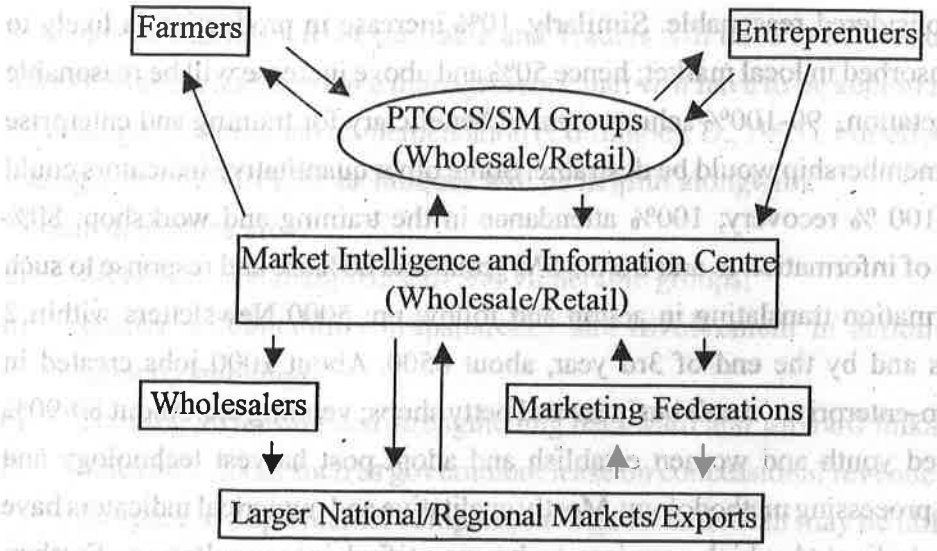
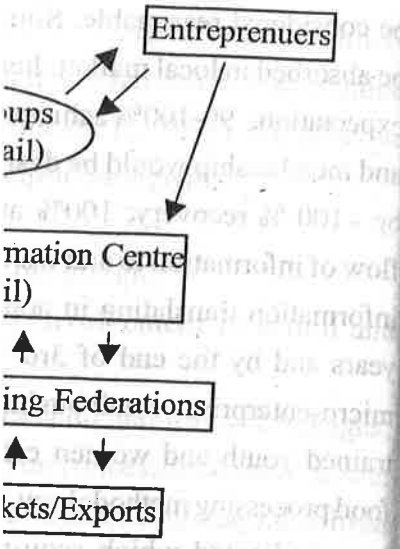


Figure 2: Present rural market chain of commodity flow (source: IFAD; NER Management for Upland areas formulation report.)

Hierarchy	Level	Status
Federation of Thrift and Credit Co-operative Union	National	Legal, registered unions are members
Union of district level unions of TCCS	State	Legal, registered district unions-members
District union of PTCCS	District	Legal- registered PTCCS members
Primary Society Cluster	8-10 villages	Recognised
PTCCS (Primary Thrift and Credit Co- operative Society)	Individual Member	

Figure 3: Levels and Hierarchy In Co-operative functioning (modified from Hulme and Mosley, 1996)



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Status

Legal, registered unions are members

Legal, registered district unions-members

Legal- registered PTCCS members

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SECTION - II
APPROPRIATE TECHNOLOGY :
LABOUR INTENSIVE METHODS IN CONSTRUCTION

LABOUR INTENSIVE METHODS IN THE CONSTRUCTION AND CONSTRUCTION RELATED INDUSTRY

Introduction

Owing to great diversity in the interactions and expressions of developmental factors over time and space, the geography, history, culture and level of progress of nations have and been continuously changing and so have their values and quality systems of life. This change has been 'the perpetual struggle of mankind' and has been fuelled, among others, by technology. About 160 countries comprise a diverse group outside the OECD countries: a majority of them are poor and in various transitional stages on the developmental scale (upper middle income, middle income and lowest income).

The preoccupation of modern era with growth and trickle down theory caused concerns of equality and sustainable development being not factored appropriately. This resulted in disparities, unemployment and urban migration which have come to centre stage as major concerns, even in developed countries. Among the comity of nations the post world war order has witnessed only a facade of liberal values, which conveniently has been sacrificed for consolidation of power, for securing access to vital resources to quench unchecked greed. Thus, the interests of poor developing countries are more often decided and dictated by forces and factors outside the concerned countries.

The aims, problems and concerns of development:

Development primarily aims at: 1. Improvement in the quality of life; 2. Optimising the use of renewable resources; 3.Creation of workplace where people live (1-3; Dunn, P.D., 1978); cheap and in large numbers (Schumacher); 4. The above should be in equitable and sustainable manner; 5. Endogenous self-reliance through participation and control. (4&5, Reddy, A.K.1979); use of local materials and simple methods.

'Development does not start with goods; it starts with people and their education, organisation, and discipline' (Schumacher, E.F., 1973). 'Schumacher (1966 Cited Willoughby, 1990) sees a close relation of unemployment with mass poverty and misery and mentions eradication of poverty as being more important than growth per se. He further argues that if 'people centred' approach

is not adopted and action is based solely on economic calculations,..... human freedom becomes 'stultified by apathy and sullen disdain' and fears 'social violence'. World Employment Report '98-99 mentions that out of a world labour force of 3 billion people, 25 to 30 per cent are underemployed and about 140 million workers are fully unemployed. 'The quickening pace of globalisation and technological change provides both challenges and opportunities at a time when the global employment situation remains grim..... the level and quality of skills that a nation possesses are becoming critical factors." (World Employment Report 98-99).

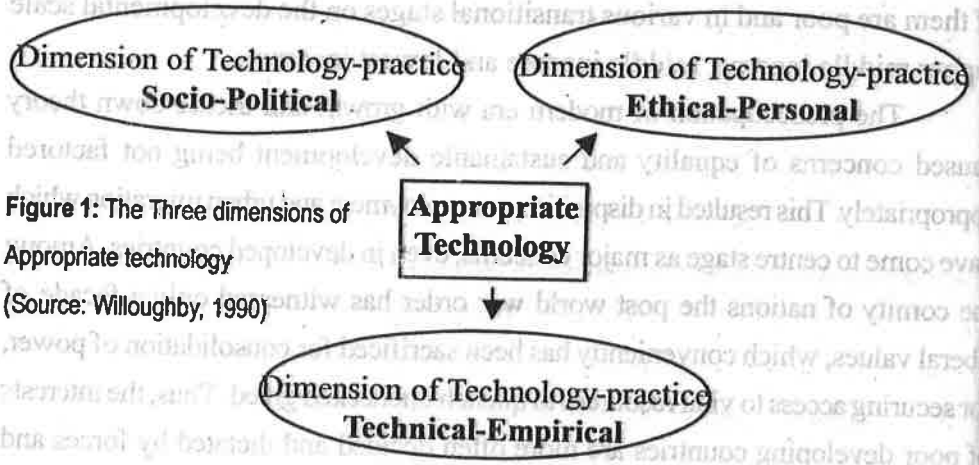

Figure 1: The Three dimensions of Appropriate technology
(Source: Willoughby, 1990)

The dimensions of Intermediate Technology:

6(six) major mutually interdependent problems called for the development of the concept of intermediate technology :

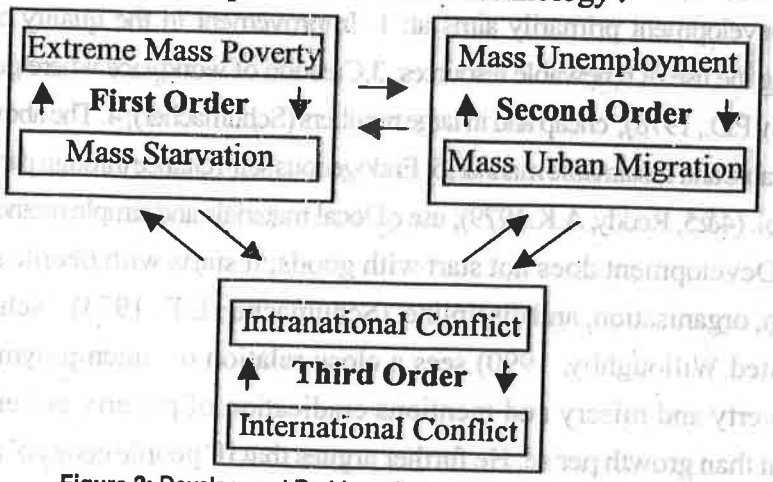

Figure 2: Development Problematique. (Willoughby, K.W., 1990)

The concept of 'Intermediate technology' can be ascribed to have emerged from the concept of 'Appropriate Technology' (A.T.). Schumacher (1973) had illustrated Intermediate Technology as a level on the range-scale of available technology in the world (£1 - £1000) and particular intermediate level (of appropriate technology) for any particular country, exemplified by him £ 100, in terms of "equipment cost per workplace". Thus, it is a specific application of A.T. to specific circumstances (Willoughby, 1990) 'tailored to fit the psychological and biophysical context prevailing in a particular location and period' (Willoughby, K.W., 1990) and is linked to 'choice of technology' which is the 'key instrument of a developmental strategy' (Sen, A.1975).

Technology and (Option) Choice: According to the ILO, technology should contribute to greater productive employment opportunities, elimination of poverty and achievement of equitable income distribution. The 'area approach' and 'factor endowment approach' must agree with the amount of resources and labour with which the region is endowed and thus for developing countries it forms the hard reality (Knudsen, H. 1992). Sen (1975) is of the view that too much emphasis on the development of new intermediate technology should not be placed and 'off- the- shelf technology' should be resorted to. Reddy (1979) is of the opinion that since very few alternative technologies have been developed, and 'off- the shelf technology' is rarely available, hence generation of technology is a precondition for the choice of appropriate technology. Reddy (cited, 1979) mentions that technology contains the genetic code of a culture and puts 3 (three) important conditions for its fulfilment:

1. A filter which transmits basic human needs to the institutions of technology generation;
2. Introduction of new set of preferences/paradigms into the innovation chain; and
3. The existence of the requisite technological capabilities.

Major componenets of appropriate and intermediate technolog can be enlisted as:

- most economical use of natural resources; being labour intensive;
- accessible to its users; frugal of scarce resources, environment friendly
- manageable by individual or small groups.

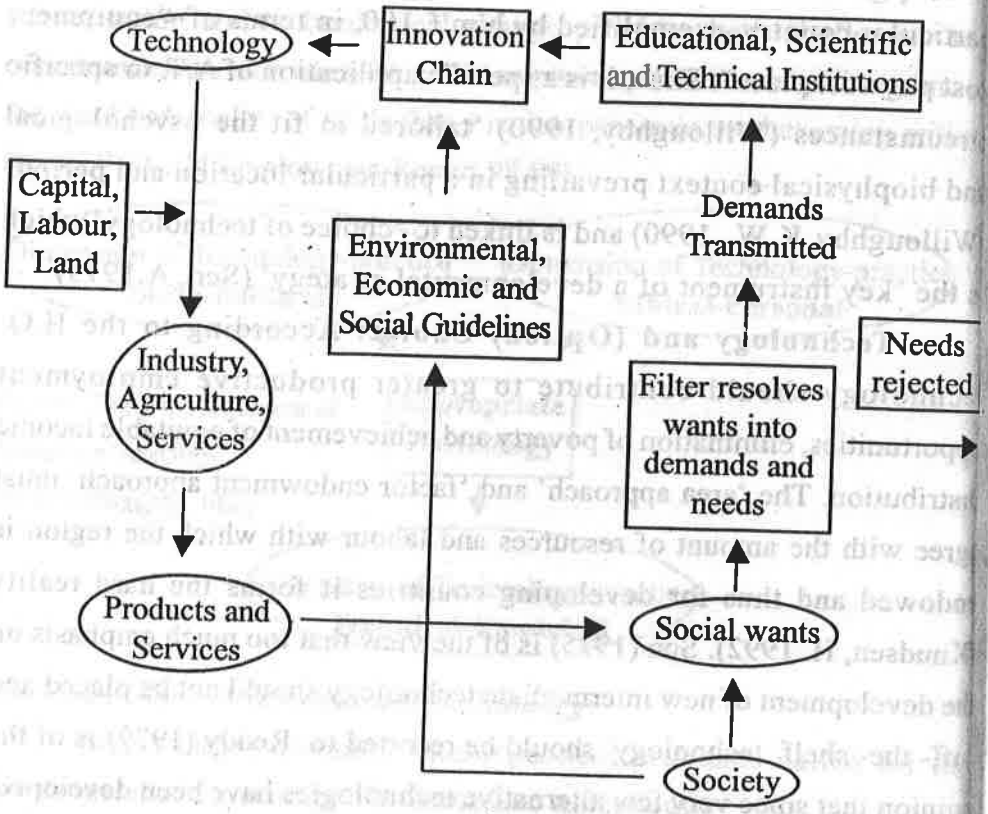

Figure 3: Generalised scheme for the generation of technology. (source: Reddy, A.K., 1979)

Sen (1975) mentions 3 (three) important aspects of employment: a) income aspect, b) production aspect and c) recognition aspect. *He is inclined to treat employment as benefit rather than cost taking into account that worklessness induces vagrancy and crime* and has a significant impact on society. He also believes that expansion of female employment may be a great force for social change and thus employment does involve more than production and income. According to Sen, A. (1975) 4 (four) sets of structural factors will constrain employment policy: technological possibilities; institutional features; political feasibilities; behavioural characteristics.

nd intermediate technology

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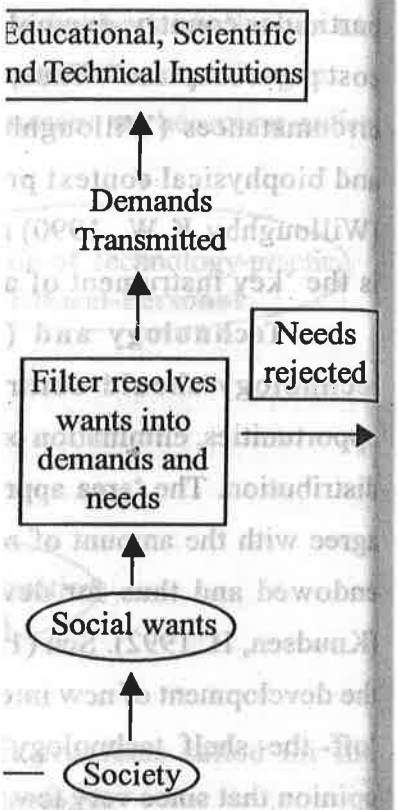

logy. (source: Reddy, A.K., 1979)

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Development	Western Technology	Appropriate Technology
Spiritual	Alienation Domination Inequality	Self-Development Emancipation Participation
Organisational	Subordination Bureaucracy Centralisation Bigness Uniformity	Self-Management Democracy Decentralisation Smallness Pluriformity
Technical	Over-Supply Hard Techniques Consumption Wasting Complex	Self-Supply Soft Techniques Recycling Sparing Simple

Figure 4: Some notions illustrating the difference in tendencies between development by western and appropriate technology. (source: Riedijk, W.,1987)

Factors favouring use of modern technology and acting as barrier for labour intensive methods:

'Most of the developing countries have suffered some form of colonisation in the recent past. There has been difference in perception of development, ideological competition, battles for control of resources and market, question of prestige, confusion of development with industrialisation and mechanisation, a view that modern methods/ technology is always the best, lack of skilled labour and competition between sectors, lack of urbanisation, lack of managers and professionals, risk from petty corruption and wastage.' (Tighe, D., 1993). Labour based methods are treated less cost effective. Besides, engineers and decision makers have an educational bias. The availability and quality of hand tools and the fact that the administrative and contract methods are now geared to engineering based methods are important factors favouring modern technology. The primary aim being cost minimisation than employment. Finance/ politicians / professionals want quick results, and sometimes more machinisation and very often specification is flaunted as high fatures of development.

Present scenario:

Many of the factors mentioned above are absent or reduced in scale and faith in technological progress is shaken. Ideological competition has now diminished and our knowledge about development has increased substantially. There is now stress on learning process both ways and emphasis on participation, decentralisation and poverty alleviation coupled with income opportunities and basic needs. There is greater awareness about dignity of labour in human existence and a belief in the non imposition philosophy. Availability of public fund (both external and internal) is geetting reduced. Ownership and sustainability for operation, maintenance and the benefits are the present day concerns. A deterioration in economic conditions in most of the developing countries, scarcity of foreign currencies,and vast growth in middle income group is noteworthy. Increasing transportation is also a distinct feature of the present day world (mostly from, Tighe, D., 1993). Mentions that Tighe, D., 1993 'The use of conventional machine -dominated construction techniques will continue to reinforce...external dependencies, mal-distribution of power, and impoverishment.'

Undesirable consequences of technological dependence may be classified into 4(four) categories:

1. Cost; 2. Loss of control over decisions; 3. Unsuitable characteristics of the technology received; 4. Lack of effective indigenous scientific and innovative capacity, which in itself is a symptom of underdevelopment (Stewart, F.1977).

The major thrust of growth philosophy with large-scale technology and equipment transfer had more credits as failures than gains. Transfer of technology has proved to be a problematic issue in which trade-off of growth may not take place.

Lessons from Russia and Japan have noted three things to be in common in their policy:

a) strict control over technology imports; b) technology imports via strict licensing; c) adapted and modified the technology and rarely introduced unmodified technology (Japan devoted 1/3rd on R&D- mostly on creating a unit of local technology- aiming at reducing the dependence. (Stewart, F., 1977)

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The example of Cement block manufacture in Kenya throws a complex relationship between choice of product, choice of technique, income levels and income distribution which are core factors for selection of technology. Many of the selection mechanisms of technology are the outcome of economic system and technology already in use, and further involve political decisions (Stewart, F. 1977).

Labour intensive Employment: According to Tighe (1993) 'Labour based technology is systemic substitution of human effort for machines in situations where it can be shown to be economically and socially viable'. (McCutcheon, R.T., 1993.) States that 'Labour intensive would mean more proportion of labour used in the factors of production' for a Labour-based (/intensive) construction has the following features:-

- 'economical and efficient employment, as great a proportion of labour as is technically feasible to produce the high standard of construction demanded by the specification and allowed by the funding available (McCutcheon, R.T., 1993)';
- complex mixture of hierarchical and consultative management structure.
- provides a vehicle for implementing the complementary policies of decentralisation and privatisation.
- facilitates small enterprise development.
- it is an effective engine for involvement, leading to participation and awareness encouraging functional democracy.
- in labour intensive rural roads construction labour component can go up to 60-65%.
- achieved partly through creation of individual, community, and institutional capacities through the establishment of large, carefully planned long-term national programme.
- recognises that factors of production in developing countries are different.
- recognition of local knowledge and technological capacities and their strength and weaknesses.
- Labour intensive investment policies are particularly relevant to a growing number of developing countries which are struggling with structural adjustments, devaluation of local currencies, scarcity of foreign

exchange, degradation of basic infrastructure and acute unemployment (Gaude, J. And Miller, S, 1992). For example, India has pursued employment generation schemes as National Programmes having a minimum of 60% as labour components, which has taken 1-2% of National income, and there are indications that economy grew faster because of these investments (Gaude, J. And Watzlawick, 1992).

Civil construction as definable sector:

- Civil construction is a vast field and production or selection of suitable technology is complicated.
- Construction sector comprises housing, non-residential building, roads and bridges, embankment and dykes (flood protection), Irrigation and drainage, water supply and sanitation, other infrastructure, etc.
- Housing sector is varied and dispersed and has many variables of climate, demand, quality, space, aesthetics, etc.
- Moavenzadeh (cited Field B. and Ofori, G, 1988) had indicated that construction's share in employment tends to follow the behaviour of its share in the GDP
- It involves a large number of backward and forward linkages. (ILO, 1992; Field B. and Ofori, G, 1988).
- Nearly 60% of gross fixed capital formation (GFCF) is invested in structures (ILO, 1992).
- It plays a key role in the infrastructure of the economy (roads, railways, dams, power stations, irrigation, airports) and 50-60% capital formation exists in the sector.
- 60-70% construction happens in public sector and the growthcan be influenced by the policy decisions. (all above, McCutcheon, R.T., 1993).
- the sector accounts for substantial proportion of labour force (30-40% of total labour force of which 75-80% comprises occupational groups, craftsmen, production process workers).
- The relation between national developmental strategy (implications of nature, size, distribution of demand for construction, structure, operational methods and inputs of the industry) and construction industry (employment and seasonal unemployment) is two-way (Field B. and Ofori, G, 1988).

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- Planning and demand management, counter cyclical planning of construction projects and technical flexibility of the sector by variety of combinant factors of production can be utilised to suit each finished product (Field B. and Ofori, G., 1988).

Country	Year	GDP per capita ($ US)	Value added / employee in construction ($ US)	Labour force in construction per 1000 population
Japan	1990	23821	47748	48
USA	1990	21569	51848	31
UK	1990	16989	32415	31
Singapore	1991	14473	27443	49
Hong Kong	1990	12560	13028	40
Taiwan	1991	8551	11839	35
Republic of Korea	1991	6534	23580	31
Malaysia	1991	2476	3755	23
Thailand	1990	1437	8177	13
The Philippines	1991	716	2358	15
Indonesia	1990	602	2733	12
Sri Lanka	1990	427	2692	11
China	1990	322	734	22

Figure 5: Construction labour in selected countries. (Source: ILO 1992; OECD, 1990-91; The World Bank, W.D.R., 1991; UN statistical yearbook for Asia and Pacific- Cited: Ganesan, S. 1994)

A technology should be considered appropriate for the construction sector provided it represents that combination of resources, procedures and techniques most likely to satisfy the socio-economic goals of the sector (Ganesan, S. 1994). Ganesan, 1994 suggested appreciation of appropriate technology in three key areas:

1. Clarification on the boundary of construction or construction related activities e.g. a project, a construction sub-sector such as highways of the total construction sector;
2. Strategies to maximise the productivity of scarce resources;

3. Policies to promote absorption of abundant resources, especially surplus labour

Ganesan also did not find conclusive evidence to suggest conflict between output and employment objectives in the long-term or that in cases of such; mitigation by suitable economic and fiscal responses. Ganesan, 1994 also suggests 'that in the final analysis, all factors considered, the social and economic benefits of greater, sustained employment creation in developing countries should outweigh any disadvantages'. Ganesan, 1994 has concluded that a desegregated construction industry model, which does not ignore the informal sector, should be the basis for exploring technological choices in developing countries which evolves into a productive combination of traditional and modern technologies of varying scales.

A World Bank research "study of the substitution of labour for equipment in civil contruction" (1971-1986 cited, McCutcheon, R.T., 1993) came to the conclusion that:

1. It is technically feasible to substitute labour for equipment for all but about 10-20% of total road construction cost for the higher quality construction considerations.
2. "Labour- intensive methods are technically feasible for a wide range of construction activities and can generally produce the same quality of product as equipment intensive methods".
3. Labour productivity can be improved very significantly by the introduction of certain organisational, management and mechanical improvements. (10-20 fold increase was noted; incentives and skilled supervisors were imperative.)
4. With superior tools, high incentives and good management, productivity can be improved to the point that labour intensive methods could be fully competitive with equipment intensive methods at certain wage rates (Wage less than US $ 4.00)/ day-1982 prices).

McCutcheon, R.T., 1993 cited various examples such as Kenya's RARP (Rural Access Roads Programme) as one of the most successful and labour intensive programmes. In Botswana better quality and more labour intensiveness (65% costs for labour) was achieved.

The above is also supported by the review of labour intensive construction in South Africa and elsewhere, (McCutcheon, R.T., 1993).

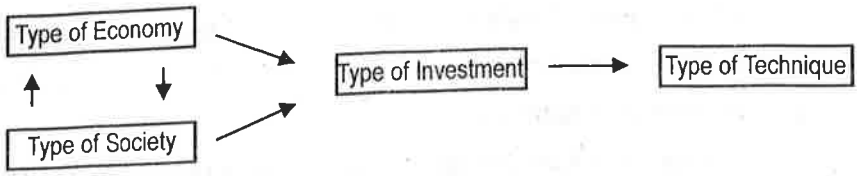

Figure 6: Choice of Projects, (Meis de Sebestian, cited Harper and Soon, 1979)

In the matters of maintenance in Lesotho, Malawi, and others, even after utilising labour based methods and increasing the current wage rate by 47% and maintaining same quality of output labour based method achieved a saving of 10-20% re-gravelling cost than the equipment intensive methods (Guthrie, P.M., and Kirkpatrick, S.W.et al,). In road maintenance, variety of opportunities emerge by restructuring and decentralisation . These can be outlined as emergence of permanent workforce at the grassroots units, individual and collective responsibility for the maintenance of a section of road, agreement between governments and communities and use of small scale and petty contractors. (deVeen, J.J. et al 1992).

Trade union research project indicated the **following prevalent causes of failures** of public works programme (McCutcheon, R.T., 1993):

- o They are seldom scaled to the magnitude and locational requirement of specifications;
- o They are seldom scaled to the magnitude of national manpower requirements;
- o Such works are introduced in fragmented and unsystematic manner;
- o There is rampant use of inappropriate technology;
- o Works are introduced in ad-hoc manner and not linked to overall developmental policy;
- o Public works programmes are entirely dependent on government commitment for fund, research etc.

On the other hand , the **main reasons for successes** of labour intensive programmes such as in Kenya's RARP and Botswana's programme are due to (McCutcheon, R.T., 1993) :

1. Long term linkage to a national programme;
2. Sound intellectual assessment of technical feasibility and economic efficiency;
3. Technical, institutional, organisational, and socio-economic aspects received concerted attention;
4. Strong organisations were established with good management system and balanced decentralisation;

5. Good and extensive training, focussed towards goal;
6. Long term political support;
7. Long term financial commitment;
8. Good co-ordination between government, departments, administration, local authorities, technical professionals and donor agencies.

However, highly specialised jobs, such as under water excavation, long distance haulage, very hot mixing, specialised piling etc would inevitably call for mechanisation and higher level of skills and methodology.

For construction technology optimisation,issues which needs consideration are: 1. Government policies on investment and employment; 2. choice of building materials in design (design equivalence), 3. slicing and packaging of large jobs and guaranteed role for domestic contractors in their execution, 4. development of domestic building materials industry, 5. improving supply of serviced land supply for housing, 6. an active role for private developers in urban renewal, 7. better housing financing and improved access for domestic builders to finance., 8. Construction plants and research to improve performances of existing material industries (mostly from Ganesan, S. 1994), 9. A strategy to increase output through activities which consumes more labour and less scarce resources, and 10. large scale training of various skilled technical and managerial personnel.

Summary and conclusion: 'A key issue for any country is the extent to which the pursuit of environmental sustainability involves trade-offs with income and employment. Relative priorities will vary from one country to another depending on the levels of wealth and financial constraints, the structure of the economy, the nature and magnitude of development problems, technological options and capacity as well as external assistance' (ILO, 1992). A strategy to increase output through activities consuming more labour and less scarce resources is a feasible way forward for most developing countries and correct technology is a precondition for the expansion of construction sector (Ganesan, S.1994). Implementation of appropriate technology demands a suitable framework conditioned by the political, social, economic and environmental factors and considerations of modern technology (Ganesan, S. 1994; Knudsen, H. 1992). Employment levels, ultimately depend on two (2) factors- choice of technology and volume of investments. A significant gain

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in total employment of 10-15% can be realised through restructuring and promotional policies in the construction sector (Ganesan, S. 1994). Socio-economic implications of not utilising the local resources, introduction of labour based approaches into the curricula, establishment of system and procedures, right type of hardware (tools and equipment) and Software (motivation, training, promotional policies) for execution and implementation are some issues which (Edmonds, G.A. and de Veen, J.J., 1992) call for concerted action in order to catalyse attainment of wellbeing. Developing countries should arrive at a reasonable balance between labour- intensive and capital intensive techniques. Proper emphasis should be laid on building up national/State infrastructure and promoting Human resource development, skill, training of workers and technicians, professionals and managers (ILO, 1992).

In case of developing countries, the suitable dynamics of intermediate and labour based technology and capital intensive technology in construction and construction related sectors appears to be in their best interest. In this case 'what is good for the rich may not necessarily be good for the poor' would be an appropriate conclusion.

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SECTION - III
ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

ENVIRONMENTAL IMPACT ASSESSMENT: AN ASPECT OF LESOTHO HIGHLANDS WATER PROJECT

"In between the two extreme types of activity; namely, (i) 'environmentally-benign' ones and (ii) 'ecologically-disastrous' ones there is a whole range of activities that have various combinations of income-generating and environmental impact potential. .....Available methodologies for EIA and assessment of income potential for precise quantitative estimates may prove inadequate, and they need to be further developed by natural resource and environment specialists and economists together." Issues in Mountain Development ISSN: 1027-0027 1996/1.

Introduction :

Environmental Impact Assessment (EIA) is an, "anticipatory, participatory, integrative environmental mnagement tool which has an ultimateobjective of providing decision makers with an indication of the likely consequences of theirdecisions relating to the new projects or new programmes, plans or policies" (Khann,RK, 2001). Thus EIA is a facilitative and decision making tool in formulation, decisionmaking and implementation of developmental aspects and efforts. It is a process used to predict the environmental consequences and to take ameliorative measures to minimise the impact in the immediate and long terms. Environmental appraisals and impact assessments have a core of participatory mechanisms to follow. "A *balance has to be struck between the positive benefits of consultation and public participation in ameliorating the impacts of actions, and in reaching consensus on environmental outcomes and the financial and time costs involved. The point of balance varies between EIA systems and over time but the trend towards more effective consultation and public participation is inexorable"* (IDPM EIA leaflet 10).

The steps involved are Identification, Predictions (based on models), Evaluation(existing rules, regulations, norms, etc), Mitigation (steps/ suggestions) and communication (of Results). The process in the EIA involves Screening (project and site related), Scoping(formatting) Rapid and Comprehensive EIA,Mitigative measures, Environmental Management Plan (EMP), Environmental Impact Statement (EIS), Post Project Monitoring (PPM). The Resources needed to do an EIA area qualified multidisciplinary team of

experts, data about project and surrounding ecosystems, anlytical instrument (models) and an effective institutional arrangements for EIA.

Background: The first phase of the project, Phase 1A, will supply 20 cubic metres of water per second to South Africa and generate 70 MW of hydroelectricity for Lesotho. There would be construction of two dams (Katse and Muela); excavation of 82 Km (45+37) of tunnels about 5m in diameter; and construction of an underground power station. Asphalt bitumen roads (new and upgradation) will be constructed to gain access to the Katse dam and the upstream tunnelling sites. Bridges, and support infrastructure for construction related activities and other services will also have to be in place. In addition, Lesotho's electricity and telecommunications networks will be upgraded extensively. It will involve change in land-use, resettlement, additional population load of 2000-3000 of different social groups, and exposure for economic exploitation.

The information presented in this study is time specific as dating in 1998-99. In the present case study, the check list and matrix is preferred methodology in view of following advatages of the checklist method:

Advantages of checklist and Why it is used here:

1. Checklists are useful and convinient tool for EIA. 'EIAs in UK uses checklist or simple matrices or some hybrid combination. It has been experienced that simple checklist and simple matrices fare equal' (Glasson, J. Therivel, R. and Chadwick, A.1994). According to Gilpin, A.1995, Leopold Matrix suffers from a number of drawbacks: - hidden uncertainties (difficult to distinguish between a high probable low impact and a catastrophic event in low probability); no criteria for measuring magnitude and importance; can not reflect indirect or feedback events; time horizon of events are not revealed; is cumbersome; not conducive to a comparison of alternative plans; fails to handle important secondary impacts; tends to neglect social and economic values. 'Most seriously, it depends on the subjective evaluation of experts and the judgement then is converted into the numbers and the scoping may not be truly reflected in numbers; Not suitable for public presentation; Danger that analysts

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Thus it is recognised that, ' improved methods are needed to accommodate more public consultation and to recognise that EIA is part of larger political decision making process' (Nichols and Hyman1982, cited Gilpin.A.1995).

2. Checklists provide detailed definition of scope by 'detailed descriptions and record of findings' (Mock, J. and Bolton, P. 1993). Checklists, according to Barrow, C.J.1997, are useful as they order thought; aid data gathering; help ensure that assessor does not overlook a possible impact; and assist the assessor to secure large amount of data so that impact assessment can be focussed; besides, determining the importance of the impacts and aid in identifying mitigating measures needed.

3. Checklist provides a tool to enable specialist and non-specialists concerned to improve their knowledge, understanding of the environmental changes which the projects may entail. It would facilitate identification of positive and negative impacts and seeks answer for mitigation (Mock, J. and Bolton, P. 1993).

Good range and variety exist (e.g. 'sectoral checklist' (ICID/ODA/ ICOLD); Scaling checklists; questionnaire checklists; environmental evaluation system); from simple listing of environmental factors (USDA1990; ADB1987; ESCAP1990; World Bank1982; WHO, 1983), to descriptive approaches (Carstea et.al.1976; Canter and Hill, 1979; USDT, 1975 cited) including information on measurement, prediction and interpretation of changes for identified factors; it can be extended to accommodate quantitative and qualitative. 'Rating, scaling...checklists find greatest application in the final evaluation of alternatives and the selection of a proposed action'(Lee,1988; Cited ,Canter, L.W.1996)

4. Checklist bring together the expertise from wide range of sources concerning the environmental changes which relate to specific group of

projects; allows comprehensive framework and ensure that all aspec are looked from various angles (Mock, J. and Bolton, P. 1993).

5. 'It facilitates adaptation and simplification to meet specific situationa need and to that purpose it has great flexibility and makes use of availabl information and resources. In this way it may be possible to conform t sensitivity of EIA in the project identification phase or in the initial stage of project planning without assembling a multidisciplinary team for EIA (Mock, J. and Bolton, P. 1993). In doing so it takes care of the sensitivity of the grassroot and provides signals from the grassroot Mock, J. and Bolton, P. (1993) states 'checklist system as the basis of comprehensive approaches to impact identification (cited, IDPM handout)'.

6. Checklist has practical application in such a manner that detailed information requirement is focussed separately for further refinement (Mock, J. and Bolton, P. 1993).

7. Checklist is considered as 'greatest value in Tropical and Subtropical regions where environmental changes tend to be most diverse and far reaching and where data is often sparse' (Mock, J. and Bolton, P. 1993).

8. It also ensures that 'there is no misunderstanding about which environmental changes are to be considered under each item and that possible linkages and overlaps between different items are brought to the user's attention by means of various tables' (Mock, J. and Bolton, P. 1993).

9. To assist the user in assessing the overall level of knowledge and the scale of each item of impact in the checklist, the checklist must be studied side by side with the informations and data sheet (Mock, J. and Bolton, P. 1993).

10. The checklist can be adapted for specific application such as evaluation; for modernisation, rehabilitation or extension of the projects; modified

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for specific type of the projects as data is comprehensive in respect of a particular location/region; planning of cluster of interrelated projects and group of projects.

11. Responds to 'the influence of the political interactions, public involvement, prescriptive legislation, standards and regulations, the effect of recession, and environmental conflicts' (Gilpin, A. 1995).

12. Checklists can be drawn from specialist literature or created on the basis of previous experience of similar projects. PPA can yield valuable inputs for future checklists.

13. 'Of all the methodologies, checklists have tended to survive as a guide to the potential impacts of a project. Checklist may initiate preliminary analysis to provide first approximation answers, or to identify areas of ignorance; they are not, however final analysis in the sense the assessments are'(Gilpin, A.1995)

Disadvantages:

- Checklist is a facilitating tool but does not give analysis.
- 'Uncritical use of checklist can result in a blinkered approach to assessment; what is not in checklist can be ignored' (Barrow, 1997).
- 'Pigeon hole approach' may crop up as interrelations are not depicted and hence simplistic view of environment (Barrow, 1997).
- Overlaps of impact are sometime reflected in various fields and can be counted more than once (Barrow, 1997).
- Can become long and unwieldy (Rau, 1980, cited Barrow, 1997).
- Often make no indication of impacts and do not prioritise the impact (Rau,1980, cited Barrow, 1997).

1. **Screening: an Environmental Impact Study (EIA) for Lesotho Highland Water Project (LHWP) phase 1 A.**

1.1. **List of those who should be consulted:**

- The king of Lesotho; Principal chiefs; Ministers /Generals in the council of Government of Lesotho; MPs;
- The Government of South Africa and their representatives;
- The Government of Namibia and their representatives;
- The chief of the executive and planning at the National, Regional and the District level(DC); VDCs, district secretaries, etc
- The concerned line departments of Agriculture; Animal husbandry and Livestock development; Fisheries; Forest Wildlife and Environment; Soil conservation; Mining and Geology; Nodal and concerned department for Water Resources; Power; Land- use and Land records/ survey department; Department of Culture;
- Inter-Basin (River) organisations;
- Headmen of villages directly affected including upstream and downstream;
- Affected villages, host communities, specific social categories, potential employment seeker, project-related liaison groups, committees and association; Village water committees, school committees, youth groups, etc.
- The people in the villages by random sampling, with special sensitivity to vocation- wise, women headed household, other weaker sections.
- NGOs, Missionaries & other religious groups working for the areas; Opinion makers;
- University/ Research organisations working for the area;

Screening : Policies, Legislation And Treaty Obligations:

'EIA will proceed in accordance with: LHWP Treaty obligations; national legislation (only came to force in1997); Lesotho government policies, guidelines and standard practices; international commitments; policies specifically established to guide certain implementation procedures. Resettlement and Compensation to the people and communities affected by the Phase 1A project works will be guided by the Treaty on the Lesotho Highlands Water Project; the LHDA Order of 1986 the LHWP Compensation Regulations, 1990: Legal Notice No. 50 of 1990.' (http://www.oneworld.org/saep/sadc/country/lesotho/lesweb2.html)

Natural Resource Conservation Laws:

'A number of national laws in Lesotho deal with development and conservation of natural resources such as water, land, soil, fauna, flora and

ers /Generals in the council

epresentatives;
sentatives;
he National, Regional and
aries, etc
imal husbandry and Livestock
ironment; Soil conservation;
artment for Water Resources;
ment; Department of Culture;

g upstream and downstream;
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s, committees and association;
outh groups, etc.
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l, other weaker sections.
ups working for the areas;

for the area;

bligations:
' Treaty obligations; national
ernment policies, guidelines
olicies specifically established
ement and Compensation to
project works will be guided
ct; the LHDA Order of 1986
Notice No. 50 of 1990.' (http:/
eb2.html)

leal with development and
land, soil, fauna, flora and

heritage (cf. www..oneworld.org. as above).' Important among them are-Managed Resources Area Act of 1992; Historical Monuments, Relics, Fauna and Flora Act 1967 - this lists a number of species such as the Maloti minnow and the spiral aloe as protected and restricts collection, trading and disturbance (cf. www..oneworld.org as above). Soil and Water Conservation Policy, Policy for the establishment of Range Management Areas (RMAs) for the purpose of controlling grazing are important policies which will have to be conformed to. 'Lesotho is a signatory to two international agreements which require countries to take active steps in habitat and species conservation: these are-The Convention on Biological Diversity which includes an obligation to monitor the status of biological diversity in the implementation of large construction projects The Ramsar Convention on protection of important wetlands; currently there are no designated Ramsar sites in Lesotho'(cf. www..oneworld.org. as above)

1.2. Elements likely to give rise to significant environmental impacts:

DAM	Phase 1A		Phase 1B	
	Katse	'Muela	Mohale	Matsoku
Type of dam	concrete arch	concrete arch	rockfill	weir
Elevation at crest (m asl)	2060	1778	2085.5	———
Height above foundation (m)	180	55	145	12
Length (m)	710	180	600	———
Catchment area (km²)	1866	———	874	580
RESERVOIR				
Yield (m3/s)	16.8	———	9.6	2.2
Extreme water level (m asl)	2060.2	1782.5	2084	———
Full supply level (m asl)	2053.0	1775.0	2075.0	2090.5
Minimum operating level (m asl)	1989.0	1760.0	2005.0	N/A
Reservoir area at FSL (km²)	35.8	0.4	22.8	N/A
Total storage capacity at FSL (m^3x10^6)	1950.0	5.9	947.0	N/A
Live storage capacity (m^3x10^6)	1519.0	3.9	857.0	N/A
Environmental flow discharge (m^3x10^6)	0.5*	———	0.3*	1.7**

Figure 1. *Basic Statistics for Phase 1A and 1B.*

* set by Treaty agreement ** likely baseflow release (to be confirmed by IFR study), provision available for flood releases (Source: http://www/lesoff.co.za/lhda/eap2.htm. #top)

1.2. A. Screening :Main construction components of Phase 1A are:

- Katse dam: on Malibamatso river, below confluence with Bokong riv
  1.95 Km^3 storage capacity; concrete arch dam –180 m high with cr
  length of 685m.
- Katse reservoir:
- Transfer tunnel to Muella power station:
- Muela Power station(underground)
- Muela dam;
- Delivery tunnel to Axle river outlet.

Associated infrastructure:

- **Roads :** Upgrading existing road Thba-Tseka to Katse; Construction of
  weather road from Piseng to Pelanengand via Matsoku valley to Katse; A ne
  road from Ficksburg border post bypassing the town; Upgrading of existi
  roads in Lesotho and \south Africa where necessary for LHWP traffic.
- **Bridges :** A major bridge across the Katse Basin in the Pelanang are
  Construction of an access bridge across Malibamatso river just below t
  Katse dam site; reconstruction of the bridges at Caledonsport and Ficksbur
- **Rail :** Upgrading the road from Fouriesburg station to Caledonspo
  border post; Rail side facilities at Ficksburg and Fouriesburg.
- **Electric Transmission :** Electric power transmission lines; substation
- **Other :** Construction of advanced construction camp facilities near Kat
  dam, Butha- Buthe; Construction of construction plants and works
  relocation of extension of border facilities in South Africa and Lesoth
  at the above crossing points; services provision –water and sanitation
  the construction sites; 7 operational sites;
- **Quarries :** Various quarries 8-10 for aggregates;

1.2.B. Scoping :Various Impacts of Construction and operation activitie

The above indicate massive construction programme which in itself wi
affect the environment considerably. Canter, L.W.1996 described constructio
activities as:- clearing, grubbing, stripping, excavation; stockpiling; loadin
hauling; placement of materials; grading; compaction; removal of material

ents of Phase 1A are:
nfluence with Bokong river
am –180 m high with cres

to Katse; Construction of all
Matsoku valley to Katse; A new
e town; Upgrading of existing
ssary for LHWP traffic.
Basin in the Pelanang area;
ibamatso river just below the
t Caledonsport and Ficksburg
urg station to Caledonsport
g and Fouriesburg.
nsmission lines; substations.
on camp facilities near Katse
truction plants and works ;
in South Africa and Lesotho
sion –water and sanitation at

egates;

on and operation activities:
ogramme which in itself will
1996 described construction
vation; stockpiling; loading-
ction; removal of materials;

blasting; Concrete placements; surfacing; building erection; building movement; building demolition; pavement demolition; batch and aggregate plants; temporary buildings; vehicle and equipment maintenance; restoration; filing reservoir; flood control operation. Besides, tunnelling; underground power station; laying transmission lines for electricity and telecommunication are also involved.

Figure : 2. *Potential environmental impacts of construction in this case; Source: adapted from Hitman Associates, 1974,pp B13-B18; cited Canter, L.W. 1996; underlined portion and impact shown are inserted and modified at some places).*

Construction Phase	Construction practice	Potential environmental impacts
Pre-construction	*Site inventory*	Short term and nominal.
	vehicular traffic	Dust, sediment, tree injury.
	test pits	Tree root injury, sediment
	Environmental monitoring,	Negligible if done properly
	Temporary controls,	Short-term and nominal
	Storm water,	Vegetation, water quality
	Erosion and sediments,	Vegetation, water quality
	Vegetative,	Fertiliser in excess
	Dust	Negligible if properly done
	Labour and migration	Substantial; demographic profile change; social stress and interactive forces; disease exposure.
Site work	*Clearing and demolition:*	Short to Long term
	Clearing	Decrease in the area of protective tree cover, shrub, and ground covers, stripping of topsoil; increased soil erosion, sedimentation, and storm water run off; increased stream water temperature; modification of stream banks and channels, water quality
	Demolition	Increased dust, noise, solid wastes
	Temporary facilities	
	Shops and storage sheds	Increased surface areas impervious to water, infiltration, increased water runoff, petroleum products.
	Access roads and parking lots	Increased surface areas impervious to water, infiltration, increased water runoff, generation of dust on unpaved areas, water quality
	Utility trenches and backfills	Increased visual impacts, soil erosion, and sedimentation for short periods

	Sanitary facilities	Increased visual impacts, solid wastes
	Fences	Barriers to animal migration
	Lay down areas	Visual impacts, increased runoffs
	Concrete batch plant	Increased visual impacts; disposal of waste water, increased dust and noise
	Temporary and permanent pest control(termites, weeds, insects)	Non degradable or slow degradable pesticides accumulated by plants and animals, then passed into the food chain of humans; degradable pesticides having short biological half-lives preferred.
	Earthwork Excavation Grading Trenching Soil treatment	Long- term Stripping, soil stockpiling, and site grading; increased erosion, sedimentation, and runoff, soil compaction; increased soil levels of potentially hazardous materials; side effects on living plants and animals, and the incorporation of decomposition products in the food chain; water quality.
	Quarrying for sand and stones	Substantial and long-term; blasting, noise pollution, disturbance of habitat of animals and plants; imbalances in geological formations; aesthetics; landslips.
	Tunnelling	Substantial and Long term; Geological alterations and consequences; sediments; noise; risks; Gaseous emissions.
	Site drainage Foundation drainage Dewatering Well points Stream channel relocation	Long- term Decrease in the volume of underground water for short term and long term periods, increased stream flow volumes and velocities, downstream damages, water quality.
	Landscaping Temporary seeding Permanent seeding and sodding	Decreased soil erosion and overland flow of storm water, stabilisation of expose cut and fill slopes, increased water infiltration and underground storage of water, visual impacts

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		Increased visual impacts, solid wastes Barriers to animal migration Visual impacts, increased runoffs Increased visual impacts; disposal of waste water, increased dust and noise Non degradable or slow degradable pesticides accumulated by plants and animals, then passed into the food chain of humans; degradable pesticides having short biological half-lives preferred.
		Long- term Stripping, soil stockpiling, and site grading; increased erosion, sedimentation, and runoff, soil compaction; increased soil levels of potentially hazardous materials; side effects on living plants and animals, and the incorporation of decomposition products in the food chain; water quality.
		Substantial and long-term; blasting, noise pollution, disturbance of habitat of animals and plants; imbalances in geological formations; aesthetics; landslips. Substantial and Long term; Geological alterations and consequences; sediments; noise; risks; Gaseous emissions.
		Long- term Decrease in the volume of underground water for short term and long term periods, increased stream flow volumes and velocities, downstream damages, water quality. Decreased soil erosion and overland flow of storm water, stabilisation of expose cut and fill slopes, increased water infiltration and underground storage of water, visual impacts
Permanent facilities	Transmission lines and heavy traffic areas	Long- term
	Parking lots	Storm water runoff, petroleum products
	Switchyard	Visual impacts, sediment, runoff
	Railroad spur line	Storm water runoffs
	Buildings	Long term
	Warehouses	Impervious surfaces, storm water runoff, solid waste spillages.
	Sanitary water treatment	Odours. Discharges, bacteria, viruses.
	Cooling towers	Visual impacts
	Related facilities	Long term
	intake and discharge channel	Shoreline changes, Bottom topography changes, water level, fish migration, benthic fauna changes.
	Water supply and treatment	Waste discharges, water quality.
	Storm water drainage	Sediment, water quality.
	Waste water treatment	Sediment, water quality, trace elements.
	Dams and impoundments	Dredging, shoreline erosion.
	Breakwaters , jetties etc	Circulation patterns in the water ways.
	Fuel handling equipment	Spillages, fire, and visual impact.
	Oil storage tanks, controls and pipings	Visual impacts.
	Conveying systems (Cranes, hoists, chutes)	Visual impacts.
	Waste handling equipment (incinerators, wood chippers, trash compactors)	Noise, visual impacts
	Security fencing	Long term
	Access roads	Increased runoff, destruction of tree cover; slope changes; alteration in the valley; dust and injury to plants; water quality and stream diversion, changes.
	Fencing	Barrier to animal movements.
Project closeout		Short term Noise, solid waste, dust. Storm water runoff, traffic blockages, soil compaction Short term Sediment, dust, soil compaction. Erosion, sediment. Nutrient runoff. Vegetation. Short term. Water quality, oils , phosphates and other nutrients

SCOPING :Impact due to operation and implementation of the project (phase 1A) :

The project objective- Inter-basin transfer of water by diverting river course will reduce and regulate the flow and will affect the overall ecology of the Senqu and Orange Rivers, and its riparian areas. Besides, 'the impact of the LHWP on Namibia, a downstream user with critical water shortages, and impact on its any legitimate future plan for increasing its irrigated agriculture from the Orange River.' (http://www.earthfile.org.za/campaigns/other/highdam.htm) will require addressing.

'Some 20000 people may flock the area by migration and squatters camp may emerge' (http://www.irn.org/program/safrica/lhwpback.html).

Reservoirs- Upstream change from river valley to reservoir; - Downstream change in river morphology (riverbeds and banks due to sediment change); change in downstream water quality; effects on river temperature; nutrient load, turbidity, dissolved gases; concentration of heavy metals and minerals; changes of biodiversity; Changes in downstream hydrology; ecotourism / watersports. Pollution; Water use and budget; effects on fish populations.

Submergence: - Human/livestock habitat disruption; migratory and work routes alteration; Resettlement and compensatory tracts; Water quality; 'It will affect directly 2000 persons (approximately 312 households) and indirectly 20,000 persons through loss of 925 ha of arable land and 3000 ha of grazing land (http://www.oneworld.org/saep/sadc/country/lesotho/lesweb2.html). Loss of agricultural and grazing land affecting livelihood, production and wellbeing; Loss of biodiversity.

Housing/ resettlement: Human/livestock habitat disruption; new ambience and way of life; uprooting; shock; health and hygiene. Influx and infiltration of population.

Operation of powerhouse: noise pollution; electricity to change way of life and consumer durables; Airshed may be affected; besides, downstream quality and profile.

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EIA Rapid:

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Figure : 3 Co

To derive these checklists such as for construction above, and available off-the-shelf can be utilised.

EIA Rapid: The checklist and Result sheet for environmental Impacts:

Impact assessment process is Two tiers process 1. Environmental reconnaissance (ER), 2. Environmental study. Based on reconnaissance a checklist should be prepared for decision making to proceed to the next stage for the study or to abandon the project. In conducting the reconnaissance and Survey it requires base information, which if not available would call for collection by adopting methodologies of survey and feasibility study in which also checklists are particularly useful. 'Check-list' may be series of questionnaire, detailed information on dimensions of project and various information sheets. 'The final output may be a Table, but behind this, is a series of structured data gathering process and notes and details ((Mock, J.and Bolton, P. 1993)' are involved.

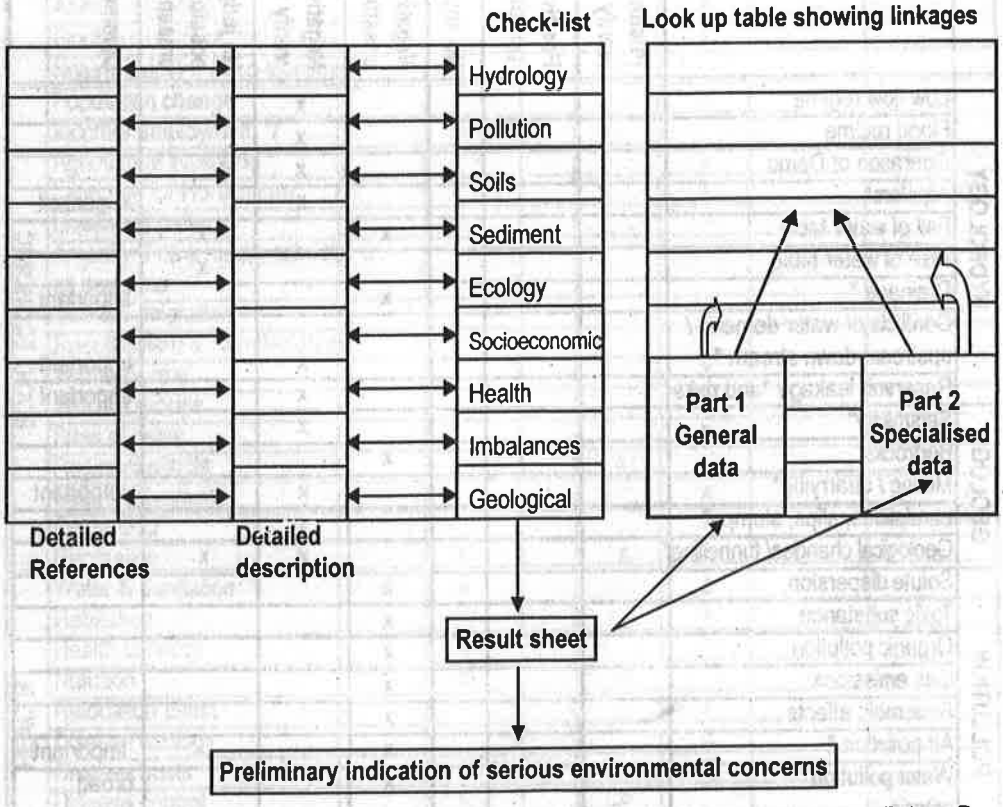

Figure : 3 Components of the checklist assessment procedure. (source: Mock, J. and Bolton, P. 1993 The ICID environmental checklist; ODA, 1993.)

The main components of the checklist, from above would be: A Summary table: this would have a list as in the column 1& 2 of Figure: 4 (and column1 of Figure5 in another checklist) which would have to be considered in relation to the project and its impact; The checklist presented here is mainly based on ICID checklist with items with star mark'*' inserted by consultation and considerations from other sources. The items listed and prepared for the checklists are a mix of various sources (ICID checklist; World Bank Technical paper140, 154; USAID....). Such checklist has the support information from project descriptions provided; Related references from books and websites and in practice based on general data sheet. The format of such checklist can be seen in detail in the ICID Environmental checklists appendices by Mock, J.and Bolton, P. 1993.

Figure 4. The checklist of possible environmental impacts in LHWP (based on ICID checklist; items with* mark, inserted after due considerations of project components and aspects of likely impacts)

		Positive impact verify likely	Positive impact possible	No impact likely	Negative impact possible	Negative impact verify likely	No judgement possible at present	Comments
HYDROLOGY	Low flow regime					x		
	Flood regime					x		
	Operation of Dams					x		
	Aquifers*					x		important
	Fall of water table				x		x	
	Rise of water table						x	
	Drainage *				x			important
	Conflicts of water demand / upstream down stream *					x		important
	Reservoir leakage *and risks					x		important
GEOLOGY	Seismicity*					x		
	Bedrocks*				x			
	Mining / quarrying*					x		important
	Landslides, slips, slumps*					x		
	Geological changes/ tunnelling*					x	x	
POLLUTION	Solute dispersion				x			
	Toxic substance				x			
	Organic pollution				x			
	Gas emissions				x			
	Anaerobic effects				x			
	Air pollution *				x			Important
	Water pollution * criteria				x			broad
	Noise pollution *				x			

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lists are a mix of
paper140, 154;
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CID checklist; items
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possible at present	Comments
	important
x	
x	
	important
	important
	important
	important
x	
	Important
	broad

SOILS	Soil salinity				x			
	Soil properties/ (fertility *)				x			
	Soil erosion *					x		important
	Saline ground water			x				
	Saline drainage			x				
	Saline intrusion			x				
SEDIMENTS	Bank stability *					x		important
	Local erosion/ (scouring*)					x		
	Hinterland effect				x			
	River morphology					x		
	Channel regime					x		
	Sedimentation					x		
	Estuary erosion					x		
ECOLOGY	Climate/ rainfall *				x			important
	Project lands / (Land use*)					x		
	Water bodies					x		
	Surrounding areas		x		x			
	Valleys/ (Catchment*)					x		
	Wet lands and plains					x		
	Rare and (endemic*) species					x		
	Aquatic life *					x		important
	Animal migration					x		
	Biodiversity *(flora and fauna)					x		
	Natural industry/ (*eco-tourism		x		x			
SOCIO ECONOMIC	Population change					x		
	Income/ employment */		x					
	Agricultural livelihood *					x		important
	Land use for Horticulture					x		important
	Livelihood pattern*					x		
	Amenity+/ new roads, schools as separate	x						+ taken out
	Human migration					x		
	Resettlement & Rehabilitation					x		
	Women's role					x		
	Minority groups					x		
	Sites of value					x		
	Regional effects				x			
	User involvement					x		
	Ownership*					x		important
	Recreation		x		x			
HEALTH	Water & Sanitation		x			x		
	Habitation					x		
	Health services		x					
	Nutrition		x		x			
	Relocation effect					x		
	Disease ecology					x		
	Disease hosts					x		
	Disease control		x		x			
	Accidents incidence*					x		
	Other hazards(STDs*)					x		important

IMBALANCES	Pests and weeds					x		
	Animal diseases				x			
	Aquatic weeds					x		
	Structural damage					x		
	Socio-Cultural*					x		important
	Habitat/ timber cutting,etc *					x		
	Animal imbalances				x			

Comments column in this checklist can show the relationship of impacts and can contain field notes. The above checklist which takes into account both positive and negative impacts provide a broad canvass. To show different flexibility in checklist, Ratings (as in case of the checklist below taken from the format of impact assessment for phase 1B; Source- http://www.lesoff.co.za/lhda/eap3.htm.) has been indicated on potential impacts. The rating has been changed as perceived and considered necessary.

Figure 5. *Summary of Main Impacts of the LHWP Phase 1A*

Important Environmental Components	Ratings				
	Nil	*Low*	*Moderate*	*High*	*Very High*
mesoclimate		x			
microclimate			x		
commercial deposits	x				
stream/river flows					x
natural springs				x	
domestic water supplies				x	
water quality				x	
aquatic habitats					x
fish				x	
aquatic invertebrates					x
aquatic vegetation				x	
rare/endangered species					x
soil types	x				
soil fertility			x		
soil erosion				x	
woodlands and orchards				x	
irrigable land	x				
wetlands			x		
drawdown zones	x				
rangelands/livestock production				x	
croplands/crop production				x	
land access				x	
mammals				x	

Important Enviror Components
insects
birds
reptiles and amph
medicinal/other us
commercial plant
rare and endange
rare and endange
biodiversity
disease vectors
pest species
housing
village infrastructu
land tenure
agriculture based
migrant labour
informal sector
commercial ventu
short term employ
tourism related en
food security
biomass fuels
fossil fuels
electrical/other en
cultural identity
community social
family social struc
traditional activitie
gender issues
schools
literacy/numeracy
school attendance
adult education/sk
clinics
occupational healt
public safety
nutrition
STDs
substance abuse
other health probl
access by road
communications
archaeological site
aesthetics
other cultural reso

Important Environmental Components	Ratings				
	Nil	*Low*	*Moderate*	*High*	*Very High*
insects		X			
birds				X	
reptiles and amphibians				X	
medicinal/other useful plants				X	
commercial plant species			X		
rare and endangered habitats				X	
rare and endangered species					X
biodiversity				X	
disease vectors			X		
pest species	X				
housing					X
village infrastructure		X			
land tenure			X		
agriculture based livelihood				X	
migrant labour			X		
informal sector				X	
commercial ventures			X		
short term employment			X		
tourism related employment			X		
food security				X	
biomass fuels				X	
fossil fuels	X				
electrical/other energy				X	
cultural identity				X	
community social interactions				X	
family social structure		X			
traditional activities			X		
gender issues			X		
schools			X		
literacy/numeracy					
school attendance					
adult education/skills training					
clinics			X		
occupational health			X		
public safety			X		
nutrition				X	
STDs					X
substance abuse			X		
other health problems				X	
access by road				X	
communications				X	
archaeological sites				X	
aesthetics				X	
other cultural resources				X	

Figure 6. *Cumulative Impacts of the LHWP Phase 1A.*

IEC or group of IECs	*Contribution of Phase 1A to Cumulative Effects*
Water quality	Moderate to high for temporary localised water quality deterioration. Moderate contribution to permanent water quality deterioration (increased highway traffic & population)
Stream and river flows	Moderate
Aquatic habitats	Moderate, mainly due to inundation; habitat disruption.
Geology including seismicity	Moderate – high as overall large length of tunnel; many quarries; already mining; could alter and disturb aquifers/spring
Flora and fauna	High for endangered species; Moderate for other species.
Rare and endangered species	High (in the absence of national data on Maloti minnow habitat and Spiral aloe distribution)
Soil erosion	Low - Moderate
Grazing and livestock production	Moderate
Croplands and crop production	Moderate- High
Lifestyle/ Livelihood	Moderate -High
Other imbalances	Moderate
Wetlands	Moderate
Medicinal and other plants	Low-Moderate
Biodiversity	Low-Moderate
Agriculture based livelihood	Moderate- High
Food security	Moderate
Biomass fuels	High (owing increased road access and timber exploitation)
Culture	High
STDs	High
Other health	Low- Moderate
Archaeological features	High (assuming that archaeological features are not numerous or significant in more remote areas)
Aesthetics	Low- Moderate

(Based and adapted on EIA for phase 1b. Source http://www.lesoff.co.za/lhda/eap3.htm)

Environmental problem: Water : Environmental concerns associated with the project have been the subject of intense studies. The altitude and expected temperature of the Katse reservoir make it unlikely that it will have any major problem with water weeds or water-borne disease vectors. No major impacts

on the ecology of tl
of water from the
originate from the
reservoir will be v
will be used to pre

Factors to be mor

(Source-En
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- Climate; ten
- Stream/ rive
- stored wate
- ground wate
- siesmicity;
- watershed m
- annual volu
- water qualit
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- fisheries asse
- vegetation cl
- water washe
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  people rema

EIA Rapid: Envi

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on the ecology of the Vaal river system are expected to result from the transfer of water from the Senqu / Orange system, since the waters of both systems originate from the same geological base. The water transferred from the Katse reservoir will be virtually free of chemical residues and pathogens. Screens will be used to prevent the passage of fish from one system to the other.

Factors to be monitored in scoping the impact of water will include

(Source-Environmental Assessment Sourcebook, vol. 2. Sectoral guidelines. World Bank technical paper number, 140.1991. as adapted):

- Climate; temperature, wind and rainfall;
- Stream/ river discharge, flow, quantity, at various points
- stored water volume in the reservoir;
- ground water; aquifers;
- siesmicity;
- watershed management, and catchment protection;
- annual volume of sediment transported into reservoir;
- water quality at dam discharge and at various points along the river (such as salinity, pH, temperature, electrical conductivity, turbidity, dissolved oxygen, suspended solids, phosphates, nitrates);
- hydrogen sulphide and methane generation behind dam;
- limnological sampling of microflora, mocrofauna, aquatic weeds and benthic organisms;
- fisheries assessment surveys(species, population .etc.) in the river and reservoir;
- vegetation changes cover, species composition, growth rates, bio-mass etc.
- water washed, waterbased and water borne disease vectors;
- changes in economic and social status of resettlement populations and people remaining in the river basin.

EIA Rapid: Environmental Impacts- WATER:

No life can exist without water. From the objective of the project it is apparent that water and its dimensions has been seen in a 'tunnel vision' as a resource. That it has intricate linkages and sustains ecology, life and life systems seems to be ignored.

Effects
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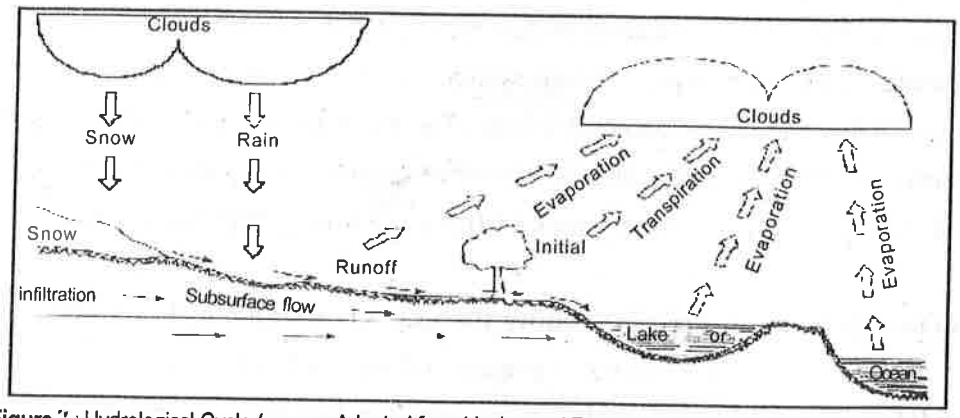

Figure 7 : Hydrological Cycle (source: Adapted from Linsley and Franzini, 1979,p.10. cited Canter, L.W.1996.

The effect of various activities of the project from the checklist earlier mentioned in terms of impact on water resources can be elaborated and listed as below :

Activities	Potential impacts
River Engineering to facilitate project layout	Loss of channel and bank habitat, enhanced erosion and silt.
Diking/ bank protection	Natural flood plain inundation prevented, silt deprivation, loss of wet lands.
Diversion to increase water supply to receptor area	Decrease supply in donor area and consequential drying of stream/ channels and flora.
Resrvoir and Dams in general	Loss of terrestrial habitation, agricultural/ pastoral land, resettlement, local rise in water table, local climate change-e.g. increased fog, visual impacts of retaining walls, waterborne pathogens, Earthquakes, land slips, Failure risks; Changes in water chemistry(nutrients, sediments and oxygen level); Water table level; reduced flooding and wet land downstream effecting livelihood and ecology; Barrier effect – migration of fish and invertebrates blocked.
Above Dam and within reservoir.	Loss of original river section, flow regime change, detention time, depth and stratification potential; siltation.
Below dam	Changes in flow regime (reduced frequency, velocities and volumes changes).
Roads	Changes in drainage system due to landscaping, gradient changes, bridges, resectioning, channel diversion; increased runoff and velocities; increased sediments loads increased pollution, metals, organics and inorganics.
Quarrying	Changes in drainage system and ground water flows, water table and stream flow lowered locally; flood risk downstream; increased siltation downstream; loss of vegetation cover and local stability; aesthetics.
Construction phase	Tunnel construction can alter natural springs, the source of drinking water in rural areas. Appreciable disturbance and increase in run off; can affect markedly stream flows and stream sediment loads; large sediment and silt; threaten fish population; considerable nutrient release, disturbance of vegetation cover; frequent pollution of water and ground water from spillages at construction sites and vehicles, landfills etc.
Increased population/ workforce and waste water generation	Increased pollution, metals, organics and inorganics; increased faecal coliforms and increased contamination risks

(Compiled mostly from Morris, P. and Biggs, J.1995. pp.188-190)

The available case study brief and various web sites do not throw much in respect of water quality and flow-rate etc. However, some information provided below indicates high presence of faecal bacteria in water resources in Lesotho and thus an already problematic issue.

Figure 8 *Some reported concentrations of faecal coliforms in untreated domestic water sources in Lesotho. (source: From Feachem, 1980; cited, D.D.Mara, 1993- chapter on Water quality and standards- Umist handout on water and sanitation)*

Items of Lesotho water sources	E.coli per 100 ml
Unprotected springs	900
Waterholes	860
Small dams	260
Streams	5000
Protected streams	200
Tap water(springs)	9
Tap water (boreholes)	1

Impact methodologies enable approach towards predicting and assessing the environmental impacts. Methodologies provide composite linkages and co-relationship of environment and its interactions. 'Predictive methodologies involve the greatest application of technology and is the least developed in terms of specific methodologies all across' (Canter, L.W.1977).

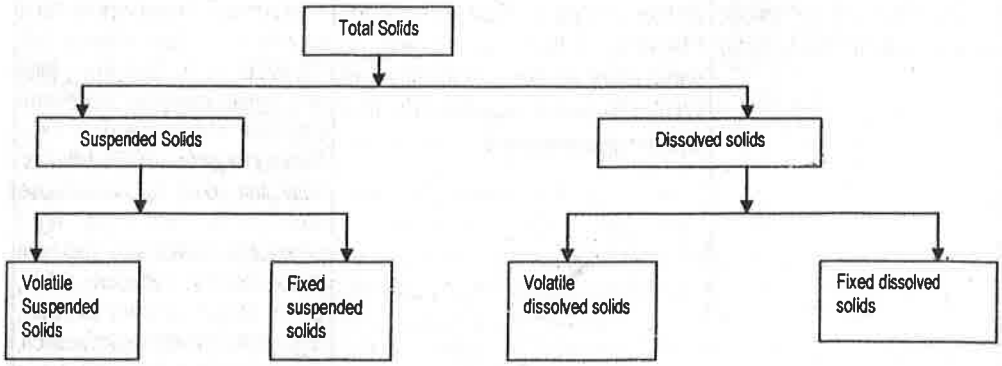

Figure 9 : *Relationships of various Solids Tests Used for water quality Characterisation. (Source: Canter, L.W., 1996)*

COMMON WATER QUALITY TESTS

PHYSICAL	CHEMICAL	BIOLOGICAL
Temperature	pH value ; Acidity/ Alkalinity	Colony counts
Colour	Hardness ; Dissolved oxygen (DO)	Coliform Bacteria
Odour	Permanngnate value (PV)	*Escherichia coliforms (E. Coli)*
Turbidity	Chemical Oxygen Demand (COD)	
Total solids (TS)	Biochemical oxygen demand (BOD)	
Suspended solids (SS)	Total organic carbon (TOC)	
Total dissolved solids (TDS)	Ammonia (NH3-N)	
Electric conductivity	Nitrate (NO3-N) ; Chloride	

ADDITIONAL WATER QUALITY TESTS

PHYSICAL	CHEMICAL	BIOLOGICAL
Taste	Calcium ; Magnesium	41. Viral Investigations
Radioactivity	Stability(Methylene Blue)	** Sophisticated microbiology**
Imiscible Liquids	Albuminoid Nitrogen ; Nitrite	
** plus others**	Phosphate ; Sulphate	
	Copper ; Zinc	
	Iron ; Manganese	
	Cyanides ; Phenols	
	Detergents ; Pesticides	
	plus others	

Source: UMIST handout for Water and Sanitation, MIDP, 98-99

In summary the significant impacts on water, methodologies for measuring and predicting the impact and data required are placed below:

Predicted Impact	Methodology	Data Requirements
Water Quality 1. Water pollution (Physical, Chemical, Biological Criteria)	Sampling/Tests/ Kits/ Survey for Physical, Chemical, Biological parameters as per specifications of WHO, National legislations and international standards	- All surveys should include data for colour, pH, conductance, SS, TS, COD, TOC, Coliforms , total and faecal bacteria. Additional collection of baseline data for – Odour, Inorganics, BOD5, Nitrates, Total plate count. Special purpose surveys for bed load, light penetration, particle size, sediment concentrations, settleable solids, CAE(carbon alcohol extract), organic phosphates, reactive silica, Shigella viruses, Schistosomiasis vector, Fish, algae, periphyton. *(source: IDH-WHO, 1978; cited, Canter, L.W.1996, adapted)*

Predicte
2. Reservoi water quality profiles, **2a** discharge r and travel time
2b. Vertical outflow v constituents c information, te water quality.
3a. **Riverflo Downstream**
3.b. *Channel rates and rese*
4.**Constructic phase impact** *prediction.*

Predicted Impact	Methodology	Data Requirements
2. Reservoir and River water quality and quantity profiles,		
2a discharge rates, elevation and travel time etc.	2a. HEC-5Q Model (reservoir system simulation/ optimization model for multiple water resource purposes including quality, supply, hydropower and flood control	2a. Inflow quantity and quality, Initial water quality conditions, System configuration and physical description, reservoir regulation manual operation criteria, System diversions, water quantity and quality target at system control points.
2b. Vertical profiles and outflow values for constituents over time, flux information, temperature and water quality.	2b. CE- THERM-1, 1-D reservoir model for temperature etc.	2b. Inflow rates, outflow rates, structural configurations, Initial constituent profiles, morphometric data, Meteorological data, Release flow and temperature targets. *(Source: US, Army corps of Engineers,1987; cited Canter, L.W. 1996 adapted)*
3a. **Riverflow; including Downstream flow impact.**	CE-QUAL-RIV1 model. 1-D for dynamic flow, time varying stream hydraulic and water quality printed for all nodes at intervals, time series variables at selected node.	Physical data, cross section geometry, elevations, and location nodes, lateral inflows and tributaries; control structures, initial conditions, boundary conditions for flow and water quality, rate coefficients and other parameters, meteorological data, equilibrium temperature and exchange coefficients *(Source: US, Army corps of Engineers,1987; cited Canter, L.W.1996. adapted)*
3.b. *Channel flow and flow rates and reservoir leakage*	Stream gauging/ stream gauging structure method	surface water discharge, peak runoff rates, flow rates. Baseline and monitoring data.
4.**Construction/ operation phase impact :** *a.- Sediment prediction.*	a. Sediment prediction methods. Some examples are- *Empirical :* Ellison/ Musgrave/ universal soil loss equation (for erosion) Toffaleti total load method/ Lacey's silt theory (for transportation and deposition. *Statistical :* Woolhiser's deterministic watershed model (for all purpose). *Simulations :* Stanford 4 model, Hydrocomp simulation (for all purpose). *(Source: Canter, 1977).*	Baseline survey data and monitoring data Baseline survey data; sample survey and as per model requirements. Baseline survey data; sample survey and as per model requirements.

Predicted Impact	Methodology	Data Requirements
b. Runoff rates	Velocity area method; Current meter; dilution gauging.	Baseline and monitoring data
5. **Microscale pollution**: a. *conservative pollutants*-non degradable.	Dilution capacity of the stream by using concentration factors.	Sampling and survey and concentration factor evaluation for down stream of power plant, near construction and vehicular sites.
b. *non-conservative* pollutants-organic substances.	Various mathematical models for DO, Streeter and Phelps,1925 and its modifications by Thomas, Camp(Cited Canter,1977)	Sampling and measurement for DO. And other tests as in the figure above.
c. *Bacterial*	Mathematical and biological tests('Most probable number' method / 'multiple tube' method; 'Membrane filtration' method	Methodologies as prescribed for laboratory (Mara, D.D., 1986).
d. *Thermal*	d. Mathematical models of varying degrees complexity to predict heat in quiescent water, flowing water, estuaries(Canter,1977)	d. as per model requirement and comparison from baseline data.
6. **Effects on Aquifer / natural springs**	a. Aquifer-vulnerability-mapping technique (Knox, Sabatini, and Canter,1993, cited Canter,1996); Models.	Ground water resources data, satellite imageries, Hydrological atlases; principal aquifers, well/ spring location, water yields, ground water quality, hydrogeological factors that controls the movement, occurrence etc of aquifers.
	b. Hydrological evaluation of landfill performance(HELP) model by (Schroeder and Peyton,1992, cited Canter,LW,19960	b. Precipitation, runoff, evaporation, infiliration, coversoil moisture storage capacity data from records or prepared by survey and samples.
7.**Groundwater impacts** a. *Construction phase - Groundwater impacts*	a.1 Surface Impoundment assessment; Landfill site rating; Waste-Soil-site Interaction matrix; site rating system; Hazard ranking system, pesticide Index etc(Canter,1996 from Canter, knox and Fairchild,1987,p 278- adapted)	a.1 as per methodologies requirements
	a.2 Index method for source and Environmental vulnerability analysis; DRASTIC (Canter,1996)	a.2. technique is based on Depth to groundwater, recharge rate, aquifer media, soil media, topography (slope) impact of the vadose zone, conductivity of aquifer and such data would be required.

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Predicted Impact	Methodology	Data Requirements
8. impacts on aquatic life a. fish population and diversity b. hydrophytes c. algal, Bryophytic and Ferns d. other plant spp.	Survey of population, flora and fauna, pre and post project catchment on determined location; habitat variation Vegetation study at sample and determined places	Survey reports on species, variety population etc. To determine positive and negative impacts; Study of habitat of species. Baseline and evaluation and monitoring data.
9.Impacts on climate, water cycle and budget	Meteorological model Penman method	Meteorological monitoring data such as precipitation, evaporation, temperature, moisture, fog, snow and dewfall
10. Estuary, wet land erosion and flood plain reduction.	Survey and Sampling; local feedback. for ecology and economy	Baseline data and monitoring data.

Impacts on the Aquatic Environment:

Tunnels could alter and threaten springs through drainage and destruction during construction. Water weeds problem is not expected. Water-borne disease vectors may be a problem with increased population pressure and unplanned settlements and would require monitoring. Inter-basin transfer of water from the Senqu / Orange system, may have substantial impact in the downstream systems and wouldrequire a good monitoring system. Impact is likely to be marginal in two river systems because of similar geological base. The Katse reservoir water may be by and large free of chemical residues and pathogens. Systems will have to be devised for preventing the entry of fish from one system to the other. Effect of water and sanitation on public health, will require monitoring. Watershed management; water quality monitoring, sedimentation studies will have to be frequently done. Development of use of satellite imagery and geographic information system (GIS) for the project area as a basis for Information gathering and analysis will be desirable.

Trans-boundary Conflict is not entirely unlikely, "it has to be noted that in 1983 an upsurge in guerilla violence took place in Northern Lesotho over rivers providing water to South Africa. At that time, Lesotho was convinced that its neighbour wanted to control the rivers to ensure a continuing supply of water to Transvaal province. Information Minister Desmond Sixishe said in 1983: "We have known for a long time that if [South Africans] took a foothold in that part of Lesotho, they would be very happy because that would give

them a free hand on our water". Thus history raises concerns over the possibly conflictual developments of Lesotho's water exports to South Africa" (http:// gurukul.ucc.american.edu/ted/LESOTHO.htm).

'The Maloti minnow, a rare and threatened species which is found only in the Lesotho Highlands, could lose two of the nine currently known habitat locations, thus placing further pressure of extinction on this species. If trout (predator on minnow) were intentionally or accidentally introduced to the reservoir, additional three known locations of the Maloti minnow will be lost.'(http://www.lesoff.co.za/lhda/eap3.htm)

Checklist of physical parameters for the hydrological components of an EIA can broadly have (Morris, P. And Briggs, J.1995) the aspects of Topography; Geology and Soils; Rainfall; Snow, dew and fog, evaporation, Infiltration, soil water and moisture, Ground water; Standing waters (ponds, lakes, gravel pits, reservoirs); Run off; erosion and sedimentation; drainage and water use; waste water systems; Water budgets. Most of the items can be studied by documenting available data and additional data would require field survey and study. Similar schemes can throw a good deal of hint.

A competent hydrologist must be engaged. The adequacy and reliability of data is of utmost importance of this vital resource. Adequate baseline data would be most desirable. Understanding that water is the only surplus and abundant resource a well-equipped laboratory and computer system with all possible and commiserate models and software and stations for monitoring must be established under the project. A feasibility study of package of methodologies for water resource would be desirable to make it efficient and cost effective and to understand the sensitivities of this vital resource. This would require Study for water resources to accurately predict the impacts such as: Base line information and monitoring data for -reservoir sedimentation; aquatic ecology; Baseline water quality and aquatic communities; Wetlands and flood plain survey and possible effect; Ground water potential and aquifer/ spring study and possible impact of tunnel on hydrology; Change in biodiversity; change in habitat and population of endangered species. Various stations for data collections and monitoring would be established.

From the information available, these are not placed in the case study material. It is presumed that such study in any case will have to be undertaken by the experts for predicting the impact and assessing the feasibility. Consultants

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will have to be engaged. Besides, monitoring stations will have to be established. A control area will also have to be demarcated to evaluate ex-post facto the effect and impacts of the project. For collection of data, Field study, survey, feedback and information from people and use of model and scientific kit will have to be resorted. To the extent possible, participatory mode of survey and evaluation can be adopted. For water, computer based data/ model system is essential. There is bound to be some overlap of water and other environmental impact study. Exchange of notes, information sharing and consultation must be resorted.

Tentatively, following activity, timescale and cost is proposed:

Broad Activity related to Water study	Time required and horizon	Expected costs in Maloti (1999)
A. Surveys and Models		
Baseline surveys for water quality,	1 year-18 months	1000,000
aquatic ecology, hydrology and river		
flow regime and downstream effect.		
B. *Monitoring systems*		
Water quality modelling/ year	1 year	200,000
Water quality monitoring	15 years	3000,000
Water conservation study	Spread over 3-5 years	750,000
and awareness		
Aquatic species monitoring	15 years	120,000
Downstream river regime monitoring	15 years	1050,000
	Total	**6120,000**
	Say	**6000,000**

To **conclude** there is moderate environmental impact expected affecting aquatic Environment.Tunnels could alter and threaten springs through drainage and destruction during construction. For prediction, use of technology and appropriate Information system (baseline, survey and monitoring and evaluation) will have to be provided. Mitigation measures have to be incorporated.

Other dimensionss :

During the last stage of the feasibility studyin 1985 the environmental study covered a wide array of issues: (1) agricultural and land use in the project area; (2) social structure and the rural economy; (3) conservation and cultural

heritage issues; (4) impact on water quality and fishing; (5) effects on tourism; (6) health effects. Consequently the Project authority made an environmental plan with six main components to deal with expected impacts: (1) biology, aquatic weeds, fisheries, conservation of biological diversity, monitoring of the effects of compensation flows on river ecology; (2) public health, including baseline surveys monitoring and provisions for health care of the construction work force; (3) cultural heritage including preservation, restoration and enhancement of paleontological, archeological, and historic resources in theproject area; (4) watershed management, including soil surveys, water quality monitoring sedimentation studies and land reclamation studies; (5) enviromental education for the population affected by the project; (6) development of a geographic information system (GIS) for the project area as a basis for watershed management and local land use planning. Total environmental, compensation and rural development costs were estimated in 1989 at $39 million, or 4% of total project base costs.According to the FIVAS an Oslo based organisation, "the logic behind this project is to supply water for growing industry in South Africa, not for development in Lesotho" further the project is already facing a serious problem of squatter camps
More than 20,000 people were likely to lose their homes or part of their property when the dams are built. Farmers cannot be compensated with new fields because of the intense land pressure there. History also raises concerns over the possibly conflictual developments of Lesotho's water exports to South Africa. there appears to be probably substantial pressure on Lesotho, its tiny neighbor to set up the project.

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SECTION - IV
SOME ASPECTS OF WATER SUPPLY AND SANITATION

SOME ASPECTS OF WATER SUPPLY AND SANITATION

No life is possible without water. The hard facts, however show that some 1.3 billion people still lack access to safe water and some 2.5 billion access to sanitation. The crisis is more exacerbated by growing water scarcity, already affecting 132 million people in 20 countries and pollution being a major cause of diarrhoea disease (H.D.R., 1998). Providing a minimum standard of safe water and sanitation would mean 2 million fewer deaths from diarrhoea each year in children under 5 years, 200 million fewer episodes of diarrhoeal illness and debilitations (World Development Report 1992 cited: Gerhardt 1994). The Nature has potentiality to renew water resource through an interlinked chain of hydrological cycle.However, limitless interference in this hydrological cycle can threaten the processes of life systems. Water resources are unevenly distributed over the globe, and this can be a possible cause for conflicts. Increasing waste, abuse, contamination and pollution is making availability of good quality water an increasingly difficult, costly and complex task. Water is needed for physiology, psychology, ecology, sustenance, survival and productivity. Thus it touches all aspects of life including the socio-economic fabric of life.

The civilisation and cultural progress we take into reckoning when we define man as a social animal was built on our ability to make water work for us, and to sustain those production system (Leif Ohlsson, 1995). Falkenmark (1990) makes the compelling argument that no successful industrial nation came forward during the initial phase in areas where water was not readily available.

The following facts are revealing:

- 70% of earth's surface is covered with water (97.5% of this is ocean water);
- Only 2.5% of this is fresh water; a great majority of this is either frozen or deep in earth crust which is impossible in economic and technical terms to exploit.
- 0.26% of the total fresh water reserves-93000 km^3 is suitable for use. (Less than a percent of a percent of all water- Postel, 1992)
- Over 500,000 cu km of moisture evaporates.
- Only 40,000 cu km is annual precipitation (not assured)

- Only 12-14-000 cu km relatively stable source of supply exists in rivers and lakes.
- Water use is expanding rapidly and by 2025 it will have risen by 40% of the present level (H.D.R., 1998).
- Since 1950, water withdrawal increased from 1365 km /year to3760 km in1995.
- Water availability declined from about 16800 km /capita/year in 1950 to7300 km /capita/year.
- At present rate, 5-fold increase in waste generation by 2025 is predicted.
- On a global scale Agriculture use-69%; Industry-21 %; Municipal - 6 % & Reservoirs -4%
- On a purely consumptive use Agriculture-89%: Industry -3%; Municipal-2%; Reservoirs-6%. (Shiklomanov, 1993)

Is it not clear that treating water as a natural, abundant and renewable resource, is nothing but symptomatic of 'water blindness'(Falkenmark, et.al.1990-inability to see within totality of hydrological cycle)? No doubt as we do not see many soluble/ insoluble/ microorganisms in water, we cannot imagine how valuable and vulnerable a resource water is!

Socio-economic aspect: Water for human needs has 4 (four) dimensions: 1.Energy, 2.Food, 3.Health, and 4. General (ecology, education, planning, meteorological, technological etc). Various level of service is dependent on availability of water, population density, local capability to manage water resource on a sustainable basis, willingness to pay, user preferences and other considerations which come into play. It has been established that both the consumption level and the construction costs rise with the service levels.

Sanitation, Health and Environmental aspects : There is a strong inter-relationship between the hydrological cycle and the environment, and there exists a close relationship between water, water quality and waste problem. The discharge of organic waste into surface water exceeding the self-purification capacity causes fall in oxygen content below the minimum level needed for sustaining aquatic life; besides, many faecal origin source carry pathogens/ diseases. Dumping of solid waste and discharge of wastewater is generally making ground and surface water unsuitable. Sanitation is essential to deal with waste and wastewater in an environmentally acceptable framework (NEDA, 1998). Deforestation and erosion of catchment area must be dealt in

an integrated manner while considering formulation of delopment projects. There could be 5 main categories of impact in relation to water and sanitation -1.microbial contamination, 2.chemical pollution, 3.yield reduction from failing supply system, 4. Yield reduction from competing demands, and, 5. Yield reduction from land -use change (Teun Bastemeger & M. D. Lee, 1992). Physical environment and in particular sanitary environment has long been recognised as having profound influence on health; however, the relevance of social environment is a recent recognition (Dr. V. J. Emmanuel, Sri Lanka, 1996). *"Without improved hygiene and sanitation, the cleanest water in the world won't prevent children dying from diarrhea"*(Steven Esrey).Typical effects of improved water supply and sanitation condition on diarrhoea morbidity through improved water quality,improved water availability had a direct relationship in Median reduction in diarrhoea morbidity in percentage terms (Source: Esrey and others, 1985)

The combination of safe drinking water and hygienic sanitation facilities is a precondition for health and for success in the fight against poverty, hunger, child deaths and gender inequality. It is also central to the human rights and personal dignity of every human on earth. Yet 2.6 billion people – half the developing world – lack even a simple 'improved' latrine. One in every six persons i.e. more than 1 billion of the world population, has little choice but to use potentially harmful sources of water. Our collective failure to tackle this problem has dimmed livelihood prospects for billions of people locked in a cycle of poverty and disease.

While adopting the Millennium Development Goals, the countries of the world pledged to reduce by half, the proportion of people without access to safe drinking water and basic sanitation. The results so far are a mixed bag. With the exception of sub-Saharan Africa, there is encouraging trend in meeting the drinking water target by 2015; however, progress in respect of sanitation remains tardy and depressing in many developing regions.During the period 1990-2002, about **412 million** more people have access to drinking water supply in South-Central Asia with major development in **rural** areas with a **16%** increase (+ 282 million), as contrasted to the **urban** settings where the increase has been around 4% (+ 131 million). World Water Day, 22 March 2005, reinforced the commencement of another International Decade for Action proclaimed by the United Nations General Assembly. **Water for Life** calls for a coordinated response from the community of Nations.

Meghalaya water supply position:

- There is a total of 2912 nos. of piped water supply schemes in the state as on 31.1.05, of which 2654 nos.(91.07%) are gravity feed schemes.
- Of the 2912 nos. of piped water supply schemes in the state, 2154nos. (74%) are fully functioning, 569 nos. (20%) are partially functioning and the remaining 189 nos. (6%) are not functioning.

The district wise status of watersupply schemes are as below:

Sl.no	District/ Region	% of Fully Functioning Schemes	% of Partially Functioning Schemes	% of Non Functioning Schemes
1	Garo Hills	80%	17%	3%
2	Jaintia Hills	72%	18%	10%
3	Khasi Hills	69%	22%	9%

Source : PHE Department Govt. of Meghalaya 2005.

Meghalaya Sanitation position: The position in this respect remained dismal .After the launch of Total Sanitation Campaign programme by the Government of India, two projects were sanctioned for two districts in Meghalaya viz., East Khasi Hills & West Garo Hills District during the year 2003-04 and baseline survey for all the districts were completed during the year 2004-05. This programme is underway in East Khasi Hills & West Garo Hills District. For the other districts, the project proposal is under the process of sanction. A daunting task lies ahead in the area of sanitation in the state.

The following discussion attempts to analyse on a broad canvass, the global commitment of water decade (1980-1990) and to attempt a post-mortem in order to understand some facets of water supply and sanitation.We all have to be alive to the challenges that lie ahead. The other topic is a presentation of cost estimation and other aspects in implementation of a hypothetical water and sanitation project.

POST- MORTEM ON THE WATER DECADE (1980-90)

"Dead water and dead sand
Contending for the upper hand.....
This is the death of water."

(T.S.Eliot, Little Gidding; cited, Winpenny. J.)

If water dies, can life survive? It is this knowledge and concern, which has drawn attention to the relevance and aspects of water and sanitation in our evolutionary perspectives and developmental thinking. The signs of this realisation,are reflected in philosophies all over the globe. The global collectivism was provided an initial spark in World Health Organisation launching a global water supply scheme in 1959. The inadequacies of such token and passing efforts, with growing realisation of the complexities involved in providing safe water and access to sanitation facilities, resounded further in world fora. The emerging suggestions crystallised in resolution 35/18 of 10.11.1980 of UN General Assembly declaring the decade1981-1990 as the International Drinking Water Supply and Sanitation Decade (IDWSSD). The goal was to provide access for people to safe water supply and hygienic waste disposal. The decade saw collaborative exchange of information, technical assessments and technological innovations with emphasis on environment, sustainability, community participation and realisation of integrated management concept. It also saw the impact of slowing economy, poverty, population-increase, and variances in perceptions, promise, prescriptions and practices within and across countries. It may not be rational to declare the death of an immortal issue; however, general appearance, milestones and marks (injuries) will be enlisted. Failure or success of the decade are two sides of the same coin; whether the 'glass is half full or half empty' (Shah.R.B.1993) is one and the same thing-the crux is –there is water in the glass.

SITUATION AT THE BEGINNING OF THE DECADE: The decade was sponsored by 7 UN agencies- UNESCO, UNDP, UNICEF, ILO, FAO, WORLD BANK, and WHO. In 1980, 2/3rd of developing countries' population did not have adequate access to safe water supply involving more than 70 % of rural population and 30% of urban population. For sanitation 75% of the population did not have sanitary facility- even pit latrine. In global context, population served by adequate water supply rose from 29% in 1970 to 38% in 1975 and

43% in1980. The percentage with adequate excreta disposal rose from 27%in1970 to 33% in1975, but appears to have fallen to 25% in 1980(G. Bourne, 1984).

The thrust and focus of the programmes during the decade were: -

- Low-cost alternatives;
- Support activities for national planning of the decade;
- Information regarding countries, their plans and regarding funding source, criteria and interface; exchange of information;
- Public relations exercise, publicity - campaigns to develop and provide momentum for decade activities etc.

	Population(millions)	Lack safe water supply	Lack adequate excreta disposal
Urban	933 (100%)	213 (33%)	292 (31%)
Rural	2303 (100%)	1613 (70%)	1442 (63%)
Total	3236 (100%)	1826 (56%)	1734 (54%)

Figure 1 : *Situation at the beginning of water decade (HDR.1991, UNDP; cited Carter, Howsam and Tyrrel)*

Events and Undercurrents in the run-up and during the Decade:

1960s- Basic research by UNESCO, Administrative Sub-committee on Co-ordination of UN

Pre 1976- Limited International co-operation. Part of UN system; WHO-close ties and links with sanitation and water; World Bank – with funding municipal water supply; UNESCO- collaborated with units of International Council of Scientific Unions.

1976-Habitat Conference in Vancouver, Canada highlighted water supply and sanitation needs.

1977-UN Water Conference, Mar del Plata, Argentina- "Action Plan" charted and suggested.

1978-Conference on Primary Health Care, Alma Ata, Uruguay

1980-Launching of Decade ; Revised Target by WHO-100% water supply; 80% urban sanitation, 50% rural sanitation

1981- Decade co-ordinator of UNDP-Peter Borne- resigned owing lack of UN support.

1982- World Bank –lending for water and sanitation drops to less than 1% of all lending (5-year average-5%)- ascribes fall in contributors' share, mainly U.S and other G7 countries; Lending for Latin America and Caribbean increases.

1983-World Water Conference, London reviews progress; WHO revised target- 95% urban water supply; 85% rural water supply; 80% urban sanitation; no target for rural sanitation The TIMES, 13 July- "Water decade fails-Less than three years after its launch the UN has quietly abandoned its water and sanitation decade"

1984-Many projects awaiting donors' clearance and were on shelves in WHO.

1985-U.N report of progress- achievement and constraints listed; Based on WHO figures, realisation and admission that the goal may not be achieved without substantial acceleration. USAID closes its water and sanitation division; UNEP-approx-22% in urban area without water and 40% without sanitation; 64% in rural area without water and 85% without sanitation (almost same position as in 1970). The decade losing ground in rural sanitation

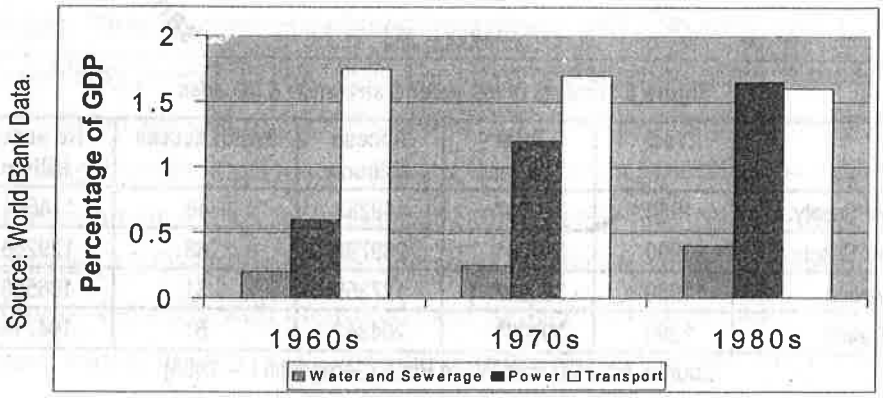
1986-World Water conference, London-2nd review; Indications that aid was flowing lopsided, probably on other considerations (more to Latin America, Caribbean, less to sub- Saharan Africa). WHO published figures: urban water spply-77% from 75%; urban sanitation-62% from 53%; rural water supply- 40% from 29%; rural sanitation-18% from 13%. WHO mentioned total coverage as distant dream Consultations between UN officials and 30 external funding agencies.

1988-UNICEF- "The state of world's children, 1989- water for all can be met in the decade of

1989-World Water Conference, London, (3rd time) – reviews progress.

1990-World Summit for children- a repetition of promise- "Universal access to safe water and sanitation by 2000"- to coincide with 'health for all by 2000'.

Figure 2 : Public investment in Infrastructure in Developing Countries Over three Decades



The happenings underscore the contradictions, hypocrisies and intricacies of promises of world order. In 1980, World Bank estimated and projected $600 billion (at 1978 price) for moderate level of service for water and sanitation. The Bank also obtained second opinion and revised it to $ 300 billion.

Biswas, A.K.1981 felt that this figure was less by atleast 20-30%(compared to the fact that spending was $240 million a day on cigarettes and $ 1400 million a day on armament) and doubted the commitment towards the decade.

SITUATION AT THE END OF THE DECADE: The facts that emerged midway and at the end indicated the complexity of the issues (Edward and Najlis, 1991).

Figure 3 : *Situation at the end of water decade (HDR1991, UNDP: cited Carter, Howsam, and Tyrrel)*

	Population(millions)	Lack safe water supply	Lack adequate excreta disposal
Urban	1332 (100%)	243 (18%)	377 (28%)
Rural	2659 (100%)	989 (37%)	1364 (51%)
Total	3991 (100%)	1232 (31%)	1741 (44%)

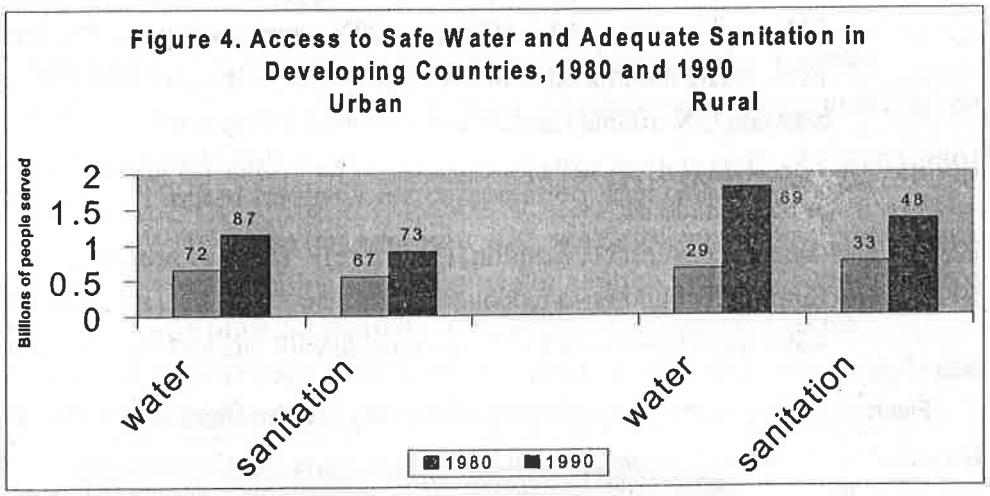


Figure 5 : *Results of the water & sanitation & decades.*

	Year	Total Millions	Access Millions	%with access	No access Millions
Water Supply	1980	323947	149283	46	174664
Water Supply	1990	399061	269795	68	129266
Sanitation	1980	323947	127359	31	196588
Sanitation	1990	399061	204342	51	194719

Source: Adapted from World Bank (Serageldin I. – 1995)

	Total	External	Internal
Africa	13.2	9.8	3.4
Americas	31.5	15.7	15.8
S.E.Asia	21.1	9.1	12.0
Sub-Total	65.8	34.6	31.2
Eastern Mediterranean	23.3	8.3	15.0
Western Pacific	44.8	3.1	41.7
Total	133.9	46.0	87.9

Figure 6 : *Total funding for Water Supply and Sanitation 1981-1990(U.S.$ billion).*

Achievements of the Decade:

1. **Coverage:** Number and proportion of people in developing countries increased dramatically- water supply in urban areas increased about 80% in1980s and sanitation by 50%(Briscoe, J.and Harvey. A.Gran, 1995). 1.2 billion more people had access to drinking water than in 1980; 770 million more had access to sanitation (NEDA, 1998). The coverage was more in rural areas and most of the increase attributable to Asia and the Pacific.

2. **'Water' reflected and focussed:** Water as an issue reflected the enormity of the problem in the face of continuous neglect and scant respect it was given hitherto. The need for concentrated, continuous and integrated effort emerged. Need for an International system in water came to the fore and is increasingly getting louder thereafter. The 'Hydropolitics' became apparent and criticism was voiced. It exposed the weaknesses and hollowness of the world order.

3. **Low cost and appropriate technologies:** With more involvement of technically qualified personnel and NGOs, as the target threw challenge, - development, promotion and acceptance of modification in technology emerged. This resulted in reduced investment and operating cost to levels affordable by poor (NEDA, 1998) The costs of sanitation came to the level of US $50/head instead of $550/headUNICEF, 1990); potentialities for wider technology transfer, local manufacturing, employment generation and enterprise development in the sector emerged. Sturdy hand foot pumps, rope pump resurrected; VLOM (village level operation and maintenance) concept emerged. Technique for wells with improved rural tools, purification and filtration also became widely known. VIP (ventilated improved pit) latrine, sanplat latrines

and compost latrines were successfully developed. Simple techniques for transport and treatment of wastewater and organic waste was developed e.g. small-bore sewers and anaerobic treatment plants producing biogas (NEDA, 1998).

Figure 7 : *Aspects of Water Supply at the end of decade (Source WHO 1990 cited NEDA, 1998).*

Region	Construction costs Urban(US $/capita)		Construction costs Rural (US $/capita)
	House connection	Public stand pipe	Public supply (all levels)
Africa	91	55	44.5
Latin America & Caribbean	152.5	68.5	80
S.E.Asia	111.7	47.7	27.7
Eastern Mediterrannean	225	135	90
Western pacific	225	107	75.5

Costs by Technological level	Technology level	US $ per capita
High cost technology	Urban water supply (house connection)	200
Intermediate cost technology	Marginal urban water supply(Network with public stand pipes)	100
Low cost technology	Rural water supply (wells with hand pumps, gravity schemes)	30

Figure 8 : *Aspects of Sanitation at the end of decade (Source WHO 1990 cited NEDA, 1998).*

Region	Construction costs Urban(US $/capita)		Construction costs Rural (US $/capita)
	Sewer Connection	Other	Latrines
Africa	120	100	22
Latin America & Caribbean	120	70	25
S.E.Asia	151.7	36	10.7
Eastern Mediterrannean	360	65	72.9
Western pacific	600	155	38.7

Costs by Technological level	Technology level	US $ per capita
High cost technology	Urban Sanitation (Sewers & Sewage treatment)	350
Intermediate cost technology	Marginal urban Sanitation(On site sanitation)	25
Low cost technology	Rural Sanitation (On site sanitation)	20

4. Increased realisation and involvement of community and user: The decade also unfolded in growing realisation in planning and implementation of water and sanitation projects the issue of sustainability, role of users, participation, voluntary contribution and involvement of people in all stages of project cycle. It converged in contemporary thinking of 'people centred' approach of planning. (Ole Thirkildsen, 1988;NEDA, 1998). However, this realisation came later out of lessons from failures.

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THE FAILURES

A. Target: an approach: In the reservations-" alth be achieved, it is e the period of tim target setting gave handling of wate consensus buildin agencies and the c coupled with lack and vulnerable res in the wider sense such a response m not fit into a conv against ozone dep

5. **Health education** - targeting and mobilising women, as an agent of behavioural change- Health education also became an integral part of water and sanitation programmes. Successful eradication of Dracunculosis (Guinea worm) supported by UNDP and UNICEF- was notable in Ghana, Nigeria, Cameroon, India, Senegal and Pakistan. Women's role as arbitrator of health behaviour in family and home was focussed. Women's increased role as stakeholder in use, management and maintenance of water supply and sanitation emerged.

6. **Synergistic and Integrative:** The decade saw linkages and relationships of technological, engineering, health, education, environmental concerns and poverty impact issues. The policy and planning approach saw 'shift from sequential to integrative', by the end of decade.

There emerged various spin-off from the issues listed above during the decade and brought to the fore appreciation and realisation of various challenges and barriers. Overall, 'it gave an encouraging picture, as a first stage providing the experience and the momentum' (Najlis, and Edwards, 1991) 'intended to act more as challenge and stimulus than a feasible objective'(NEDA, 1998).

THE FAILURES : WHOSE AND WHERE:

A. Target: ambitious and unmatched by action and fragmented approach: In the run up to the declaration of the decade many had expressed reservations-" although no one realistically expects such an ambitious goal to be achieved, it is expected that these figures will be dramatically changed during the period of time" (G. Bourne, K.Biswas, 1984). Ambitious and unrealistic target setting gave wrong message of being a hype and rhetoric. The fragmented handling of water and sanitation required more effort on co-ordination and consensus building than on action. The signals right from the start by UN, its agencies and the developed world were of detachment and dithering. This was coupled with lack of realistic and proper perceptions of water as finite, mobile and vulnerable resource (Falkenmark and Lundqvist, 1995). 'Work on water issue in the wider sense lacks an effective forum' (Clarke, 1991). One explanation of such a response may be that water issues, due to their locality and diversity, will not fit into a convention on the lines of such as successful Montreal Protocol against ozone depleting substances (Biswas, A.K., 1993).

B. World Economic Situation: The situation of world economy during the decade was painfully disappointing (Najlis and Edwards, 1991). Many developed countries saw slow growth or negative growth in their economy. The debt of developing countries doubled during the period causing resource crunch. Sub-Saharan Africa was ravaged by drought, famine, war, and other disasters (Najlis and Edwards, 1991). The donor agencies did not commit themselves to the agenda. Sub- Saharan Africa received only 15% of disbursements in the sector. Only US$139 billion was invested, of which 66% came from own resources of developing countries. The targeted spending per annum was achieved only 25-30 %. This was also coupled with the failure of resource mobilisation and utilisation including cost recovery (NEDA; World Bank; Caster, Howsam and Tyrrel).

Figure 9 Estimated investment in water supply and sanitation, 1980-1990 (US $ billion) WHO, 1992(10% of total urban expenditure taken as peri-urban immediate system)Source: Ghosh and Nigam,1995.

REGION	WATER				SANITATION				
	Urban		Rural	Total	Urban		Rural	Total	TOTAL
	Total urban	Peri-urban			Total urban	Peri-urban			
Africa	5.1	0.5	1.9	7.0	5.8	0.6	0.4	6.2	13.2
Latin America	14.8	1.5	0.9	15.7	15.4	1.5	0.5	15.9	31.5
S.E.Asia	5.9	0.6	7.2	13.1	7.2	0.7	0.8	8.0	21.1
Sub Total	25.8	2.6	10.0	35.8	28.4	2.8	1.7	30.1	65.9
East Mediterranean	8.8		2.7	11.5	10.6		1.2	11.8	23.3
Western Pacific	10.9		15.7	26.6	14.3		3.8	18.1	44.8
Total	45.5		28.4	73.9	53.3		6.7	60.0	133.9

Of all lending by World Bank during the Decade, water projects consumed 20% of all lending amounting $35 billion of which $21 billion was allocated to irrigation and hydropower. Rural water supply projects received only 5%($1 billion) whereas for urban areas $5 billion was lent. Less than 4% of water lending during the decade went towards 'alternatives', 0.4% for small scale irrigation, 0.6% for watershed development and 2.7% for water conservation and efficiency, 76% went for new infrastructure, 11% for maintenance and up-gradation and 9% for Institutional development and technical assistance (World Bank, Cited in Waterline, 13(2), 1994). These clearly indicated deviation from the goal.

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Figure 10 *Projected p*
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C. Population growth: The population-growth indicated no decrease. Sub- Saharan Africa had more than 3%; which meant even maintaining 1980 levels would require 40% increased service. Also,there was higher rate of urbanisation in developing countries (3.6%/year-more than twice of rural areas)

Figure 10 *Projected population growth (Source: WHO data in World Water – 1986 cited Briscoe, Ferranti – World Bank – 1988)*

Region	1980 (Actual – millions)	2000 (Projected – millions)
Africa,	330	450
Asia-Pacific	2060	2510
Latin America & Caribbean	120	130

Figure 11. Historic population for Biraben (Source : UN (1992), Shiklomanov, 1993,WRI,1994.Water and sustainability-Global patterns and long range problem (cited Raskin, Hansen and Margets, 1996).

Global Trends	1900	1950	1990
Population(billion)	1.6	2.5	5.3
Water withdrawal/capita(cum./year)	360	540	570
Water withdrawal Total(cu.km/Year)	600	1400	3000

D. Failure of commitments: Majority of the governments did not take up the challenge and the task seriously and looked up to donors. IDWSSD was an aggregate of the activities of the countries- there were many declarations by various countries- nature of scope and activities also varied widely (Najlis and Edwards, 1991). There was also vagueness as to what constituted 'adequate coverage'. Limited capacities of ministries and agencies and inter-ministerial and iter-sectoral divergences in different countries also made an impact on the committed work and coordinated action.

E. Other factors contributing to failures:

- Provision of water supply and sanitation was not the only priority issue in developing countries.
- Search for balance between government's involvement and its cautious withdrawal to allow and encourage local initiatives created confusion that also led to failures.
- Inadequacy of Human Resources, their distribution, suitable working environment, career prospects, needed due attention which was missing.
- ALate realisation of community participation as an effective tool was also a factor.

- Spending imbalance,more thrust in the first half in infrastructure building of water supply, disposal of solid and liquid waste was neglected. Sanitation sub-sector suffered and lagged; 85-90% allocation went to water supply.
- Later realisation of integrative aspects with environment, community, technology, health and resources.
- Fragmented sectoral policies, inadequate co-ordination, weak or non-existent institutions dealing with the matter holistically (mostly taken from World Bank, 1988; and Edwards and Najlis,1991).

The above factors and failures were also reflected in aquatic environment. While environmental quality in industrial countries improved over the 1980s, it did not improve in middle-income countries, and reduced sharply in low-income countries (Serageldin, I. 1994).

Figure 12. *Dissolved oxygen levels in rivers in Developing and Industrial countries – World Bank 1992. (Source: Serageldin I).*

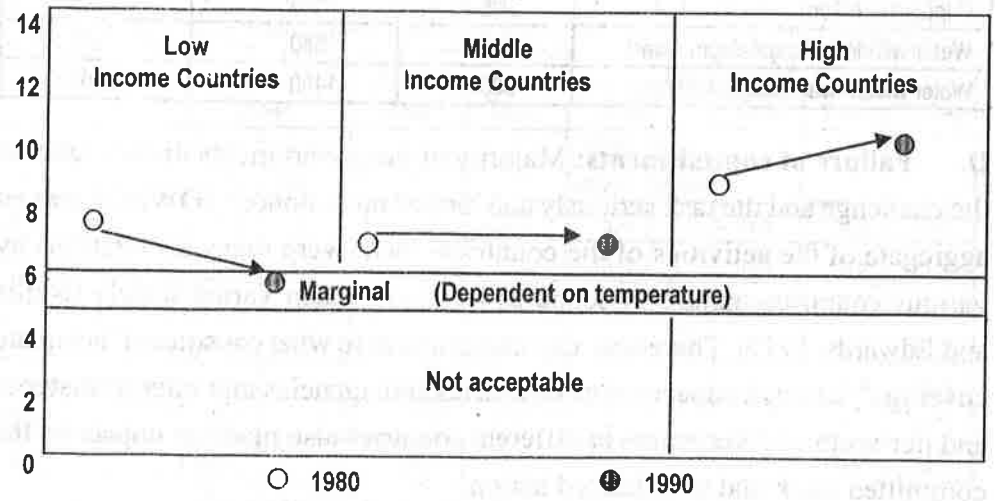

Figure 13. *Major decade constraints in developing countries, Global Survey, 1983.* Note: Constraints ranked by column. descending order from left to right based on WHO (1986) modified and cited-Ole Thirkildsen, 1988.

Funding limitations	Import restrictions	Lack of planning and design criteria
Operation and maintenance	Logistics	Inappropriate technology
Inappropriate institutional framework	Insufficient health education support	Inadequate or outmoded
		legal framework
Inadequate cost recovery framework	Intermittent water services	Insufficient Knowledge of
		water resources
Lack of professional staff	Non-involvement of communities	Inadequate water
		resources
Lack of sub-professional staff	Lack of definite Govt. Policies	

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Conclusion : In its keynote address in 1980 Dr. Kurt Waldheim had mentioned that "the cost for achieving these goals would be considerable and will have to be borne by developing countries themselves with the help of donor countries,.....There must be necessary political will to give the Decade the due priority it deserves." If coverage is the only criterion for measuring the decade, it admittedly does not measure well, but all agree that the decade achieved its vital role by providing contextual platform for actions, strategy, and innovations. The decade also played a catalytic and synergistic role in convergence with Health for all and water and sanitation for all.

In evolving and implementing vital developmental issues, success or failure is relative on scale, and is overtaken by emerging events, trends, paradigms, policies and politics of the time. Success or failure is collective both at micro- and macro-levels. The Decade played its role of catalysing and focussing the related issues in order to give it a carry forward legacy. In evaluating the decade we should see it from a developmental perspective rather than being judgmental. Year 2000 (the next decade) also came to an end. Much water has flown down-streams since the previous two decades. Whether the goal under new agenda as set in 2005 will be achieved as a watershed, or would be watered down will only become known when analysts do another post-mortem and sign their report. The indications atleast on sanitation front do not appear encouraging. It should be the pursuit of contemporary time to strive to achieve the parameters of health and environmental sustainability. Whether it compromises the issue by posturing and rhetoric or by trying to achieve "some for all rather than more for some" will only be known and reflected in actions by countries and their planners and leaders. Closer home, much remains to be done.

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COST ESTIMATION CASE STUDY : Upgrading a WasteWater Treatment Plant.

Project objective is to refurbish and upgrade the existing 20-year-old wastewater Treatment plant as detailed in the project outline in the setting.

The important components of the project are: changing water distribution pipes attached with new flow meter; control and valve systems to ensure regular and equal flow to treatment tanks; sump pumps and determination of capacity; also impeller pumps and its size and diameter; reuse of old pipes for overflow pipelines.

Setting / External factors for assumptions:

For convenience of setting, the project is being undertaken in a developing country with tropical climatic conditions and congested urban areas. Corrosion rate and measures need to be understood. The tanks are metallic and reduction in the strength and thickness of the wall of the tank may require closer investigation. The steel structure for raising the tank and platform may also require closer investigation and inspection. It may be desirable to consider concrete structures. The condition of the old pipes will also be an important factor. Information concerning impeller size, capacity and diameter and requirements of sump pump will have to be associated. The area is congested, besides the old layout and design. With increasing awareness, there is apprehension regarding foul smell and mode of removal of debris, associated noise, dust and disturbance in the vicinity and prayed public opinion is sought to be assuaged. The level of expertise, organisational and financial capability of municipal organisations is generally not very high in developing countries. Since it concerns a public service, local politicians and opinion makers try to raise points and stakes. Use of local contractors or subcontractor and labour-based method will be harped for generation of local employment and business. Inter-agency co-ordination is another important facet.

List of the factors expected to have impacts on the cost for the purpose of preparing estimates :

1. The broad objectives agreed with the client in respect of defining scope, time frame, mode and manner of implementation, the mode of contract, and major constraints were defined (Time or cost or both needs deliberations; quality is of utmost requirement as the work is associated

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with human health and hazard) and risks needs to be assessed; use of local labour etc.

2. The stakeholders and their functional relationships; roles and responsibility clarity pertaining planning, funding, execution, directions.
3. Process and time taken in decision- making. Extent and levels defined with adequate delegations at each level.
4. Socio-political situation, administrative practices and their implications on project.
5. Financial arrangement and flow of fund needs to be worked out in advance; separating local and offshore fund, own resource, grant, loans and programmes for the project.
6. Location and associated considerations; unhindered work site availability, safety and security; facilities on work sites.
7. The availability of basic data for planning and design; if unavailable, then additional cost for survey and compilation needs to be factored. Estimation should be done after considering all details.
8. Climatic and weather details of temperature, humidity, rainfall, wind direction, solar lighting.
9. Environmental details: Legislation and changes over time and likely trends of environmental/ water regulations; air, water, pollution levels; flora; rivers and distance of release; effluent quality requirements and standards and end-use/ reuse.
10. Design / technology criteria- to ensure untreated sewage is not discharged in the conveyors/ released; -adequate preliminary treatment to avoid sediment deposit in the conveyance system; -design conveyors (suitable diameters and gradients) to transport sediments in order to avoid sediment build up; -design conveyors to be capable of operating efficiently over a long period of time with minimum maintenance; -sufficient hydraulic capacity at the design horizon of say the year 2025; -average dry weather flows data and for 5 years past/ projected; -diurnal variations of flow and storm drainage; influent source, load and special requirements of treatments to avoid foul smelling; possibility of a tertiary system as additional requirements.

11. Logistics; operational, functional, executional, equipment and support systems; and providing contingencies.
12. Availability of resources: quantity, quality, timely, adequacy. Relative comparative costs in view of the market.
13. Material cost will follow from the detailed design and resource availability; such cost would include cost for pipes, platform and other structures, pumps, valves, flow meters, reinforcements and linings. Cost of these can be available from vendors, market price of similar projects and recent procurement records. The cost can be worked out based on standard rates for work and material items; cost of labour and wage or piece rates.
14. Capability of resources: Human (labour, organisational, technical), Capital, Community. Institutional strengths and steps for training / motivation.
15. Market factors: Demand and supply of the service, associated equipment and facilities. Current and future demand of the service- population, urban growth pattern, water consumption, waste pattern, projected level of service, system coverage, liability of flooding.
16. 75% of the installations are to remain on line, this may involve associated shut down, phasing, based on flow variations. Accordingly meticulous scheduling and of the works will have to be worked out; Standby pumps will have to be arranged.
17. Contract packages -advance works- e.g. such as design/ consulting/ inspections / clearing the sedimentation tanks.
    - Civil works- tank structure refurbishing, pumping station, sludge handling and loading facilitator; interim outfall.
    - Engineering and maintenance- upgrading existing system; preliminary treatment plants; sludge de-watering facilities; pumping, E & M equipments for sedimentation tanks.
18. Work breakdown structure and allocations of responsibilities and any overlaps; arrangement for communications.
19. Types of contract; payment conditions in the contract; conditions and agreements in the contract. Amounts in the contract, after evaluation, can be utilised for revising/ updating the estimate.

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20. Estimated recurring cost, maintenance aspects (as can not be done in-house) on contractual terms and mode of recovery/ funding and associated implications.
21. Schemes for cost recovery: Capital cost recovered/ not recovered; who will bear and institutional arrangements etc.
22. Arrangements for project, funding, contract, other statutory requirements, cost recovery; environmental / aesthetics mitigation measures and cost involved in these.
23. Odour development and prevention; method of removal of dried sludge.
24. Reuse of treated water and quality requirements.
25. Availability of water and costing. Impact of drainage/ storm drainage on sanitation.
26. Fixed Costs : repayment of principal amount borrowed; repayment of interests on borrowed capital.
27. Variable costs: such as – administrative expenses-salaries and wages; - repair and maintenance charges; -chemicals and consumables; - electricity charges; -depreciation charges.
28. Contingencies including control; Risk assessment and indirect expenses on engaging consultants, standby pumps; tolerances _+ 10%; Exclusions from base estimate (using 12 inches pipes); inflation; exchange rates.
29. Mechanism of cost recovery: such as – municipal tax; registration and connection charges; solid waste drainage tax. Internal cross subsidising; on time development charges; and sundry charges.
30. The expertise available in-house, continuity of staff and technical supervisors; expertise of local contractors and nature of their association with front runners; the work ethos prevailing etc.

The estimate should be based on detailed design. Terms of reference for the consultants must be clearly drafted. The Operational (resource cost) technique of estimating may be considered with incorporation of elements of factorial approach.The cost of labour, plant, equipment, and materials should be at current rates and should be accumulated as direct or indirect costs in the way they will be incurred- fixed, time-related or quantity- proportional. The operational technique will have to take care of various uncertainties and risks

which may cause delay. The technique would provide the basis for the base case cash flow; current cost/ time basis for application of inflation forecasts and compilation of a project cash flow. The cash estimate will take into account the cash flow projections. The total cost consists of consultancy, design cost, material cost, equipment cost, installations, erections, testing, and commissioning as components of base estimate. Contingencies will be added and tolerances of _+ 10% will work as overall cost estimate.

Project Execution Plan:

1.Initiation / Feasibility: Following points need to be elaborated and looked into:

- Broad objectives in consultation with the client and Constraints (defining Time, Cost, Quality axis; no compromise on quality as related to public health).
- Need assessment survey; only 25% functional dislocation.
- Establishing participatory spring flow measurement, monitoring of the undertaking.
- Completing initial inspection and feasibility report; technology choice.
- Rough estimate.
- Project team constituted and selects targets.
- Consultant engaged and mandated.

2. Stakeholder analysis/ social profiling:

- Government; agencies; local bodies and civil society.
- Community mapping; profiles; felt need, perceptions, objections, suggestions.
- Prioritisation.
- Technology choice.
- Mode of participation in financing, operations and management.

3. Preparation phase / Development:

- Managemental arrangement / administrative arrangement.
- Define objective; define beneficiaries.
- Define project; work breakdown, components, constraints.
- Define roles and responsibilities; delegations and devolutions.
- Define action plans, network, scheduling, monitoring.

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4. Training / Predesign:

- Training of promoters, Management, Stakeholders, Project Team, Staff, Design Team.
- The in-house designing and estimating efforts.

5. Detailed Design:

- Project design team completes technical survey and detailed design with quantity and cost estimates.
- Design discussed and shared with stakeholders (client, funding agencies, govt, other agencies involved) and important vendors.

6. Approval:

- Detailed Project estimate and arrangement shared with all stakeholders and in principal approval.
- Proposal submitted to various agencies involved- government, local bodies, client /funding agencies.
- Project management and Technical advisors/ Consultants make presentation of design and cost estimate for donors/ client's approval.
- Discussion and agreement on design and construction and project programmes and obtains approval.
- MOU signed formally detailing commitments.
- Steps for sanction and release of funds and pursues it.
- A core Co-ordinating and Monitoring Committee involving Client and important stakeholders constituted with due empowerment to the representatives.

7. Contract and Procurement:

- Project management takes steps inviting bids for procurement and contract.
- Evaluation and appraisal of bids and award for suppliers / contractors award after consulting client.
- Involvement of local capable contractors, vendors.

Contract strategy: The work has limitations of a clear- cut definition, because in such a sensitive public work connected with health and hygiene, it is better to be

cautious and not take chances. Further, 75 % of the layout has to remain on line. Design specifications will definitely have to take care of corrosion, structure, pumps, valves, flow meters and any associated technical details; however, certain risks remain. Thus the contract strategy will address the requirement in the situation. In this case there appears to be considerable uncertainty and challenge of design and work execution requiring ingenuity and motivated action on the part of the contractor. Thus, in such situation, most suitable is Target cost contract as time is a great constraint. Adequate pre-tender design, site investigation and material search must precede. Initial target cost may be based on the most upto-date knowledge of work available and a comprehensive costed programme for the project. Management contract may also be thought of but the level of expertise of the contractor, possible delay in work and associated problems in such a case becomes a negative factor. In this case since public health and risks are involved, hence the project team, client will have to constantly monitor and supervise and work in tandem with the contractor. There will have to be consultations and good co-ordination among them. Besides, incentives can be provided for efficiency and cost effectiveness. Such a contract is of cost reimbursable type, minimising claims on account of variations, settlement becomes easier, involvement of client is collaborative and decision making is faster in the given imperative situation. Competitive bids will be invited from a pre-qualification and screened list of contractors. The evaluation of bids by comparing the market prices, detailed costing break ups and internal assessment devices and similar experiences would allow the choice to be narrowed to one or two most suitable contractors. Relevant experience and proof of expertise is paramount. Safety record of the contractor is also important, both in respect of work execution and considerations of facilities and safety towards men along-with equipment and working environment. Further, while selecting the contractor, his track record on ingenuity and capacity for executing the work in simultaneous- operation stage, restricted site access and availability will have to be considered. Thus, the Target cost contract is preferred on account of flexibility, cost effectiveness, close co-operation between client, project management and contractor; multi-contract situation such as instrumentation, pipe-works, installations and structures, constraints, restricted access and availability of refurbishing components, considerable uncertainty, timely execution etc.

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Payment to the contractor will have to be on actual cost with certain incentives for risk sharing. This will have to be negotiated and agreed upon before the award and agreements. The savings, if any, will be shared, too, in accordance with the agreed mechanisms for incentives. Fee will be paid for separate payment for overheads and other costs as per contract agreement and not be covered under actual cost and profit. Change in scope and major changes and variation in design as agreed in contract condition would entail additional payments as due and agreed.

8. Implementation:

- Project works starts.
- Scheme construction- Project manager, project supervisor and contractor; (client).
- Monitoring the progress- Project manager, client, and government. (The project planning and implementation Committee).
- Testing, commissioning and opening- Project manager, client, Contractor.

Step 9. Completion and Operation:

- Workshop/ training for operation and maintenance.
- Project completion reports.
- Monitoring visits- 6 monthly after commissioning; follow ups, recommendations.
- Regular check/ monitoring of influent / effluent quality released, other important parameters and operational criteria.
- Instrumentation checks associated and regular servicing.

Step 10. Evaluation:

- Monitoring and Evaluation of functional, design, technical, organisational and other aspects for evaluating the success and forecast of projections and assessing achievements. Once after 6 months and later after 2 years.
- Recommendations for the project.
- Recommendations for future projects.

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SECTION - V
MOTIVATION THEORIES : ANATOMY OF A CASE STUDY

MOTIVATION THEORIES : ANATOMY OF A CASE STUDY

INTRODUCTION:

Man is a rational animal, so was the premise in deductive logic, to illustrate man. Maslow, A.H. says 'man is a perpetually wanting animal' indicating instinctive aspect in man. I am also reminded of T.S.Eliot, in 'The Rock' reflecting : ' The lot of man is ceaseless labour..", and he goes on to define man as " The perpetual struggle of mankind is man." The greatest obsession or tryst of man has been his quest for self (literally and figuratively). Whatever man has created and endeavours to create has been the consequence of this quest for understanding his self and its interaction with the environment in whic he lives and that surrounds him. One important facet of this quest (perpetual want/ struggle) has been to discover what enthuses, pumps-up or energises man? The search has taken us to all directions and frontiers - intrinsic and extrinsic, biotic and abiotic, individualistic and collectivistic, body and mind, machine and organism, drive and force, push and pull and such others. Yet all theories have been unable to answer fully that eluding facet of the quest which in organisational behaviour has been termed as motivation.

An act is performed, things happen or are made to happen. While performing, one may or may not be conscious of what makes him do or perform; similarly, in a team what makes one do which others are also attempting differently? Though 'men like watches always differ', but what makes them tick together? Is it to achieve or attain a goal, and if so is it a desire or expression of his narrow self or his expanded self? Is there synchronism or synergy in what men attempt as a group ?

This essay attempts to understand a few strands of thoughts and theories in respect of motivation. A case of small action-group in the shape of District Blindness Control Society in a remote tribal hilly district of Meghalaya state of India would be illustrated from personal knowledge. In the cited case mainly the need theory of motivation has mainly been explained besides also giving sprinkle of other theories and comments.

Definition and Dimensions: The term 'motivation' is derived from Latin word 'movere' meaning 'to move' (Steers and Porter, 1991). Motivation has been defined 'as the set of processes that arouse, direct, and maintain

human behaviour toward attaining a goal' (Baron, R.A. Greenberg, J. 1990). Mitchell (1982) defines motivation as 'the degree to which an individual wants and chooses to engage in certain specified behaviours' (cited Mullins, J. L.1996) and says that 'motivation represents those psychological processes that cause the arousal, direction, and persistence of voluntary actions that are goal directed' (cited, Ford, M.E.1992). Steers and Porter (1987) believe motivation is concerned with-1. What energises human behaviour; 2.What directs or channels such behaviour; and 3. How this behaviour is maintained or sustained.

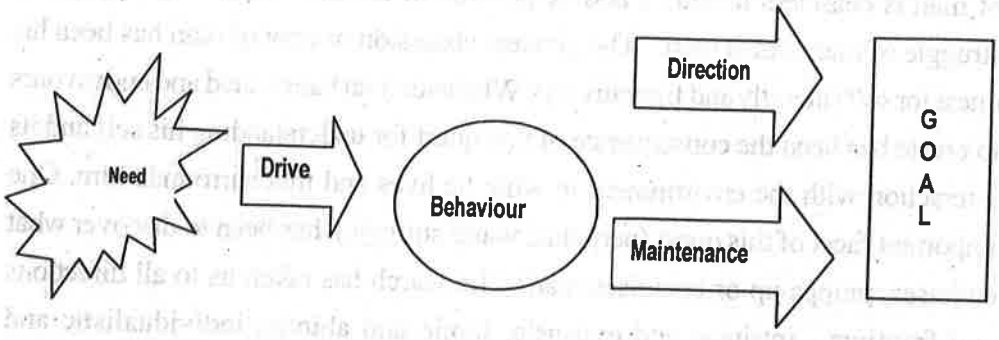


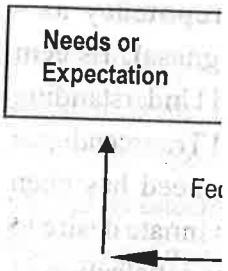
Figure 1. *Components of Motivation (Baron,A.R.& Greenberg,J).*

4 (four) common characteristics underline motivation (Mitchell, 1982, Cited Mullins, L. J. 1996)-

- Motivation typified as an individual phenomenon ('concerns human' Maslow,1943);
- Motivation is described, usually, as unintentional, ('more unconscious than conscious'Maslow,1943);
- Motivation is multifaceted with two important factors such as arousal/ drive and direction or choice of behaviour;
- The purpose of motivational theories is to predict behaviour (Motivation is not behaviour and is not performance- it is collective expression of concern for action, external and internal forces influencing choice of action).

Ford, M.E. (1992) in proposing Motivational Systems Theory (MST) has defined Motivation *'as the organised patterning of three psychological functions that serve to direct, energise and regulate goal directed activity: personal goals, emotional arousal processes and personal agency beliefs'*.

Thus building blocks in generalised model of motivation can be, needs or expectation, behaviour, goals, and some form of feedback (Steers and Porter1991).



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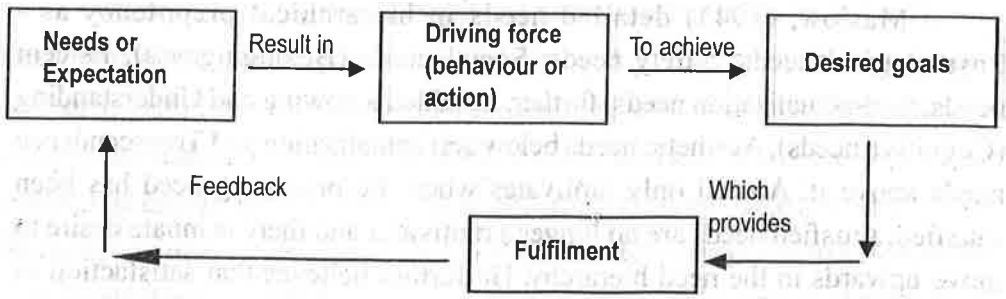

Figure 2. *A simplified illustration of the basic motivational model (Mullins, L. J. 1996).*

The underlying concept of motivation appears to be ' some driving force within individuals by which they attempt to achieve some goal in order to fulfil some need or expectation' (Mullins, L. J.1996). Carlisle considers motivation 'as a response to the tension resulting from lack of need satisfaction' (Perera, 1989).

It will be appropriate to understand the theory of human motivation propounded by Maslow (1943,1954) where basic needs have been enlisted and also other related theories in order to illustrate implicit and explicit divergences. Maslow's Basic Needs can more rationally be understood by having appreciated the preface of his theory of human motivation, as summed up below :-

1. Integrated wholeness of the organism, and all states of the organism in motivated or as motivating;
2. Non-somatic origin;
3. Motivation theory related and centred to human;
4. More on unconscious level than conscious;
5. Various cultural paths to the same goal;
6. Typically an act has more than one motivation;
7. Human needs arranged in hierarchies of prepotency;
8. Needs are interrelated and stratified; higher needs emerge only when lower needs are satisfied;
9. Not only integration of organism but relatedness and reactions exists;
10. External and internal environment must be taken into account.
11. Motivation theory not synonymous with behaviour theory- Motivation as one of the determinants of behaviour which is also determined by culture, biology and situations;
12. Classification of motivation based on goals rather than drives or behaviour;
13. Motivation classification must deal with problems of level of specificity or generalisation of the motives to be classified.

Maslow, (1943) detailed needs in hierarchical prepotency as - Physiological needs; Safety needs; Social needs (Belongingness); Esteem needs; Self-actualisation needs; further, he added Knowing and Understanding (Cognitive needs); Aesthetic needs below self actualisation and Transcendence needs above it. A need only motivates when the preceding need has been satisfied; satisfied needs are no longer a motivator and there is innate desire to move upwards in the need hierarchy. He further believes that satisfaction of these wants 'is not ordinarily altogether mutually exclusive but only tends to be.' The need hierarchies have been modified by Alderfer (1969); Mc Clelland (1965) elaborated to indicate flexibility of need states by training for strengthening and achievement.

It may be mentioned that Maslow has elaborated and admitted possibility of flexibility in respect of degree of fixity of the hierarchy of basic needs. In some self esteem is more than love needs; in innately creative persons creativeness more than any other determinant; ideals, high social standards, high values made secure in the earliest years, tend to remain secure and strong thereafter in the face of threats (Maslow, 1943,1954). It has also been stated that in reality most of human beings have varying degree of partially satisfied needs; and emergence of new need for the first time is gradual from nothingness. Thwarting of needs have dangerous consequences of psychopathic origin.

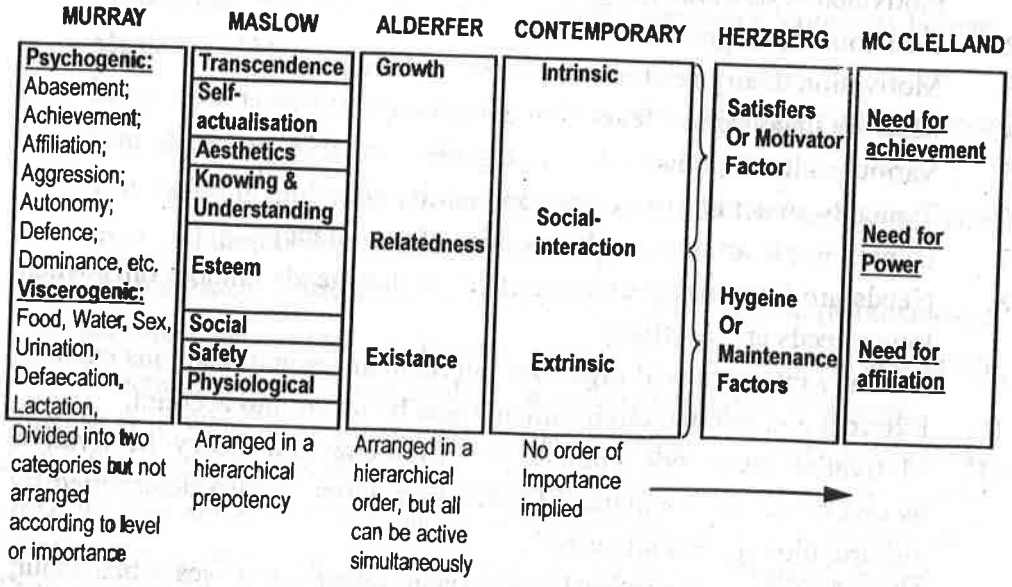

Figure 3. *Comparison of Need theories (modified and expanded from David. J. Cherrington, 1983 (cited. Steers & Porter ; & A. Sargent, 1990).*

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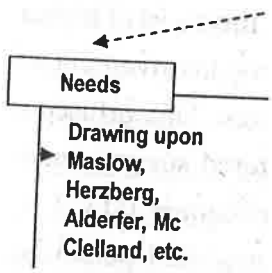

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Whereas the physiological needs and safety needs are inherent, it is the love/ social need where man as social animal exhibit the dimensions of higher emotions. Affiliation, group, family, the aspects of strength, confidence, freedom, independence, prestige, self respect, recognition, appreciation, evaluation of others and self, etc is reflected as esteem needs. 'What a man can be he must be' (Maslow, 1943)- the restlessness of man to achieve and express his self takes him to higher manifestations of self-actualisation. Maslow (1954) has added Knowing and Understanding (Cognitive needs) and Aesthetic needs which were appropriately put below self-actualisation. The essential aspect of human rights and freedom which were mentioned as 'almost ends' earlier, have duly been accommodated as needs. Further, actualisation of self can not be limited to the self as the need to expand the self and merge in Cosmos has been the essence of religious philosophies in one form or the other. Hence the transformation of self to Cosmos has been accommodated, as Transcendental needs. It may be surmised, here, that these higher level needs are always in dynamic state in intelligent and perceptual persons and at that level the state of needs might be alternating or interacting continuously as constant learning and may be considered to be in 'dynamic flux' till attainment and full release. There may be criticism of need theory by behavioural mangers that it does not provide a formula for motivating men. Some would like to have things measured and proved in laboratory. The innate aspects concerning humans are proved by its long persistence of use rather than some hypothetical calculations.

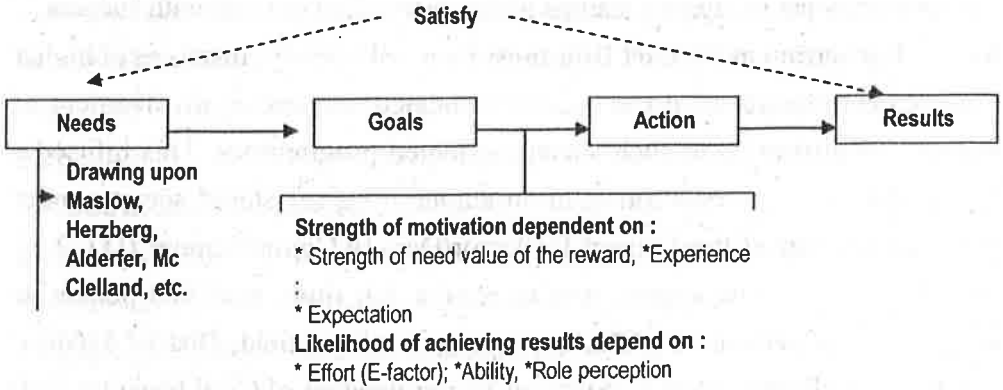

Figure 4. *The Complex model of Motivation, (Sargent,A.1990).*

Besides, need theory, Expectancy theory (Vroom, 1964); Goal theory (Locke); Equity theory (Adams) and Attribution theory (Heider and Kelley,

1973) and Motivational Systems Theory (MST)(Ford, M.E., 1992) are some of the many theories abound describing mainly the 'process approach'. These may be dealt while explaining the case cited below.

The Case of District Blindness Control Society (DBCS), West Garo Hills, Tura, Meghalaya, India.

Some cultural facets of the district are- Predominant community- Garo (tribal; mostly converted Christian, some non-christians); Others- Hindu (tribal and Nontribal); Muslims. Garo society- Clannish, by and large egalitarian, and Matrilineal; others apparently collectivist. The topography is hilly terrain.

a. Background: Blindness control has been an important National health and social concern. National programme for blindness control was being implemented through the Directorate of Health Services in States, through normal channel of District Medical and Health Officer (DMHO) and the district Surgeon in districts. The objective was both curative and preventive. The achievement in the state of Meghalaya, a hilly tribal state in the Northeastern part of India, in the period 1983-1993 was reportedly not encouraging. The number of cataract operation undertaken totalled only 500 (more or less) during the decade in the entire state; the respective figure for the district was reportedly only 50 (more or less) and attempts to organise camps in the district had not met with success.

b. Formation of District Blindness Control Society: Instances of higher achievement elsewhere in the country indicated responsive involvement of district administration in such socially oriented programmes. This infused a policy direction for constitution of an autonomous registered society under the chairmanship of the District Collector/Deputy Commissioner (D.C.) all over the country. The society was to have a full time, qualified person as secretary; involvement of NGO functioning in related field, District Medical and Health Officer (DMHO), Surgeon Superintendent of Civil Hospital (100 bedded), Eye Surgeon and the Adviser opthalmology as state co-ordinator of the programme as members. The fund was to be released to the society after receiving the reports of progress and completion of other formalities. Awareness

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building, eye screening, and operations both in camps and hospitals were programme components.

c. **Administrative system**-traditionally putting D.C. as representative of the state government; officials look up to him for guidance/ direction and advice; people accept him/her as such to a varying degree, also consider him as source of administrative wisdom, action and expects fairness and justice (being the head of administration of justice). As in the case of bureaucratic set up-problems of co-ordination, political dimensions and their ramifications, general motivation level may not be high, 'status-quoist', uncertainty, avoidance is high in general, lack of innovation, experimentation, can be generalised problems.

d. **Changed structure, mode, roles and leadership and The process of achieving:** The DBCS in West Garo Hills District was registered during 1991/1992 but activity had not started till May1993. No fund was received by the society consequently. The Adviser opthalmology (a lady) was the new state co-ordinator, who had a chance meeting with the D.C. (who had recently joined the district) in the state capital and discussed the necessity and opportunity in this respect. Both showed enthusiasm and resolved for action. A meeting of all concerned in the district headquarter as planned and initiated by the D.C. materialised. Superintendent of police and Commandant of Border Security Force were also invited in the meeting and made co-opted members. The state co-ordinator assured personnel and team support and also initial medicine and supply of spectacles for post- operative distribution. Initially the members were cautious and reserved in their critical analysis. On encouragement, and rapport establishment (as the D.C. had earlier served the district as ADC) the coldness melted and the reservations of members and their past experiences were listed. Mostly the problems were of planning, co-ordination and motivation. Besides, there were no focussed action in the past, responsibilities were not delineated, monitoring was poor, there was no effort to elicit people's support, there were also ego-clashes among professionals (technical persons). Motivation of all concerned was an important task. A calendar for annual action and organisation of eye-operation camps were fruitfully discussed and prepared. Full expression of difficulties, reservations, possible roles in future assignment, suggestions for improvement and possible implications of actions were deliberated in participative manner.

The meeting of the society decided to select the in-charge of 'blind school (a small but beautiful set-up run by a Christian missionary organisation) as its secretary. The person, an elderly lady of foreign origin working in the district for more than a decade, obliged on honorary basis with occasional help of staff during camps. A private eye specialist, the only other in the district, was also roped in right from the very first meeting. The private eye specialist was of foreign origin of a neighbouring country but naturalised citizen by marriage, working in other Christian missionary hospital. The DMHO was a positive person (muslim by religion) , the surgeon superintendent was a Hindu and the eye-surgeon a tribal, all from the neighbouring state of Assam. There was another philanthropic doctor from government set-up, secretary of red-cross society, a Bengali gentleman, working in the district for more than 25 years.

The first eye-camp was crucial to test the basic hypothesis that this time it will work. Since fund was not released by the Govt. of India by then, it was a major constraint. The approach adopted was to utilise equipments and infrastructure of state government, mobility by all individual resources of the members with supplement from district administration. The paramilitary force operating on the international border areas were to support logistics of cots, blankets, kitchenware and also support staffs for cooking. In order to elicit good response, especially from the poor, it was decided to provide free food (5-6 days) for the patients and one attendant per patient from the kin. It was also decided to provide free medicine, spectacles, and post-operative follow up and advice on the indicated dates on their health card , in addition to the camp cost being free. The raw materials for food were mobilised through district chamber of commerce, traders and local organisations. Volunteers were from the schools, NGOs and the Youth clubs.

The methodology adopted for such mobilisation was to have a meeting with the Local community usually 4-6 weeks in advance to explain and enthuse the community. The meeting was invariably initiated by the D.C. with core members of the society present and participating. It lead to a firm planning, delineation of duties and responsibility and indicated commitment of the groups where individual roles were complementary, supplemental and which allowed free and volentary expression of commitments. A close monitoring of progress of arrangements, publicity and awareness through media, local community, market committees,

and through all possible means with contingency for emergency and shortfalls were scrupulously palnned and managed.

e. **The Achievement:** The result of the first camp was an encouraging turnout of 400 an odd eye-patients and 51 operations in the camp. The society soon received the grants from the government after the reports of two camps were sent. The society having smelt success went about the task with full vigour and dedication, further refining from the feedback and arranged 7 (seven) such camps in the first year achieving 551(more or less) operations. In the second year the operations were about 400, and the activities expanded to eye screening in block areas, schools with intensive awareness building on eye-care. Organisation of essay, quiz, topical issues in the shape of debate, essays, science exhibitions, seminars, etc. Extensive use of media campaign including through local T.V. station in local language was adopted. As an additional outcome, politicians appreciated the efforts and did not attempt to thwart it realising the people's support for such actions. Many Public Health Centres Buildings constructed but not made functional were energised (motivated) to be made functional as eye-camps utilised such buildings invariably to put positive pressure on the health authorities to make the facilities functional.

f. **What 'did' the actors-Possible Motivating Factors:** In the related case, Good (self) performance; Professional satisfaction for all participants from various dimensions; and search for the expression of self, driven by various need dimensions can be briefly explained as below.

NGOs- blindness related activity; wider activity area, learning and interacting; (a lump sum cash incentive besides formal appreciation to the key persons). Esteem, cognitive, aesthetic and self-actualisation needs and possibly beyond.

Professionals- non-government- alternative role, job enrichment, esteem, opportunity (suggestions from some corner to appoint the person as secretary and eventually materialising), to improve his hitherto dwindling professional image; monetary incentive.

Government- State Co-ordinator; DMHO; Surgeon Superintendent; Other physician (a compulsive philanthropic): Knowing and understanding, aesthetics, esteem to self-actualisation. Reduced pressure on hospital with attendant savings of resources; shift of responsibility and risks; power to certify the adequacy of camp arrangement; (Surgeon

Superintendent most reticent, but veered around to keep district administration in good humour and realised the promise and potential of a good work).

Eye-surgeon-direct responsibility in health sector; in the underlying conditions poor would not have come to him; a good motivation was also a vehicle (a jeep) of the society which was provided to him (on which the Surgeon Superintendent also had an eye; and generally district administration keeps such vehicle). This was a good entry point to ensure his continued commitment, else..; from time to time the vehicle was also utilised for the society activity. He was given additional responsibility of maintaining accounts, as the honorary secretary was reluctant. In this case , it was Security, esteem needs, cognitive needs, aesthetic needs and self-actualisation. (the career appraisal of DMHO, Surgeon Superintendent and eye surgeon and superintendent of police was to be initiated by the D.C. as a normal administrative action)

People- Good face to district administration as it works both ways; power display by providing community resource; community leadership roles, emergence and display; chanelisation of energy of youth, merchants projecting Good Samaritan image. Esteem, cognitive and aesthetic needs seem to interplay.

Patients- free medical care; congenial environment near their villages, free food for self and attendant; faintest hope of being able to see (even partially- many cases were blindness for more than 8-10 years); free medicine and spectacles. Physiological, safety, social and esteem needs.

For family of patients – less cost (only travel), risks, and troubles; post operative care included. Safety, social and esteem needs.

For the administrator- Leadership, meeting a challenge, self-esteem (good self-appraisal for carreer sheet; an enriching experience to relate), probably a means of understanding and knowing, aesthetics, self-actualisation, and possibly beyond.

Police and paramilitary- part of administrative set-up; opportunity for pro-people face projection (esteem); closer understanding of forces in the community and aesthetics.

THE ANATOMY OF CASE RELATED :

As an enriching experience, it is embedded in the memory. One would like to moralise **" Therefore without being attached to the fruits of activities, one should act as a matter of duty, for by working without attachment one attains the supreme"** (text 19, chapter 3-Bhagwad Gita as it is).

Charity in Indian ethos cuts across religion. The cited case also indicate strategic planning by the administration (leadership) in which motivation energised the potentials of individuals involved to accentuate the outcome and effectiveness (as shown diagrammatically below).

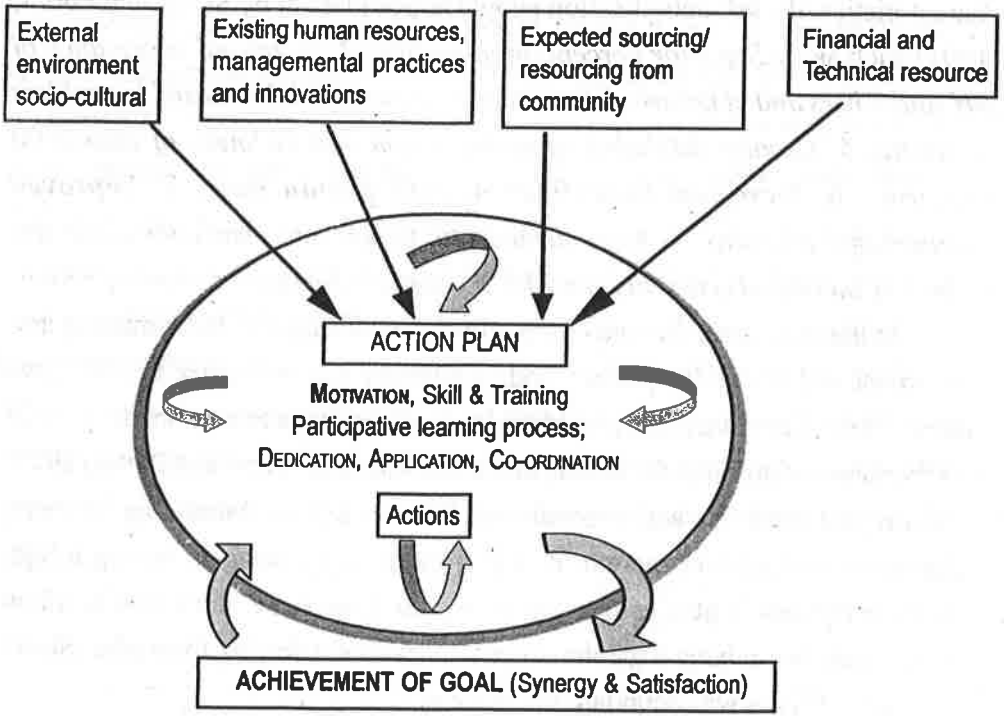

Figure 5. *Representation of relational aspect in Planning, Motivation, Action and Achievement.*

In the cited case we can see the needs as motivating factors in different strata of actors. Physiological needs (to get cured of blindness and the urge to see again by patients). Security needs from cost, care and post operative dimension by patients and family members. Overall, social needs in the programme objective, performance of the group, response from the public and general response in the turnout. Abundance of esteem needs by people, professionals and all. The aspects of aesthetics and cognitive capacities and

self-actualisation shown by the administrator, professionals, people, traders, NGO; and some individuals possibly of Transcendence. It may be of relevance that the state co-ordinator and the secretary being woman and highly motivated persons and other lady nursing staffs involved must have accentuated the cause. Organisationally the formation of society itself was need driven; so was the need for better esteem for the administration in general. Besides, we can see the sprinkle of process approach of expectation and from management point of view Mc-Gregor's theory 'X' and 'Y' operating in subtle manner. In the cited case individuals showed to a varying degree some aspects of characteristics of a self actualisation people as pointed out by Steers and Porter, (1991) such as : *1.Superior perception of reality ; 2. Increased acceptance of self, and others and of nature; 3.Increased spontaneity; 4.Increased in problem centering; 5. Greater freshness of appreciation and richness of emotional reaction ; 6. Increased identification with human race; 7. Improved interpersonal relations; 8. More democratic values and character structure; 9. Greatly increased creativity; and 10. A carefully designed system of values.*

In the cited case, the two characteristics which appears to be missing are- detachment and desire for privacy and autonomy and resistance to restrictive cultural norms. These are mostly highly individualistic characteristic not compatible with the nature of goal and the setting in the referred case. Steers and Porter (1975) mentions that need for achievement can influence the relationship between performance and job satisfaction. It is also found that managers having a high need for achievement also tend to be more participative, i.e., they tend to allow their subordinates to have a greater voice in decisions affecting their jobs (Steers and Porter, 1977) as was abundant in this case.

Mc Dougall and Solomon (cited: Lawson, K. Savery, 1996) suggested seven (7) working conditions positively associated with the job satisfaction which were also applicable in the stated case : *1. Mentally challenging work (with which individuals can cope); 2. Personal interest in the work itself; 3. Work which are not too tiring physically; 4. Rewards for performance in line with personal aspirations that is just and understood; 5. Working conditions which are compatible with the individual's physic needs and work goals; 6. High esteem on the part of the employee; 7. Help in attaining interesting work, pay and promotions in minimising role conflict and ambiguity.*

In a case study of NTPC, India ,Shahi (1989) mentions top five (5) motivating factors across the levels as : *a. sense of achievement; b. greater responsibility; c. avenue for growth; d. Recognition for good work; e. autonomy and freedom in work in varying level of hierarchy in the organisation.*

This order was reflected in middle and higher managerial levels though lower levels also reflected it but not in the same order. Most of these can be seen to be echoing the same in the stated case, which lead to the success in achievement.

Zender (1971, Cited Mehta, P.1994) mentions that the tendency for group achievement is similar to that of individual achievement-and members are concerned with group outcome for personal satisfaction. Members in the cited case showed strong commitment for group outcome and derived personal satisfaction from contributions of others too in a synergistic manner.It was seen that as a group everyone found his or her island of roles besides contributing to achieve the collective objective. De Tocqueville, (cited Whyte,Jr.W.H., 1989) mentions *'the more equal social conditions become.... the more men display this reciprocal deposition to oblige each other.'* Further, Whyte, Jr. (1989), mentions that '*people co-operate for substantive reasons- to achieve certain goals, and unless these are comprehended, the little manipulations for morale, team spirit and such are fruitless'*. Thus in sustaining the programme in the case cited, individual's appreciation and grasp of situation must have been the key factor.

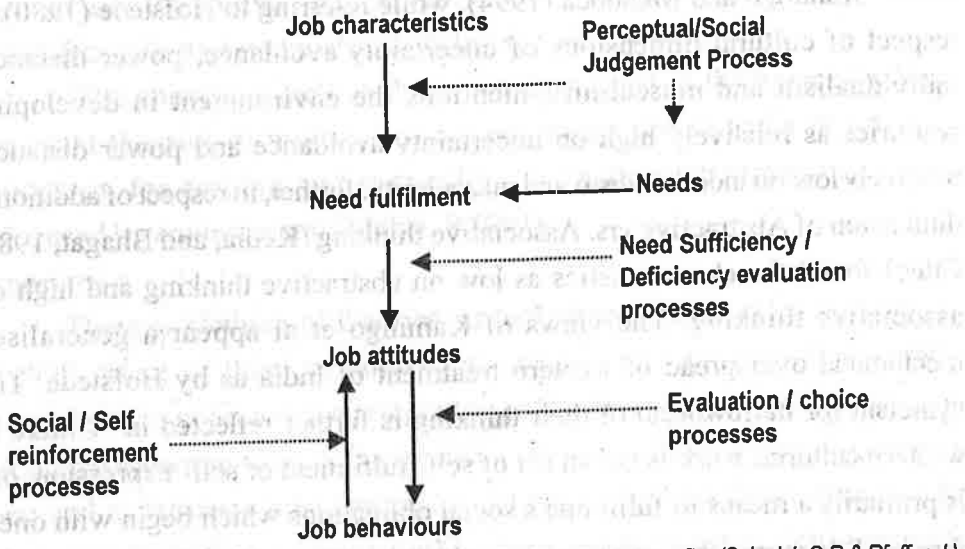

Figure 6. *A Need-satisfaction model of jobs, needs, attitudes, and behaviours after (Salanick,G.R & Pfeffer, J.).*

Mehta (1976) mentions that working people tended to show strong concern for collective goals of social achievement in ' action projects'. 'In such cases leadership quality imbued expressed significantly greater concerns for social achievement... they also showed greater democratic tendency for collaborative and co-operative action' (Mehta, P.1977). According to Mehta, social achievement is different from the *n.* achievement of Mc Clelland, as it encompasses ' the improvement of conditions and quality of life for the group or society to which one belong' against the individual focus in *n,* achievement. Bandura, (1977,1982, cited Mehta, P. 1994) has indicated 'efficacy expectation' and 'outcome expectation' and combination of these in 4 (four) behavioural situations-

Personal efficacy	Outcome expectation	Resultant behaviour
High	Low	Engage in Social activism
High	High	Work within the system to achieve their goals
Low	High	Feel inferior and despondent
Low	Low	Resigned and apathetic

According to Dreze and Sen, (1989 cited Mehta, P.1994) ***"concern with the lives of others is clearly a crucial ingredient of public action".*** Enlightened and committed field functionaries and organisers help initiate the process of empowerment of the poor and public has to be seen as an agent and not merely as patient (Dreze, & Sen, cited).

Kanungo and Mendoca (1994), while referring to Hofstede (1980) in respect of cultural dimensions of uncertainty avoidance, power distance, individualism and masculinity, mentions the environment in developing countries as relatively high on uncertainty avoidance and power distance; relatively low on individualism and masculinity; further, in respect of additional dimension of Abstractive vrs. Associative thinking (Kedia, and Bhagat, 1988, Cited) found the characteristics as low on abstractive thinking and high on associative thinking. The views of Kanungo et al appear a generalised mechanical overspread of western treatment of India as by Hofstede. The cynicism (or narrowness) of their thinking is further reflected in "Unlike in western cultures, work is not an act of self- fulfilment or self- expression, but is primarily a means to fulfil one's social obligations which begin with one's family..." It seems that in their over generalisation of the characteristics of

developing countries, Kanungo has totally missed the essence of 'Karma yoga' and has isolated one thread of the weaving to depict Indian culture and misinterpreted it. 'Everyone must engage in some sort of activity in this material world. But actions can either bind one to this world or liberate one from it. By acting for the pleasure of the supreme, without selfish motives, one can be liberated from the law of Karma (actions and reactions) and attain transcendental knowledge of self and the Supreme (Chapter 3-essence- Bhagwad Gita as it is). Sinha, D. And Tripathy, R.C. (1994) mentions in this context 'when a whole culture or society is pigeonholed in dichotomous categories such as masculine / feminine, active / passive, or loose/ tight, subtle differences and qualitative nuances that may be more characteristic of these social entities are glossed over'. Further, the authors describe that both individualistic and collectivist orientation may co-exist within individuals and cultures in particular reference to Indian situation. They mention Indian Psyche as a) highly complex- display high 'tolerance of distance'; and b) Indian selfhood is so constituted as to react highly in contextual manner. They further elaborate the distinction with the western mind "in the way boundaries are laid that define mental structures. In the western mind boundaries appear to be more stable and fixed-self and environment, mind and matter, subjective and objective, material and spiritual... *The Indian mind... is governed by boundaries that are constantly shifting and variable. The self sometimes expands to fuse with the cosmos, but at another it may completely withdraw itself from it* .The self and in-group have variable boundaries. The self does not relate to the in-group but is included in it. In western mind such dichotomies are complete."

'The concept of self as the originating agent is the basis of several important theories of motivation; human beings desire to be effective in motivation for seeking and responding to challenges, however, is also influenced by environment' (Mehta, P.1994).

Summary :

There is plethora of theories on motivation- 32 as listed by Ford, E, M.1992. Most of them as pointed out rightly by him do not provide a comprehensive cohesion and integration in the field. Various schools such as a. Rational economic man; b. Social man, c. Self actualisation man; d. Complex man; and e. Japanese man and pursuit of excellence has been classified by Schein (1965). **In the case cited, besides applying the need theory, a sprinkle**

of other models, efficacy theory and expectancy theory has been mentioned in its interpretations. Cultural application and dimensions has also been dealt to show assumptions, attitudes, personal beliefs and aspirations, interpersonal relationships and social structure which may play a great role (Skinner, 1964) in forming the underlying conditions. Motivation, skill, and other factors do interplay as intermediate conditions in order to give expression to the immediate conditions in the form of achievement, satisfaction and involvement in social actions.

The case cited illustrated the various need aspects in social action programmes. It also brought out synergy in collective action in collectivist environment providing enriching cultural media for growth and achievement of potentials. It also depicts that even within a so called bureaucratic set-up, the search for public service and social responsibility do find its expressions in actions and innovations, for and by men, which gets accentuated with peoples participation. However, this is more reflective of benevolent democratic set-up where the search for excellence transforms and expresses in reality with the continuous learning process in search and attainment of human rights, empowerment, truth, justice and equity and such higher human endeavour as one is potent to achieve. Value systems reflecting the knowledge and aesthetics provide encouragement for self-actualisation and transcendental sojourn in highly perceptible and responsive intelligent individuals.

Conclusion:

Of all these theories, The Need theory provides most cogent explanation to the basic foundation and aspects of motivation. If the need as classified and expanded by Maslow and modified by others are further expanded to mean urge, drive, expectation and is co-related to rational organism like humans, it may find the core content of motivation to follow as such. Such core content when related to the environment for providing context in the churning mill of socio-cultural milieu would find the various meaning and interpretations of Motivation (as covert part) and expressions in actions as behaviour (obvert part). It is relevant not to mix motivation with behaviour which may be expressions of 'other determinants including motivation'

(Maslow,
manifesta

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Dimensions in Development : Topical Discussions

It is a pursuit of Development Studies. The materials presented in the book were prepared by Dr Shreeranjan in 1998-99 during his stay in the University of Manchester, Manchester, U.K. as a visiting scholar. Each chapter is self contained and suggestive in nature in the preparation of rural plan project. It raises basic debate of top down or bottom up approach. Here lies the main philosophy of rural construction which is a continuous process.

The planner and the people concerned must have a clear vision of social and economic philosophy and content of the programme for equitable development of the community in rural North East India to avoid the widening disparity between the rich and the poor. This book is an important contribution to the study of rural development mechanism programme for economically backward groups anywhere. It is innovative in its approach.

The author, Dr. Shreeranjan, is a member of the Assam - Meghalaya cadre of the Indian Administrative Service (IAS). The author has served the cadre in the state of Meghalaya with distinction and dedication for more than eighteen years. Before joining the administrative service, the author was a lecturer in Ranchi University (now in Jharkhand). The author was also awarded the degree of doctor of philosophy (Ph.D) from the Department of Biotechnology, Gauhati University, Guwahati, Assam, India, in 2004.

North East India Council for Social Sciences Research (N.E.I.C.S.S.R.) is a highly scholastic body devoted to the cause of development studies of Northeastern India and has organised various conferences, seminars, workshops on contemporary and relevant topics. NEICSSR has continuously been publishing a journal since 1974. It has also published more than 60 (sixty) books. Prof. B. Datta Ray is the Founder Secretary of this organisation.

I . Project Approaches, Evaluation and Project Planning Matrix

Development is 'liberation of human potentialities (Gyu Gran, 1988). The process to attain such liberation is attempted to be understood by Man ('a rational animal') through both deductive and inductive logic. Further, this rationality (logic) of understanding development needs explanation sometimes in terms of a measurement. Alas, the nouns so commonly flaunted in the field of development (Sustainability, Empowerment, Equity, Participation etc) can be uncountable (or even unaccountable) or difficult to measure.

The pursuit of development is conceptualised and consolidated in the form of Project. Since 1980s, planned development has witnessed shifts in project concerns (Mosse, Farrington, and Rew, 1998): -

1 from technology led to sectoral and cross sectoral issues
2 from project centred to organisation centred concerns,
3 from externally planned, technically and managerially prescriptive (blueprint approach) to more flexible, iterative process approach in which neither means nor ends can be fully known in advance (Uphoff,1992, cited)
4 from centralised top-down to decentralised, participatory, bottom up approach.

Project is required to be funded; it is an investment of resources (both human and capital) for bringing desired change (objective) over a specified time period. The money-minded world must measure it; how much, why, what for, for whom, in how much time, to what avail and how much returns are some of the questions which need to be answered before, during and after the investment of resources in order to seek 'value for money' invested. It again impinges the grey area of 'value'. Indeed, the value varies with value systems. Is the logic transcending Philosophy; or is it Sociology; or Economics- may be a bit of all with topping of Anthropology as it concerns humans. But, how much of each? The question lingers, the debate is carried forward – development and its study also becomes 'a continuous learning process'. 'The sequence of transformation process from Resources-to-Goods and Services-to-Local action-to-Welfare and Capacity' has to be on sustainable basis (Honadle

and Cooper, 1990) in order to fit in the Mill's concept of governance 'towards democratic Participation and Efficiency (Carley, M and Christie, I.1992). Be that so, the rigour of drill, and range of economics must be arranged objectively and scientifically with tempering by values of value systems and expressed in the phase of project cycle.' This expression comes out in the end-phase (time-wise and figuratively) of project namely during Evaluation in: -

a building the local knowledge repositories to support sustainable development, and

b the inclusion of information about the degree and type of project contributors to sustained, self initiated, complementary development action' (Honadle and Cooper, 1990).

The following 3 topical essays attempt to examine the pros and cons of approaches in Project Cycle and good practices in evaluation in a theoretical frame and perspective. Treatments have been downscaled to fit the objectives of this topical discussions. An example of a hypothetical contextual Project Planning Matrix (log-frame) has been provided followed by a project advisory note to encapsulate some dimensions of project formulation and implementation. These are relevent in some way in contemporary design features of development projects.

PROJECT PLANNING CYCLE:
BLUEPRINT VS. PROCESS APPROACH

1. INTRODUCTION: The concept of Development has been the main concern and endeavour of the world in the last 50 years.The 1960s and 1970s saw consolidation and conflicts in world order. Failures of the 1980s have seen a growing disparity in the world economic development. The shift in policy leading to structural adjustment and withdrawal of subsidies and support system, exposed the weaknesses of developmental regime and brought to the fore the significance of non- economic issues in development such as environment, gender and community aspects for sustainability. 'The emergent paradigm for human living on and with Earth brings decentralisation, democracy, and diversity; reductionism and linear thinking give way to an inclusive holism, open systems and diverse options and actions' (Chambers, R.1997).

In planning the developmental goal, project becomes a means for bringing about supplemental and incremental change in economy and in society. Two primary concerns in this respect have surfaced in recent years . The first deals with the an understanding of the complexity and unpredictability of planned development. The second looks to find ways in which project managers can deal with social relationships keeping in mind the institutional context in which they operate (David Mosse, 1998).

2. THE PROJECT CONCEPT: Project can be defined as *"A discrete package of investments, inputs and activities designed to remove or alleviate various developmental constraints in order to achieve one or more outputs/ benefits in terms of increasing productivity and improving the quality of a group of a target beneficiaries over a given time-span i.e. it is time bound."(*J. Mullen's handout, 1998 .IDPM) Franks and Cussworth define it *as -" A project is the investment of capital in a time- bound intervention to create productive assets" and elaborated capital as both human and physical; and assets as human, institutional or physical.* The definition given by BSI and by Rodney Turner is also relevant. Project is thus a holistic expression of interactions and interdependencies that exist in socio- cultural, economic, technological, spatial,

organisational, and managerial milieu pertinent to development administration. 'It is only at the project level- and through this medium alone that the development comes to terms with reality' (Mullen and Sen, IDPM handout). Through project design the innateness of society, locality, polity, potentialities, and policies reflect themselves.In order to sustain the process of development, the project design must capture the context, referred to, as "medium". Rondinelli (1983) termed development projects as policy experiments, which can survive and express on the efficacy of such a medium. Once conceptualised, the project lives its life as a living organism, in such a medium (Mullen and Sen, IDPM handout); reacting, interacting and effecting change in achieving its objectives. Like an organism, project is in constant interaction with the internal and external environment, both affecting each other.

3. PROJECT CYCLE And APPROACHES: Project has a clear objective. There also exists organisation, collaboration and a team of people. An investment is made and a time scale is fixed taking into account the attendant risks and uncertainties; which results in effecting a change .The logical lay out of sequential steps involved in the phasing and planning of project has unfolded in the concept of project cycle. Two main source of project cycle emerge-1. Baum (1982) in cyclic form (figure 2) and, 2. UNIDO (1979)(figure 2.) in linear form. There are 5 stages in Baum's project cycle-1.Project Identification,2.Project preparation and Selection, 3.Project Appraisal and Approval,4. Project Implementation and Supervision, and 5. Project Evaluation as stages in project cycle.

The UNIDO version has separated Approval as a separate step and inserted Negotiation before it. Cussworth and Franks (1993) modified both the versions and listed 1.Identification2 Formulation, 3.Implementation, 4. Commissioning, 5.Operation and Evaluation.

Mullen and Sen (IDPM handout, 1998) has modified Baum's cyle (figure 2). The levels of analysis involved and the stages of project planning (J.Mullen handout) clearly depicts the intricacies and iterative aspects of project planning and project cycle in brief . In recent days as various activities overlap and reinforce the stages of outline design, appraisal, and detailed design have been termed as Formulation.

Project Cycle	Activities	Documents available to the public
Identification	JOINT BORROWER/BANK INVOLVEMENT - Sources of Project Ideas - Bank/Economic work - Prior Projects - Other Agencies - Initial Summary of Project approved by country department	*Project Information Document (PID)*
Preparation	RESPONSIBILITY OF BORROWER - Technical/Financial assistance available from - Borrower, Bank, Other agencies - Studies (Technical, Economic, Institutional & Financial) - Study of impact on environment - Project summary revised by the Bank	*Technical Information* *Environment Assessment (EA)* *Revised PID*
Appraisal	RESPONSIBILITY OF BANK - Evaluation of project viability - Economic, Technical, Institutional, Financial & Environmental appraisal	
Negotiations	JOINT BORROWER/BANK INVOLVEMENT - Borrower reviews final documents - Terms and conditions of loans agreed	
Approval	- Board of Directors of the Bank approves the loan - Signing of loan agreement by both parties	*Staff Appraisal Report (SAR); or Technical Annexe (TA)*
Implementation / Supervision	- Loan declared ready for disbursement - Implementation by borrower - Supervision by Bank	*Legal Agreement*
Ex-post Evaluation	- Completion and Audit reports - Analysis used for future project design	*Impact studies*

Figure 1 - Project Cycle : UNIDO, 1979 (source IDPM handout)

"The different stages in the cycle are interlinked and have multitrak timeline; and through its cycle a project continuously refines itself, in search of a true definition, through continuous evaluation of its performance, alternating between feedbacks and feedforwards"(Mullen and Sen, IDPM handout). A person engaged in a project has to be conscious of its dynamism and interactions both at the Content (the "what" of the plan) and Process level (the "how "of the plan). In evolving the design of project cycle, environment in its real and metaphorical sense plays an important interactive role.

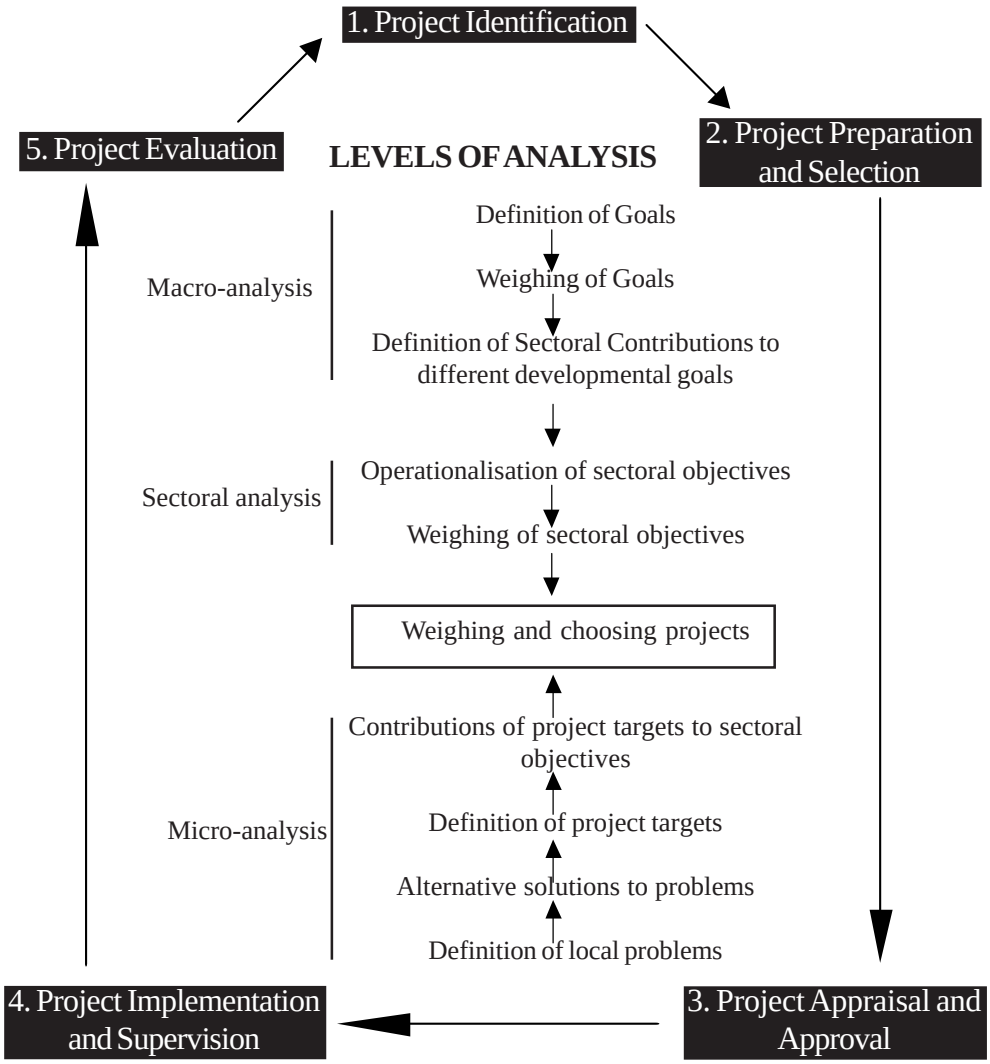

Figure 2: The Project Cycle (Baum, 1982; modified Mullen & Sen - IDPM handout)

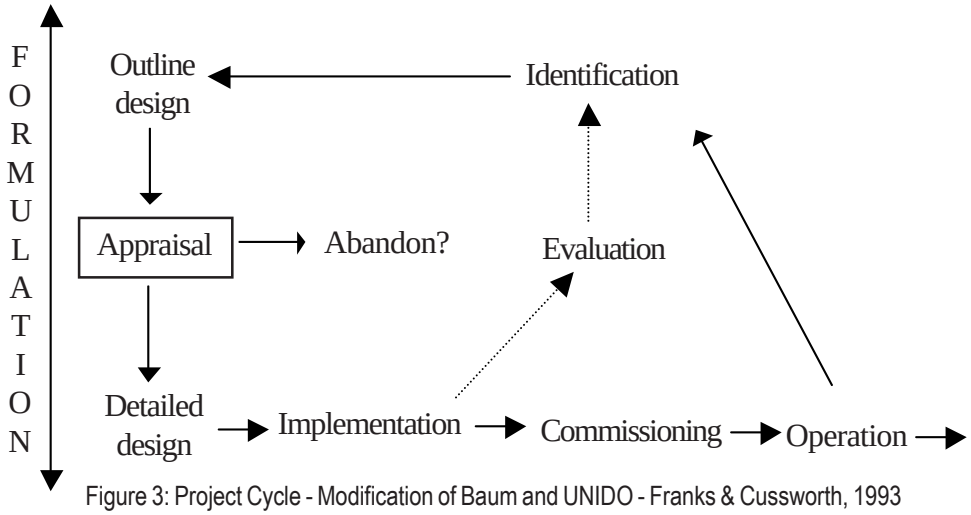

Figure 3: Project Cycle - Modification of Baum and UNIDO - Franks & Cussworth, 1993

Planning has been an effective tool in both local and global strategies. Hence more and more players driven by their own concerns of historical, geopolitical, humanitarian, economic and other contexts have entered into developmental ventures of bilateral, unilateral, and multilateral aid regimes, with or without conditionalities and understanding of realities that unfold. "Planning will have a major part to play in rectifying the unsatisfactory conditions of many rural communities"(Cairncross et. al.1980, cited by Ole Thirkildsen, 1988). However, the problem arises in consideration and adoption of different approaches. The conventional approach is typified by the **Blueprint approach**, having a clear objective, detialed pre-implementation planning and adherence to a chartered and laid out course; and, a new process to decipher the expression of meaning of development through project, represented by **Process approach** being less rigid, more amenable, flexible and interactive.

Project Task	Environment	Design of Project Cycle
Known	Stable and predictable	Simple
Unknown	Stable and predictable	Less simple
Known	Unstable and unpredictable	Complex
Unknown	Unstable and unpredictable	More complex

Figure 4: Project task, environment and design (Ita. O' Donovan, 1997)

3A. Blueprint Approach: The general concept of the project taken up within the notion of the project cycle has been referred to as Blueprint approach (analogous to engineering designs and drawings). It represents a rigid model of Project conception, Appraisal, Sanction, Implementation, completion and Operation and is linked with time (schedule) and money. It also indicates systematic and careful planning in advance to be strictly implemented according to the plan (Franks and Cussworth,1993). The project parameters are specified in terms of a Project Execution plan (PEP)- a route map for the project covering the strategies, organisation, control procedures, responsibilities and relationship between the investor and the beneficiary.

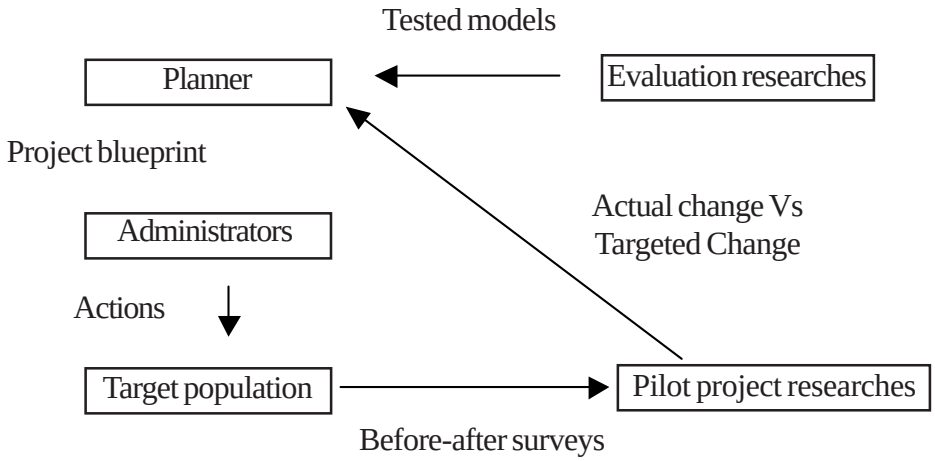

Figure 5: The Blueprint Approach to Development Programming (Korten 1980)

Characteristics of Blue Print Approach:

·The focal point being, the Plan itself (Faludi,1973-quoted-Ole therkildsen,1988);

·Focus on project preparation prior to implementation; typically detailing -objectives, targets, outputs, predetermined timeframe, level of resources required and an implementation schedule(Korten,1980);

·A blueprint for designed-in advance solution to the problem identified. (Brinkerhoff & Ingle, 1989).

·It is strongly oriented towards 'structure' and 'control' to enable managers to make; minor adjustments in the course of implementation to maintain projects on target;

·Researchers are supposed to provide data from pilot projects and other studies,

which allows planners to chose the most cost effective project design and to reduce it to a blue print for action (Korten, 1980).

·Centralised decision- making; Donor driven; Top- down.

·Gaps between what is planned and what is actually produced seen as requiring corrections (Honadale & Rosengard, 1983; Rondinelli, 1983, Stout, 1980, quoted-Brinkerhoff and Ingle).

·An evaluation study to assess the extent of achievement of target and deviations is used for revision of blueprint at the end or in between, of the project cycle (Korten, 1980).

·The relationship between donor and recipient is of classical contract type.

·The role of beneficiary is limited and prescribed.

Advantages of Blue print approach

- The blueprint approach has methodical and objective advantages in projects relating to large infrastructure, capital intensive projects (Frank & Cussworth, 1993), for example, industrial plants and construction where it is still a dominant approach.
- It has a long operational history (Ita O'Donovan, 1997) and is a Dominant approach in development concept so far where experts, technicians, and auditors feel at ease.
- It has clearly laid down objectives, inputs, activities, costs and timeframes. Hence, the confusion in execution is minimised.
- The approach is oriented towards analysis, planning and specificity with the objective of efficient and effective attainment of pre-stated goals and targets. Brinkerhoff & Ingle has mentioned that it has a short-term emphasis.
- The product achieved is a visible structure or a 'thing' (Chambers 1997).
- It meets the requirement of timeframe, budget control and regulations. It emphasises on procedure and process of bureaucracy such as audit and evaluation.
- In its application to infrastructural projects, risks are identifiable or describable.
- It has a formal leadership, clear line of authority and division of labour.
- Communication within the organisation involved in the project is imperative.
- In purist form donor/investor is owner and controller.
- In its problem solving it is pro-active and curative rather then leaving it to 'other forces'.

- There is no long-term stake of the donor/ agency; in case of investor reasonable pre-mediation takes place to maximise profit.
- In its stages accountability can be fixed/determined.
- Relatively straightforward and structured design (Eyben, R., 1991).

Comments:

With the changing perception and direction of development in the world order directing the need to re-orient the developmental projects closer to the people and treating beneficiaries as the 'first client' (Mullen, IFAD document); decentralisation and participation has attained a centre stage. Apparently the blue print model shows chinks in its armour. During the 1970s and the 1980s experiences gained from developing countries becoming available, views emerged that the blue print approach of project planning does not achieve 'fit' and is an 'inadequate response to the rural development problems' (Korten 1980). The findings of Ole Therkildsen, in studies of donors funded (Denmark, Holland, Finland, Sweden and World Bank) planning and implementation of rural water supplies in Tanzania brought out that control-oriented programme with the features of a) Focus on medium and long term construction targets, b) detailed pre-implementation planning, c) prior collection of data for specific plans, d) specification in plans on the role of beneficiary and e) bypassing of recipient national, regional and district level organisation by technical assistance team, resulted in failures and unsustainable development. The study revealed that in control-oriented planning and implementation (Read Blueprint Approach) problems arise owing to five wrong assumptions, which do not fully or partially hold:

i. Beneficiaries share the objective and are committed.

ii. Assumption of the existence of powerful decision making and authoritative and compliance enforcing agency.

iii. Pre-determined plans presupposing future of the economy, the stable politico-institutional conditions; knowledge and operational information.

iv. Less thrust on participation – supply driven top down approach and assumed user acceptance, resource commitment and mobilisation.

v. Bypassing local institution.

It was also revealed that the control oriented approach itself was at fault and the negative impact has been amplified by economic conditions in Tanzania. Korten(1980), termed "blueprint approach more a hindrance than aid" in programming of rural development action where the need is adaptive, bottom up. The blueprint approach is considered as rigid, with too much reliance on prior and comprehensive data gathering, meticulous planning and controls acting in vicious circle.

'Ideas change or new ideas gain wider currency when the existing dominant ideas do not appear to explain insistent problems which require resolution.'(Kuhn1970; Hunt1989, cited, Franks & Cussworth, 1993) Two insistent problems in respect of project and its management have been 1.the problem of estimated delivery of benefits to concerned beneficiaries, and 2.the sustainability of the project beyond its estimated life.

ODA's post evaluation tryst of Evaluation process and perspective derived from experiences within and outside, brought the following home:

- Project appraisals have been too optimistic about project costs.
- Desire to engage in policy area rushed the sectoral analysis and project preparation time
- Project were schedule driven, thereby impeding the learning process
- Consultants sometimes get too involved in project development
- Improved project procedures could deal with most of the above concerns (Ita O' Donovan,1997).

3B. The (Learning) Process Approach: In response to the failures of blueprint approach to achieve 'fit' in rural developmental context, an alternative was developed called process mode (Sweet & Weisel, 1979 cited Brinkerhoff & Ingle,1989).Study of five successful cases of participatory form of development in Asia viz. N.D.D.B.(National Dairy Development Board, India) ,C.B.F.P.S.(community based family planning services); B.R.A.C.(Bangladesh rural advancement committee, S.S.M.(Sarvodaya shramdan movement ,Srilanka) and N.I.A.P.(Pakistan) –indicated

bottom-up, capacity building process on first hand knowledge coupled with leadership and teamwork (Korten ,1980).

The word 'process' is three dimensionally linked to developmental projects- 1.Learning process as contrasted to blueprint, 2.Process, referring to relationship and contextual reference, and 3. Process-refers to dynamic, unpredictable, and idiosyncratic elements in development programme (David Mosse, 1998).

Ita O' Donovon ,1997, mentioned four essential requirement for the process approach to projects:

1. Clear specification of the totality of project: project framework;
2. Participation, commitment, ownership, learning among and between different stake holders;
3. To get things done- action on the ground; flexible response from ODA's (donors) procedures, and
4. To manage the project effectively and efficiently.

Characteristics

a) Precise outputs, immediate objectives and how to achieve them with overall objectives are not defined over the entire duration of the project but are instead revised and developed as the project proceeds.

b) Local participants play key roles in the design, appraisal and implementation of the project; sometimes the roles and degree of commitment of local participants cannot be gauged until the project is underway (a,b- ODA – HMSO – 1995; R.Eyben, 1991).

c) Identification, appraisal, design, implementation, monitoring and evaluation becomes more interwoven.

d) Continual information is gathered over a period of programme work. Project cycle is seen as an iterative process (Mullen, J.).

e) Dynamism with relationships, transactions, decision making or conflicts and their resolution.

f) Inductive and open ended. Flexible design for adjustments, and a systematic feedback for evaluation and supervision activities (Mullen, J.).

g) Monitoring and research is situated outside project structures; not a substitute to other forms of monitoring, logical framework or stakeholders analysis but reinforces and help the concerns of developing the process (e to g – David Mosse, 1998).

h) Decentralised, people oriented, participatory, bottom up approach.

i) Leadership and good communication, supportive political climate emergence.

Advantages of Process Approach:

The characteristic itself throws up the benefit and advantage of the process approach more relevant to developmental projects.

1. General objective and direction of project intervention is broadly defined; provides flexibility in respect of design, specific action and services.
2. Operates simultaneously on several time horizons (Faludi, 1973); hence, suited to dynamic systems.
3. Multiple decision maker – bargains, adjustments, response to opportunities, information through a network of channels, continuous dialogue with beneficiaries enhances the capability of the approach.
4. It enables learning from errors and deviations ,hence providing opportunity to rectify the discripancies.
5. Good for long term policies and strategies (2-5 Ole Therkildsen, 1988).
6. Ownership, partnership and commitment from stakeholders becomes imperative leading to Institutonal development (Eyben,1991).
7. Joint learning process expected to build capacity and contribute to sustainability (5-7 Ita O' Donovan, 1997).
8. Achieves higher 'fit' in respect of rural development and beneficiary oriented projects (Korten, 1980).
9. Scope for more innovation and experimentation which encourages grass root wisdom and lateral thinking – emergence of new technologies, better design to do the project.
10. Working relationship between various actors are enhanced leading to evolution of a relational contract which results in a win-win situation between parties.

11. No fixed target and expectations.

12. Monitoring is action oriented and the entire approach relates to the present with focus on sustainability.

13. Provides good medium for growth of the project as a living organism.

14. Encourages the local community to think about problems, organise and work out solutions.(Eyben,1991)

15. Constant interaction between technical experts, developmental administrators and people.

16. With the involvement of people, there is pressure on policy shifts leading to more conducive and responsive political climate.

Comments

There could be criticism about the approach being vague, ill defined, time consuming, with too many stakeholders. The process projects of forestry schemes in India and land privatisation project in Russia indicate process approach being generalised, under examined and uncertain (Alan Rew & Angelica Brustinov, 1998). One criticism may also be that 'the process' may itself be hijacked by local elite/ mafia/ powerful (Blair 1978- Comilla Project, Bangladesh cited Guygran, 1983).

The importance of external ,internal and working relationships have emerged in the process approach.Both external and internal factors need to be addressed to facilitate development of the approach(Ita O' Donovan,1997)

Mullen, in 'New Operational Procedures for the project cycle' stresses the need for

1. A simpler and flexible selection.

2. Intense, participatory and cumulative approach to project formulation, and

3. Appraisal-is the shape of focussed, use of log frame, innovative, strategic and adaptive of other tools in the development of the project cycle.

4. Search for a Middle Path

In continuous search for alternatives it will be imprudent to consider that blue print and process approach emerge as clear alternatives. In practice, projects may be a mixture of the two (R. Eyben 1991). In such cases it would be necessary to provide linkages.

Brinkerhoff and Ingle,1989 have attempted 'integrating blue print and process approaches as – **Structured Flexibility Approach**'. The approach takes the essence of both the blue print approach in its analysis, planning and specificity, as well as the flexibility of the process model with participation and stress on social aspects. Its structural skeleton consists of **five inter related elements:** a) Management improvement conceptual framework, b) Reconnaissance/Analysis of organisation and external environments, c) Detailed design of a solution to the problem, d) Implementation of design, and e) continuous monitoring and feed back leading to redesign and adaptation.

Brinkerhoff and Ingle have dealt with the comparison of three approaches in detail, which are avilable for reference. However, the approach works when : 1) facilitative conditions are in place, 2) Incentives to play critical role in promoting changes exist and 3) Management as set of activities leads to creating performance capacity. Further ,a caveat has been given that the approach takes too much time and personnel; institutional development agenda and complexity of participation increases vulnerability and may cause delay in the project. The cost effectiveness is also open-ended. However, the same can also be ascribed by sceptics to the process approach.

Adaptive Approach

Rondinelli, 1983 made successive stages of experimentation, pilot, demonstration, replication or production as distinct stages of development projects. As particular methods are found to be successful on experimental scale, wider coverage is attempted through pilot and comprehensively extended to reach a greater number of beneficiaries. More cautious and gradual approach can be assimilated with iterative aspect and learning in the process approach.

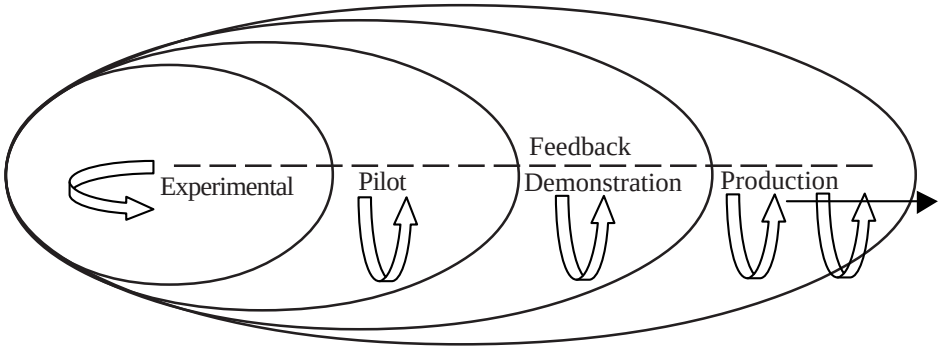

Figure 6: The Adaptive Approach (Rondinelli 1983; Source: Franks & Cissworth 1993)

Learning Process Approach

Korten, 1980 having studied five success stories of Asia indicated in the opening remarks, of process approach , has detailed three stages: 1) Learning to be effective, 2) Learning to be efficient and 3) Learning to expand. There is distinct emphasis on bureaucratic re-orientation. There are various views, which indicate that, *learning process and adaptive approach is the progenitor of process approach.*

Logical Framework Approach

The concept emerged in 1960s, with an effort to combine the aspects of both blue print and process approach. Despite being in use by UK's ODA/DIFID, the criticism is that it is more biased towards the blue print approach (Steve Wiggings & Demot Shields, 1995). Coleman (1987) has termed the approach as an 'aid to thinking' rather than a set of procedures and mentions that it should be utilised as such.

Narrative Summary	Objectively verifiable indicators	Means of verification	Important Assumptions
GOAL	Measures of goal achievement	Sources of information methods used	Assumptions affecting purpose-goal linkage
PURPOSE	End of project status	Sources of information methods used	Assumptions affecting output-purpose linkage
OUTPUTS	Magnitudes of outputsPlanned completion date	Sources of information methods used	Assumptions affecting inputs-Outputs linkage
INPUTS	Nature and level of resources necessaryCost Planned starting date	Sources of information	Initial assumptions about the project

Figure 7: Logical Framework Matrix; (Gilroy Coleman, 1987)

Summary & Conclusion:

"In development thinking, paradigms tend to co- exist, overlap, coalesce and separate. Arguably, the big shift of the past decades has been from professional paradigm centered on 'Things' to one centered on 'People'(R. Chambers, 1995).

Blueprint approach has its methodical advantage in the spheres of construction, large infrastructure(thing), whereas the process approach transcends the permeability of project in its interactions with all that concerns and affect people ,including "thing". It is clear that the process approach is most suited to the developmental projects relating to the people.

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MAJOR CHARACTERISTICS OF GOOD PRACTICES IN EVALUATION SYSTEM

Definition and Dimensions: Evaluation, unlike Monitoring which in essence is the continuous managemental internal assessment/ review of the implementation, attempts to assess value or worth, and 'is a discontinuous function, concerned with ascertaining the degree to which objectives have been achieved through the activities' (Mullen, J., 1988). Carlson, Kohlin and Ekborn (1994 cited, R. Dale, 1998), consider it 'as an activity for finding out the value or result of something.....answer (ing) the information needs of various actors...'. UN ACC Task Force on R.D., 1984 defined Evaluation as a process for determining systematically and objectively, the relevance, efficiency, effectiveness, and impact of activities in the light of their objectives.'

Evaluation can be done, as considered necessary by the parties and exigencies of requirements: -

1. At the end of the project-
    a. Final or Terminal evaluation;
    b. Ex-post evaluation,
2. Mid-term (Ongoing) evaluation

1.a. **Terminal or Final evaluation** is done at the end of the project and within1-2 years of completion. The project is generally rated / compared in quantitative terms to assess effects and extent of attainment of the objective of the project.

1.b. **Ex-post evaluation** is done after 2-3 years of completion of the project and is comprehensive towards assessing, the extent of objective of the project attained, effects and impact of the project on its beneficiaries; level of participation in the project and community level organisation, leading to institutional development, performance of delivery system and organisation involved (Mullen, J.1988). It also looks into the aspects of sustainability and broader policy issue (Rubin, 1995). Base-line information prior to the implementation is a *priori*.

2. Mid-term or Ongoing evaluation is undertaken by an independent agency, during the implementation phase using information and output collected during monitoring. It is more extensive examining in detail and applying evaluation criteria to the project to ascertain the operational problems encountered, and the overall course of direction of project. It picks up any danger signal which might have been unnoticed during monitoring (Mullen, 1988). It reflects by pointing out for instance, that the activity was on time and/or within costs but planned effect has not appeared and desired impact may be otherwise/ or not achievable. In essence it provides feedback to point out change in the objective and lay down its prescriptions and proscriptions.

Dimensions in evaluation: Evaluation should be pragmatic, simple, useful, manageable, analysable and must address the basic purport, direction and needs. Role of funding agency (ies), relationships and control to assess dominance or keenness or genuineness in undertaking evaluation requires scrutiny. The focus of evaluation concentrates on the project outline and objective including underlying objective and may also include- a geographical area, groups of beneficiaries, types of activities and time period. Besides, evaluation also attempts to analyse effectiveness of a particular kind of activity over a group of projects all working in the same area to see how they interact with each other (Rubin, F.1995).

Schematic presentation of Evaluation of Rural Development projects: modified to include only Evaluation: is presented at figure 1.

Objective / Purpose of Evaluation: The purpose of evaluation is to assess and improve performance. There can be more than one reason to conduct evaluation such as to make choices and decisions, to learn, to assess, to increase accountability etc.It hinges upon appropriate indicators, methodologies both qualitative and quantitative, participatory process, role, position and assessment of the evaluator (Marsden, Oakley and Pratt, 1994). It must be ensured that there is harmony between design, purpose, uses and methodologies (Pratt and Lozois1993, cited). The two objectives of evaluation enlisted by Honadle and Cooper, 1990, mentioned in the Introductory Remarks can be achieved possibly by closing the learning loop by

PURPOSE	Monitoring Ongoing Evaluation Terminal and Ex-post Evaluation
BASIC PURPOSE	Determination of continuing relevance and present and likely future outputs; effectiveness and impact of an activity during implementation; major corrections, if required Assessment of the overall outputs, effects and impact and drawing lessons for future planning
SOURCES OF INFORMATION	In-depth studies; participation, Observation; sample survey; rapid reconnaissance. Socio-economic surveys
LOCATION OF M &E UNIT	Parent department/ministry and /or central planning agency (usually small and compact, but can be large and interdisciplinary for relatively large projects, depending on availability of resources for full fledged surveys, or assistance of external agencies or institutions may be secured)
REPORTING TO	Project management; policy makers; beneficiaries; funding agencies ditto-M&E may be independently carried out by beneficiaries and /or their representative bodies. (A good evaluation should encourage their participation)
MAIN FOCUS	Assessment of continuing validity and relevance of project/ programme design and targets and assessment of effects and review of cost effectiveness; target orientation. Maximum and long term objectives, differential effects and impacts on project beneficiaries (beneficiary orientation). Drawing lesson for the future on critical factors affecting success or failure of project or programme.
PERIODICITY	Concurrent. Baseline survey prior to or during first year of project implementation. Repeat surveys at mid-point, completion and full development of project (desirable annually or even seasonally with a limited number of key indicators)

Figure 1: Schematic presentation of Evaluation of Rural Development projects: modified to include only Evaluation: Source-UN ACC Task Force on R.D.1984, IDPM, handout by Mullen, J.

ensuring participation, cumulative and continuous linkage with knowledge, and action on continuum basis. Evaluation ,thus becomes a learning and empowering process in which institution building, negotiation and clarification of objective is important, (Marsden, Oakley and Pratt, 1994) and has to relate to economic, socio-cultural, political and organisational context. It would encompass all those having varying interests in the project, the actors involved in planning, implementation and operation of the project, stakeholders- beneficiaries, women and other vulnerable groups, the funding agencies, advisory units in an agency, individuals or groups carrying out similar work, government departments, and policy makers (Rubin, F.1995).

Major Concerns and Issues which needs addressing in the evaluation may be:-

- a consumer /user orientation;
- development of quality control measures;
- changing organisational requirements ;
- a balance between qualitative and quantitative measurement ;
- relevant ,timely and accurate information;
- setting clear objectives, achieving realistic targets; (above mostly from Marsden ,Oakley and Pratt,1994; Mullen, J. IDPM handout,1998) .
- seasonal and climatic factors , customary practices, cropping season , working habits
- anticipation of any key events of political, social, traditional and administrative kind (Rubin,F.1995) etc.

The Criteria (to be used) for evaluation: -- It is here that the characteristics unfold and show performance during formulation and operationalisation. It would address level of efficiency, effectiveness in the process and consequential impact of the project. The evaluation has to also address the external and internal factors and their causal relationship in effecting the outcome (Mullen, J 1988). Further it has to address the dimensions of relevance, replicability and concerns of sustainability. Besides, special performance issues and factors influencing performance will have to be addressed (Cassley and Kumar, 1987; cited Binnendijk, 1990). In negotiating the indicators, it is essential and desirable to have consensus with the stakeholders.

It is better to focus on critical indicators which decisively indicate change or interpretation of change. Some (Rubin, F.1995) have adopted and suggested ranking/ marking system in order to make it faster and rapid (Feinstein, N.O., 1993). There is always a tendency to incorporate too many and long list of indicators. In such eventualities there is either fatigue, ritualism or abandonment. The management of information system becomes a critical aspect.

Use of Information: Evaluation system generally uses 3 kinds of information (Mullen, 1988)-**1. Primary data**-such as field information on project progress available from monitoring, budgeting, reports, inspections etc,These may require modification at times to suit and conform to evaluation, **2.Secondary data**- from census office, statistical office, or other developmental monitoring office: these require to be checked regarding adequacy, timeliness and possible dis-aggregation; **3.Custom-made surveys**-to meet specific requirements of the project. The tools for such methodology can be *Logical- Framework* (Coleman, 1987) or *FRAMES* (Feinstein, N. O., 1993)or *Other kinds* which can be a P*articipatory Approach* (Uphoff, 1992, Chambers, 1994). The other format which deserves treatment can be questionnaire design, other methods of collecting information and data analysis (Mullen, 1989). Honadle and Cooper, 1990, have mentioned 'Workshop' as an effective but under-utilised tool for information system. The process of data collection, arrangements of indicators needs elaboration, specification, and overall harmonisation with the MIS. Detailed design requires to be put in place with a distinct idea whether this is to be done internally, externally, or both. It is important to ensure, only significant collection, analysis and reporting appropriate for the purpose is captured. The data coverage mode and modalities of presentation format needs to be evolved including cross checking the complementarities (Mullen, J. 1998, IDPM handout.) with the monitoring process. Analysis of Project Objectives, logical breakdown to disaggregate important inputs/ activities, outputs, effects/ impacts and assumptions and the causal relationship between input and output with dimensions of implementation and management. (Mullen, J. IDPM handout, 1998) comes out effectively in Logical Framework (Project Planning Matrix).

For example: -

Narrative Summary
GOAL
PURPOSE
OUTPUTS
INPUTS

Execution and choices of information methodologies: -The strategy and approach would conform to objectives, dimensions and modalities of the information

system towards agreed direction. The method could be time consuming and spread over a period of time or it could be snapshot/Rapid, and has to relate to the expectations of the stakeholders.

Quantitative and qualitative aspects (the variables)-

The quantitative aspect is verified on the basis of data collected in accordance with the predetermined indicators and has to relate to the information system of the project (Mullen, J. 1988). The relationship between the monetised output (effects and impact) in relation to the costs incurred in creating such outcomes discounting time-lags and shadow pricing for subsidies and inflation, is reflected in the Cost-Benefit analysis. This methodology is best for infrastructure and production promoting projects (Dale, R. 1998). Rossi and Freeman, (1993, cited Dale, R., 1998) mentions **5 means of assessing Cost-Effectiveness** (monetised benefits)-* direct measurement; *market valuation; *Hypothetical questions; *econometric estimation; and *observing political choices.

The qualitative aspect is much more difficult, but most essential and critical in developmental projects. The indicators and variables can be like in Human Development Report (UNDP) pertaining to living standard, education, literacy, health-care etc. There is a need to involve stakeholders for spelling assigning and sorting out indicators. These indicators can also be deciphered from the gap between effect and impact (Mullen, J.1989)of the project ; lesser the gap higher the efficiency and effectiveness of the project .

Finsterbusch and Wolf, 1977 have indicated impact on individuals, organisation and communities of the internal and external environmental aspect including the physical environment which can not be wished away. The World Bank guidelines on social aspects indicate socio-cultural and demographic character of the People, social organisation and their productive activities, acceptability of interventions, acceptable strategy and consideration for any special and vulnerable groups (Ingersoll, J.1990).

Core variables- These can be listed as- *efficiency;* effectiveness;*Relevance (complementary to efficiency and impact); * impacts; *sustainability; *replicability. Nerve-pulse regarding such variables can emerge from (Dale, R.1998):-experiences from the same type of development work in the same area or even elsewhere; -

experiences from other comparable types of development work in similar environment/setting; -some substantiated theoretical reasoning referable; relevance can compare similar interventions, or can see the overlaps; -long-term, indirect consequences. The aspect of sustainability would look into continued maintenance of physical facilities', constant use, ability to plan and manage similar works, continued production and outputs, cumulative accumulation and momentum gathering of impact resulting in multiplier effect (Dale, R. 1998). Replicability looks into wider application in similar or different context, and is not related to the evaluation, with the exception of the learning aspect for future use.

Participatory techniques: A variety of such tools and techniques have emerged. Some of them are -Rapid Rural Appraisal (RRA-Cernea, 1985), Participatory Learning Methods (PALM), Rapid Assessment Procedures (RAP), Rapid Rural System Analysis (RRSA), Agro-ecosystem Analysis (AEA), Participatory Rural

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Appraisal (PRA)(Chambers, 1994) etc. The above techniques employ drawing, flow charts, task actor role diagrams, aerial photographs, livelihood analysis – livelihood, food security, indebtedness; time-use analysis; mobility analysis; life-histories, personal life quality accounts; wealth grouping and ranking, group exploration of specific phenomena; looking towards future from group and individual angle. This approach incorporates Focussed group discussion and workshops etc. 'Evaluation is a form of enquiry where the end is information. Information is power and evaluation is powerful' (Search News April/June, 1991;Cited Marsden et. al.1994). Formal Social Surveys which can be structured , semi-structured or informal , depending on the wisdom and expertise of interviewer , require skill-impartation and ' modesty from the experts from the outset' (Uphoff, 1991). Uphoff has cited the example of Nepal (Rasuwa-Nuwakot development project), Ghana (Upper region agriculture development project) and Mexico (PIDER-1, 2, &3) to emphasise 'participatory necessity for efficiency, equity and empowerment ', but also cautioned against pseudo participation. Scoones and Thompson (1994) have summed-up the major frontiers for methodological development as - 1. A balanced marriage between quantitative and qualitative approach and appropriate criteria for trustworthiness for each. 2. to bring local level perspective into mainstream, and 3. the mode and method of empowerment. Unfortunately the valuation system of these broad aspects are divergent and the search for a fine marriage may be as elusive as of marriage itself , so long illusions remain regarding what constitutes mainstream, it will be illusionary.

Formal reporting- Observations; participant's observation; Technical method (GIS, Health indicators); methods for analysing information are compiled, presented, discussed and finalised and reported as feedback. Reflection on entire exercise before submission may be a good practice.

EXAMPLE: of an Evaluation scheme for a Regional Integrated Area Development Project, based on Village tract level programmes and projects (Source: Training Handbook on I.R.D. – J. Mullen, 1988 IDPM,)

Objectives-

1.Strengthen planning capacity at regional level.

2.Strengthen project implementation capacity.

3.Improve quality of life of the inhabitants at village tract level.

Information System: - basic ' blocks' of information relating to objectives.

1.A comprehensive Data Base: necessary to measure the impact of the project on the target population. Should relate to 3 distinct administrative levels. :-a. Village tract level-7 quality of life indicators ; b.District level- 23 economic, social, and ecological variables; c. Regional level-23 economic, social and ecological variables

2.Information on Project Implementation: -measure project inputs (financial, technical and human resources) and outputs against planned inputs and outputs and objective achievement. (can be provided by the technical personnel of ministries concerned)

3.Data Gathering by Following Methods: - special surveys; -observation; - regular reporting

Indicators
1. Per cap
2. Yield p
3. Percent
4. Rate of
5. Level o
6. Rate of
7. Percent

Figure 4: Quality of Life Indicators:

Key Social-economic and Ecological Variables

1. Total population 2. Male and female active population from 15-60 years old 3. Total population dispersed 4. Number Of households 5. Rate of infant mortality 6. Number of health centres 7. Number Of medical and paramedical personnel 8. Principal diseases registered and number of cases 9. Population with access to clean water supply 10. Rate of illiteracy 11. Number of schools 12. Number of pupils 13. Annual rainfall 14. Total area 15. Total cultivable area 16. Total area with irrigation facilities 17. Cropping pattern and output 18. Number of animals

and kinds 19. Number of people living on land without registered titles 20. Approximate income per household 21. Number of employed in off farm occupation 22. Number And frequency of markets 23. Number of Kms. All weather roads and rural feeder road etc.
(Glossary should define the terms used)

Summary

The Preparation of evaluation looks into conceptual framework, history, social, political, economic, organisational context, defining purpose and negotiation which is the most crucial aspect and where interplay of interests, sensitivities and sensibilities need to be appreciated, understood and incorporated. The Planning would go into the terms of reference, contents and context of T.O.R. which will detail purpose, ownership, use, objective, operationalisation based on logical-breakdown of objectives, and areas of concern. It would also detail the methodologies involved, skill required, formation and constitution of team, site visits, time-frame, budget, follow up and presentation etc. (mainly from Marsden et al 1994, Rubin, 1995.) Execution will operationalise the content and context of TOR and bring all minimum requisites into play. After analysis using appropriate tools,their will be presentation and submission of report with explicit findings and recommendation.

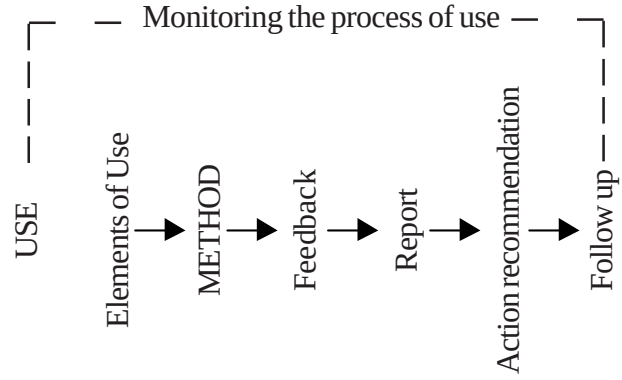

Figure 5: The Progress of EVALUATION (Source: Marsden, et.al.1994)

In general good practices in evaluation process will have following elements (partly from Marsden et. al. 1994): -

- Clarity of objective;
- User / Controller

- Focussed and Clarity
- Maximum degree of transparency
- Consultations; Participation; Communication
- Appropriate and suitable methodologies
- Logical sequence; Flexibility
- Anticipation of conflicts
- Suitable evaluation team
- Underlying assumptions specified
- Good and integrated information system
- Timely and periodic feedback
- Mechanism for using and receiving the feedback
- Various types of evaluation process
- Honesty (free from biases)

Thus the major characteristics of good practices in evaluation system would encompass:

- Evaluation as an integral part of development or change process-'reflection-action'
- An understanding of evaluation as 'empowering process';-enhancement of core skills; need to manage internal and external interface;
- Recognition of subjectivity in evaluation (and gradual move towards refinement);
- Recognition of accountability;
- Varying perceptions-negotiated, consensual, and recommendatory
- Technique-less formal; flexible, unstructured/ semi-structured and promoting/ encouraging/ catalysing/ evoking-Participation;
- Emphasis on social enquiry rather than economic measurements
- Evaluator as facilitator
- Importance of logical framework reflecting at any given time the current focus of the project (mostly from Rubin,F,1995)
- Need to clarify team-up approach to reflect the complexity of the project
- Evaluation to feed back into the project or future project or policy (Ita, O'

Donovon. 1998) ('M & E- has been slow to learn from its own experiences; Coleman,1992; also exemplified amply in Kenya's Portfolio review ,IFAD-IDPM handout-Mullen,J,1998)

Conclusion: There has been 'a new convergence of interests and approach between social research and development practice' (veneraction1989; Uphoff1992). Since the 1960s the concept of evaluation has seen changing methodologies and since the 1980s it is continuously under refinement. It would be inappropriate ' to treat the aspects of cultural identity and popular participation' (Norton, A cited Rew, A, 1996) as 'residual part of evaluation' (Meir et al 1994 cited Rew A, 1996). Logically gaps still remain-what value a value-system will attach to a particular benefit, gain or loss is highly contextual and may vary from case to case. Besides, the Ecology also manifests and expresses itself in a dynamic fashion making the measurement further notional. No wonder in such a dynamic situation, evaluation bocomes 'as much an art as a craft.' The process, therefore, has to ensure that it does not become 'extractive and stressful'. Good practice in evaluation would then become responsive and facilitative towards capacity and institution building underscoring prominently the participation and people-centred and 'process centred' shifts. This will enable the stakeholders and beneficiaries to dream and work together and infuse a process of symbiosis in functions. Such partnership has potential to energise the liberation of human potential.

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PROJECT PLANNING MATRIX (Logical Framework)

Project Title: Marketing and Processing Support to SM Group Members, Hypothetical settings: West Garo Hills, Meghalaya, India.
Hypothetical IFAD(International Funding And Development) Funding: Rs. 2.00 Million (est.). Dated: 3. 3. '99

Narrative Summary	Indicators (including means of verification)	External Factors (Assumptions)
1. Development Objective. Improved economic security and incomes of S.M.Group members through organised market orientation of produce and training.	-Increased income of poor farmers and youth; diversification of income sources, incidence of asset accumulation; -Improved general well-being; housing condition, level of consumption and items in food, dress and clothing of children and women, number of consumer items; -Higher level of Organisational group dynamism; knowledge and skills absorption; -Quarterly monitoring reports, baseline surveys, ongoing evaluation, supervision visits, Progress reports, Gross production (tonnes) in relation to area (ha), House roofing, savings, consumption expenditure, number of consumer durable. -Final impact study evaluation.	1.Continued political support for development reflected in particular in agricultural and industrial (Pricing, trade, and incentives) policy of commodities favour investment in agricultural activity. 2. Security situation in the state/ district remains normal and does not impede enterprises. 3. Environmental impact aspect of agricultural waste disposal is addressed sincerely and early. 4. Effective recycling of fund, servicing and broad-basing activity to micro-financing; thrift and credit society adopt banking professionalism rooted to farmers development.
2.Immediate objectives: 1.Better prices on produce to farmers. 2. Assured and secure market by organised and informed marketing of farmer's produce.	1.Comparision of prices and margin of profit prior and after; Savings generated and deposit in the credit and thrift institution. Higher product/produce quality, Baseline data, inspection reports, M&E reports, Society and Financial institutions ledger. Market	1.increased investment in the farming activity energised by incentives and pricing and quality maintenance 2.Effective role by govt agencies, agricultural

3.Effective
harvest los
4.Increase
enterprise
employme

2. Effective extension works of selected and trained SM group members result in spread and adoption of post harvest and food processing technology. 3.Reports and advice by consultant acted upon and further action set in motion. 4.Efficient and integrated functioning of Market intelligence and information centre; and regular publication and circulation of bi-monthly newsletter established; 5. Trained entrepreneurs received credit support and established micro-enterprise leading to increased employment opportunities.	group meetings for crops and horticulture held ;-stability of membership; election held, representation of women and youth and minorities-Expenditure of budget/ Project register/ number of participants in briefing, meeting. Society registers at PTCCS. Inspection report, M & E reports 2. Around 25 SM group trainers received one month training; around 800 youth and women exposed to post harvest and food processing technology-Expenditure for training, Project report, inspection report, M&E reports 3.One man month consultancy; contract signed, copy of the study report. 4. Regular publication of Newsletter; number of copies printed and circulated; number of advertisement from govt agencies ,private business; Concurrent evaluation by M &E; number of enquiries received and responses sent and causal link of group marketing through information centre; revenue generated; 5.Around 500 micro-enterprise set up. Number of employment generated 750; 250 applications under process for credit and registration- increased demand for power /; register of society /financial institutions/ industries department, power consumption records. Project reports, M&E reports,	weaker sections in the committees. 2.Good recommended germ-plasm/ planting material available for better quality produce; 3. Prompt decisions on loan/ investment applications. 4.Market-information and intelligence linkage with national and regional marketing federations including chambers of commerce forged on symbiotic basis. 5. Other actions of market consultancy recommendations for warehousing, post-harvest grading centre, cold storage; and other infrastructural set up required are worked to be in place;

Project Advisory Note

Background: Marketing and Processing Support to SM Group Members in West Garo Hills of Meghalaya (India) is a hypothetical IFAD funded project for estimated cost of Rs. 2.00 Millions. The project aims to increase income and create opportunities through training and organised marketing. The project duration is 3 years. The population of 5 lakhs (0.5 million), predominantly (85%) tribal, live in rural area and majority are dependent on agriculture (97%). The area has good

3.Market re
consultanc
advice on
intelligence
selected c
4.Establish
wholesale
information
commercia
market cor
5.Support
information
publication
6.Enterpris
manageme
S.M. group
steps towa
developme
7.Additiona
obtaining l
on conces
rates for in
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with Tele a
provided f
concessio
paper obta
governmer
circulation.
measures
motivation,
group dyna
democratic

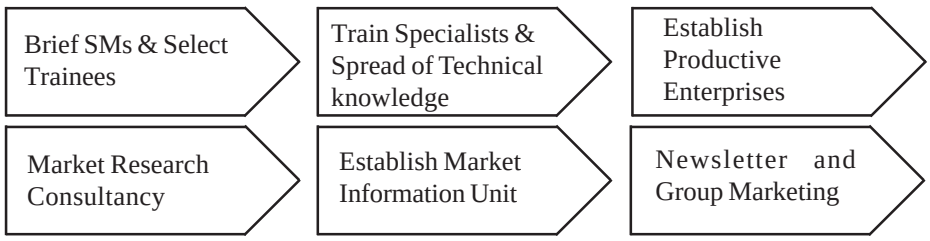
Glossary:

productivity potential with remarkable agro-climatic variations.

Problem: Farmers do not get remunerative returns on account of low quality produce, isolated and unorganised marketing, absence of value addition, considerable post harvest losses and lack of information for harvesting. A deep sense of market insecurity has affected crop diversification attempts resulting in lack of opportunities. Underemployment has generated a sense of frustration and signs of unrest having implications on law and order are surfacing.

The Project Planning Matrix has depicted inputs, activities, output, immediate objectives (purpose), developmental objectives (goal). The indicators and means of verification have been mentioned against each level (as in NORAD) alongwith assumptions for achieving and effecting higher level.

The project activities will follow 2 main parallel sequence of activities as depicted below:



Main Project Strategies are:

1. Providing timely and relevant information, on harvesting, marketing and price.
2. Garner better prices on produce and remove sense of insecurity.
3. Enhanced capabilities through organised group, training and investment.

This will be achieved by fine tuning the PPM with full participation and as an iterative process approach in all phases of project cycle. The Logical framework should function like 'chameleon' (Gasper, 1997) and show dynamic response to the environment and context by use of ingenuity. District Implementation Unit under the Chairmanship of the District Collector and Project Manager as the chief executive will implement the project. The Primary Thrift and Credit Co-operative Society (PTCCS) has already mobilised SM group to a great extent.

The Co-operative hierarchy, existing market and organised market is shown diagrammatically at figure 1, 2, &3.

Stakeholder analysis will be desirable and Traders will have to be consulted. SWOT analysis and Resource management Chart will have to be kept in mind for strategic planning and implementation (Cordingley, D., 1995). For effective management CPM/PERT techniques will be helpful alongwith.

Certain desirables are:

a) More focus on marginalised and vulnerable groups;

b) greater accountability, transparency and involvement in action and capacity building;

c) Training ,extension and strengthening backward and forward linkages;

d) Innovative ideas such as government lease on concessional revenue rent for space in Supermarket complex; savings on this count may be utilised for computer and Internet access for speedy and timely information. Harnessing employment oriented government schemes for adequacy of investment. For Newsletter, different measures on advertisement and after1st year a nominal subscription amount and after increasing circulation, even extending it to other district and the state.

e) Institutional arrangement for effective co-ordination concerning assumptions such gearing of agriculture and industries extension machinery for diversification of agriculture and income sources and follow up.

f) Establishment of a farmer's emergency fund, for non- diversion of loan and for consumption or emergencies.

g) Prompt decision on loan applications by the PTCCS / FIs; Open forum and publishing details of list; and the trappings of approval culture may be desisted.

h) Political, socio-cultural, gender, environmental, institutional and financial and economic viability will have to have positive interplay in decision making.

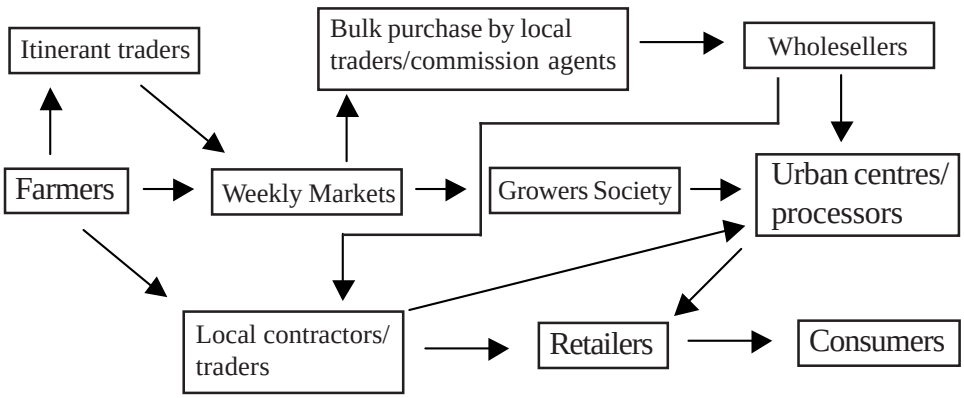
The indicators are illustrative and not exhaustive which needs to be decided in consensus with the stakeholders. A panel needs to be constituted for effective monitoring where random sampling of beneficiaries can be resorted to ; testing the understanding and absorption of technology, professional functioning of Group/ Information centre and credit and thrift society may be desirable.

Benefits, and quantification of value: No definite figure has been given for success, but 80% farmers income increasing by 100-200% within 3 years can be considered

reasonable. Similarly, 10% increase in production is likely to be absorbed in local market; hence 50% and above increase will be reasonable expectation. 90-100% achievement of beneficiary for training and enterprise and membership would be desirable. Some other quantitative indicators could be –100 % recovery; 100% attendance in the training and workshop; 80% flow of information to and fro the SM group and 80%use and response to such information translating in action and follow up; 5000 Newsletters within 2 years and by the end of 3rd year, about 6500. About 1000 jobs created in micro-enterprise / small business and petty shops; vending etc. About 80-90% trained youth and women establish and adopt post harvest technology and food processing methodology. Mostly qualitative and numerical indicators have been indicated which requires to be quantified in consultation. Further, increased area, production and diversification of crops data. investment in agricultural machinery; procurement and sale transaction related to agriculture and finished/ value added products. Effective and positive participation of all stakeholders. Women participate actively in household enterprise.

There is a necessity to establish a control area outside the catchment of project having similar socio-economic level for assessing effect and impact during evaluation.

Figure 1: Better Positioning and enabling the rural poor through organisation and training under the Project.



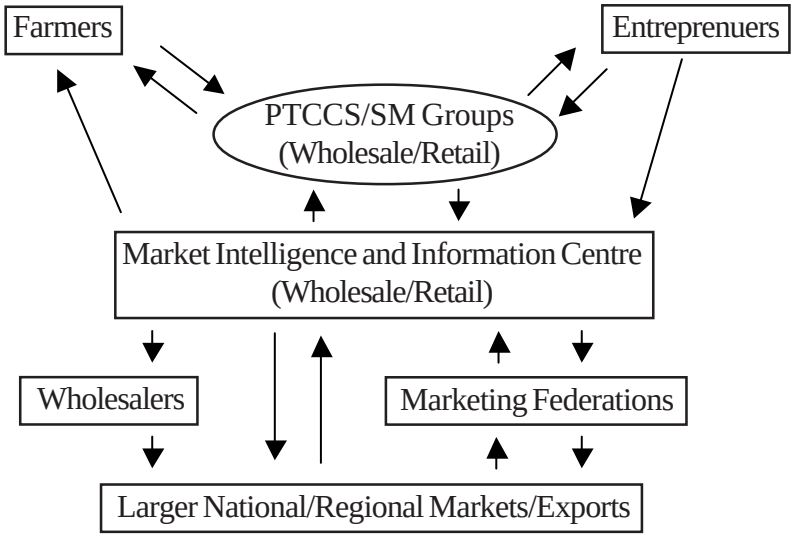


Figure 2: Present rural market chain of commodity flow (source: IFAD, NER Management for Upland areas formulation report.)

Hierarchy	Level	Status
Federation of Thrift and Credit Co-operative Union	National	Legal, registered unions are members
↑		
Union of district level unions of TCCS	State	Legal, registered district unions-members
↑		
District union of PTCCS	District	Legal- registered PTCCS members
↑		
Primary Society Cluster	8-10 villages	Recognised
↑		
PTCCS (Primary Thrift and Credit Co- operative Society) ←	Individual Member	

Figure 3: Levels and Hierarchy In Co-operative functioning (modified from Hulme and Mosley, 1996)

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II. APPROPRIATE TECHNOLOGY : LABOUR INTENSIVE METHODS IN CONSTRUCTION

According to Willoughby (1990), enlightened development philosophy must avoid the pitfalls of misdirected development and should: 1.emphasise on gradual evolution; 2.take into account the needs and capacities of people, rather than production of goods as its departure point; 3. focus on the integrated development of rural areas rather than 'westernised' industries; 4. incorporate serious considerations of meta-economic factors; 5. stress on self reliance at all levels of society; 6.Incorporate more sophisticated appreciation of the role of technology and promote assessment of appropriateness of technology.

A mid-term review of the Vienna Programme of action pertaining to science and technology for development in 1985, and an end of decade review in 1989 reiterated the necessity to strengthen the endogenous capacities by technological assessment and the mportance of studying socio-economic implications environmentally sound technologies. World Employment Programme, groups 10 major related themes (ILO, 1992): 1.Sectoral technology choice, 2.Innovations and labour intensive technical change; 3.Technologies, products and consumption patterns; 4. Technological change and conditions of rural women; 5.Institutional factors and technology; 6. Infrastructure and employment generation; 7. Energy, technology and employment; 8. Macroeconomic framework for technology policy-making; 9. Strengthening endogenous technological capacity; 10.The impact of new technology on employment.

Discussion on matters concerning technology can form a series of books and is difficult to capture only in a chapter. However, the following essay attempts, in a limited manner, to analyse the promotion of the use of Intermediate Technology and Labour intensive methods in the construction and construction related industry, and to discuss various facets of what may constitute the long term interest of poor and developing countries.

Introduction

Development is continuous and evolutionary process which aims at realising the full potential of individuals and synergising the same in the context of a Country. Owing to great diversity in the interactions and expressions of developmental factors over time and space, the geography, history, culture and level of progress of nations have and been continuously changing and so have their values and quality systems of life. This change has been 'the perpetual struggle of mankind' and has been fuelled, among others, by technology. About 160 countries comprise a diverse group outside the OECD countries: a majority of them are poor and in various transitional stages on the developmental scale (upper middle income, middle income and lowest income).

The preoccupation of modern era with growth and trickle down theory caused concerns of equality and sustainable development being not factored appropriately. This resulted in disparities, unemployment and urban migration which have come to centre stage as major concerns, even in developed countries. Among the comity of nations the post world war order has witnessed only a facade of liberal values, which conveniently has been sacrificed for consolidation of power, for securing access to vital resources to quench unchecked greed. Thus, the interests of poor developing countries are more often decided and dictated by forces and factors outside the concerned countries. Free will and choice remain the preserves of a powerful few.

The aims, problems and concerns of development:

Development primarily aims at: 1. Improvement in the quality of life; 2. Optimising the use of renewable resources; 3.Creation of workplace where people live (1-3; Dunn, P.D., 1978); cheap and in large numbers (Schumacher); 4. The above should be in equitable and sustainable manner; 5. Endogenous self-reliance through participation and control. (4&5, Reddy, A.K.1979); use of local materials and simple methods.

'Development does not start with goods; it starts with people and their education, organisation, and discipline' (Schumacher, E.F., 1973). 'Schumacher (1966 Cited Willoughby, 1990) sees a close relation of unemployment with mass poverty and misery and mentions eradication of poverty as being more important than growth per se. He further argues that if 'people centred' approach is not adopted

and action is based solely on economic calculations,..... human freedom becomes 'stultified by apathy and sullen disdain' and fears 'social violence'. World Employment Report '98-99 mentions that out of a world labour force of 3 billion people, 25 to 30 per cent are underemployed and about 140 million workers are fully unemployed. 'The quickening pace of globalisation and technological change provides both challenges and opportunities at a time when the global employment situation remains grim….. the level and quality of skills that a nation possesses are becoming critical factors." (World Employment Report 98-99).

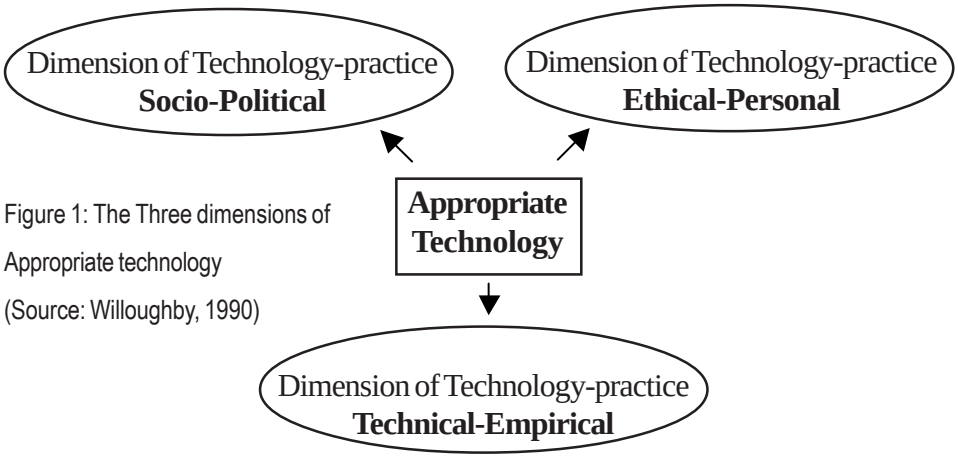

Figure 1: The Three dimensions of Appropriate technology
(Source: Willoughby, 1990)

The dimensions of Intermediate Technology:

6(six) major mutually interdependent problems called for the development of the concept of intermediate technology :

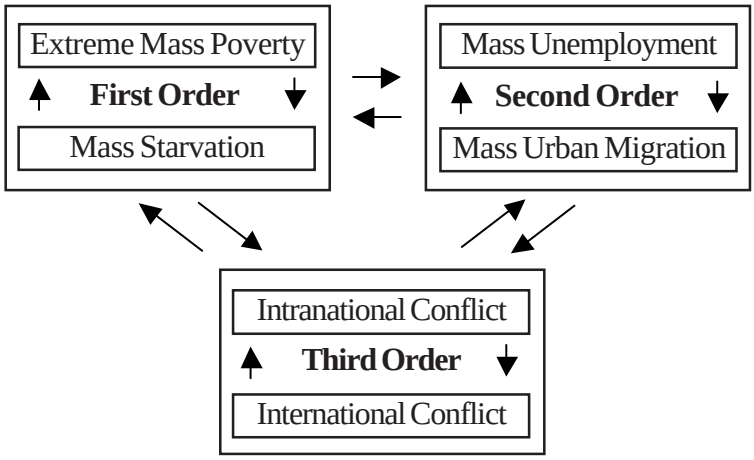

Figure 2: Development Problematique. (Willoughby, K.W., 1990)

The concept of 'Intermediate technology' can be ascribed to have emerged from the concept of 'Appropriate Technology' (A.T.). Schumacher (1973) had illustrated Intermediate Technology as a level on the range-scale of available technology in the world (£1 - £1000) and particular intermediate level (of appropriate technology) for any particular country, exemplified by him £ 100, in terms of "equipment cost per workplace". Thus, it is a specific application of A.T. to specific circumstances (Willoughby, 1990) 'tailored to fit the psychological and biophysical context prevailing in a particular location and period' (Willoughby, K.W., 1990) and is linked to 'choice of technology' which is the 'key instrument of a developmental strategy' (Sen, A.1975).

Technology and (Option) Choice: According to the ILO, technology should contribute to greater productive employment opportunities, elimination of poverty and achievement of equitable income distribution. The 'area approach' and 'factor endowment approach' must agree with the amount of resources and labour with which the region is endowed and thus for developing countries it forms the hard reality (Knudsen, H. 1992). Sen (1975) is of the view that too much emphasis on the development of new intermediate technology should not be placed and 'off- the- shelf technology' should be resorted to. Reddy (1979) is of the opinion that since very few alternative technologies have been developed, and 'off- the shelf technology' is rarely available, hence generation of technology is a precondition for the choice of appropriate technology. Reddy (cited, 1979) mentions that technology contains the genetic code of a culture and puts 3 (three) important conditions for its fulfilment:

1. A filter which transmits basic human needs to the institutions of technology generation;
2. Introduction of new set of preferences/paradigms into the innovation chain; and
3. The existence of the requisite technological capabilities.

Major componenets of appropriate and intermediate technology can be enlisted as:

- most economical use of natural resources; being labour intensive;
- accessible to its users; frugal of scarce resources, environment friendly;
- manageable by individual or small groups.

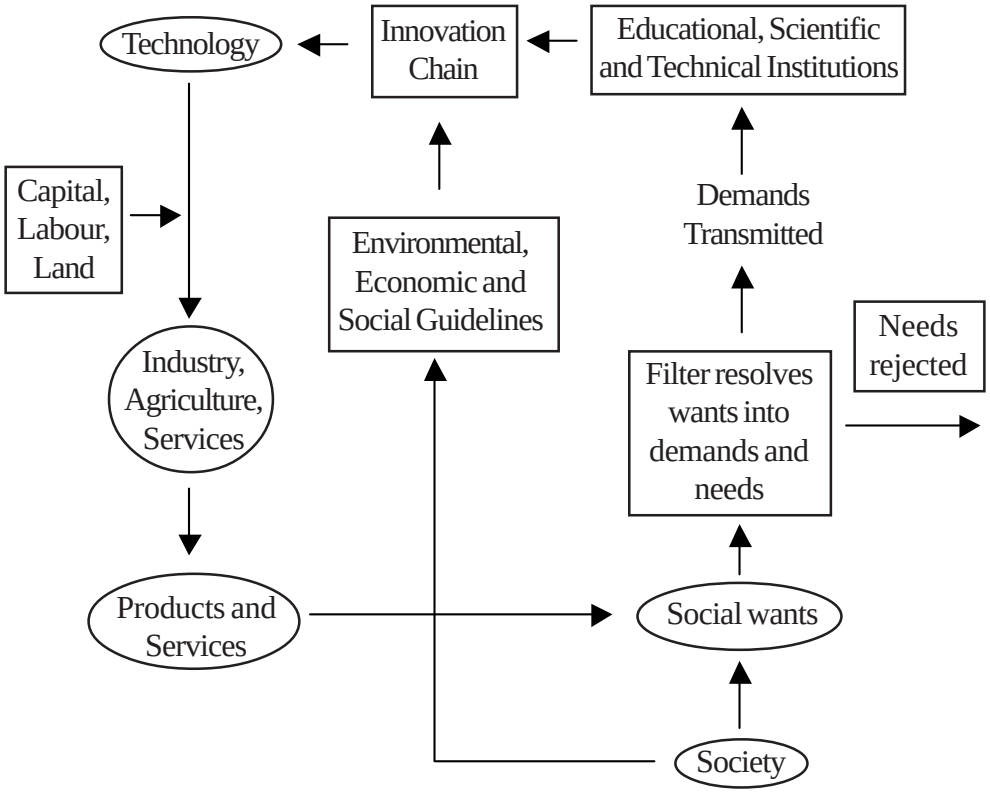

Figure 3: Generalised scheme for the generation of technology. (source: Reddy, A.K., 1979)

Sen (1975) mentions 3 (three) important aspects of employment: a) income aspect, b) production aspect and c) recognition aspect. *He is inclined to treat employment as benefit rather than cost taking into account that worklessness induces vagrancy and crime* and has a significant impact on society. He also believes that expansion of female employment may be a great force for social change and thus employment does involve more than production and income. According to Sen, A. (1975) 4 (four) sets of structural factors will constrain employment policy: technological possibilities; institutional features; political feasibilities; behavioural characteristics.

Development	Western Technology	Appropriate Technology
Spiritual	Alienation Domination Inequality	Self-Development Emancipation Participation
Organisational	Subordination Bureaucracy Centralisation Bigness Uniformity	Self-Management Democracy Decentralisation Smallness Pluriformity
Technical	Over-Supply Hard Techniques Consumption Wasting Complex	Self-Supply Soft Techniques Recycling Sparing Simple

Figure 4: Some notions illustrating the difference in tendencies between development by western and appropriate technology. (source: Riedijk, W.,1987)

Factors favouring use of modern technology and acting as barrier for labour intensive methods:

'Most of the developing countries have suffered some form of colonisation in the recent past. There has been difference in perception of development, ideological competition, battles for control of resources and market, question of prestige, confusion of development with industrialisation and mechanisation, a view that modern methods/ technology is always the best, lack of skilled labour and competition between sectors, lack of urbanisation, lack of managers and professionals, risk from petty corruption and wastage.' (Tighe, D., 1993). Labour based methods are treated less cost effective. Besides, engineers and decision makers have an educational bias. The availability and quality of hand tools and the fact that the administrative and contract methods are now geared to engineering based methods are important factors favouring modern technology. The primary aim being cost minimisation than employment. Finance/ politicians / professionals want quick results, and sometimes more machinisation and very often specification is flaunted as high fatures of development.

Present scenario:

Many of the factors mentioned above are absent or reduced in scale and faith in technological progress is shaken. Ideological competition has now diminished and our knowledge about development has increased substantially. There is now stress on learning process both ways and emphasis on participation, decentralisation and poverty alleviation coupled with income opportunities and basic needs. There is greater awareness about dignity of labour in human existence and a belief in the non imposition philosophy. Availability of public fund (both external and internal) is geetting reduced. Ownership and sustainability for operation, maintenance and the benefits are the present day concerns. A deterioration in economic conditions in most of the developing countries, scarcity of foreign currencies,and vast growth in middle income group is noteworthy. Increasing transportation is also a distinct feature of the present day world (mostly from, Tighe, D., 1993). Mentions that Tighe, D., 1993 'The use of conventional machine -dominated construction techniques will continue to reinforce...external dependencies, mal-distribution of power, and impoverishment.'

Undesirable consequences of technological dependence may be classified into 4(four) categories:

1. Cost; 2. Loss of control over decisions; 3. Unsuitable characteristics of the technology received; 4. Lack of effective indigenous scientific and innovative capacity, which in itself is a symptom of underdevelopment (Stewart, F.1977).

The major thrust of growth philosophy with large-scale technology and equipment transfer had more credits as failures than gains. Transfer of technology has proved to be a problematic issue in which trade-off of growth may not take place.

Lessons from Russia and Japan have noted three things to be in common in their policy:

a) strict control over technology imports; b) technology imports via strict licensing; c) adapted and modified the technology and rarely introduced unmodified technology (Japan devoted 1/3rd on R&D- mostly on creating a unit of local technology- aiming at reducing the dependence. (Stewart, F., 1977)

The example of Cement block manufacture in Kenya throws a complex relationship between choice of product, choice of technique, income levels and income distribution which are core factors for selection of technology. Many of the selection mechanisms of technology are the outcome of economic system and technology already in use, and further involve political decisions (Stewart, F. 1977).

Labour intensive Employment: According to Tighe (1993) 'Labour based technology is systemic substitution of human effort for machines in situations where it can be shown to be economically and socially viable'. (McCutcheon, R.T., 1993.) States that 'Labour intensive would mean more proportion of labour used in the factors of production' for a Labour-based (/intensive) construction has the following features:-

- 'economical and efficient employment, as great a proportion of labour as is technically feasible to produce the high standard of construction demanded by the specification and allowed by the funding available (McCutcheon, R.T., 1993)';
- complex mixture of hierarchical and consultative management structure.
- provides a vehicle for implementing the complementary policies of decentralisation and privatisation.
- facilitates small enterprise development.
- it is an effective engine for involvement, leading to participation and awareness encouraging functional democracy.
- in labour intensive rural roads construction labour component can go up to 60-65%.
- achieved partly through creation of individual, community, and institutional capacities through the establishment of large, carefully planned long-term national programme.
- recognises that factors of production in developing countries are different.
- recognition of local knowledge and technological capacities and their strength and weaknesses.
- Labour intensive investment policies are particularly relevant to a growing number of developing countries which are struggling with structural adjustments, devaluation of local currencies, scarcity of foreign exchange, degradation of

basic infrastructure and acute unemployment (Gaude, J. And Miller, S, 1992). For example, India has pursued employment generation schemes as National Programmes having a minimum of 60% as labour components, which has taken 1-2% of National income, and there are indications that economy grew faster because of these investments (Gaude, J. And Watzlawick, 1992).

Civil construction as definable sector:

- Civil construction is a vast field and production or selection of suitable technology is complicated.
- Construction sector comprises housing, non-residential building, roads and bridges, embankment and dykes (flood protection), Irrigation and drainage, water supply and sanitation, other infrastructure, etc.
- Housing sector is varied and dispersed and has many variables of climate, demand, quality, space, aesthetics, etc.
- Moavenzadeh (cited Field B. and Ofori, G., 1988) had indicated that construction's share in employment tends to follow the behaviour of its share in the GDP.
- It involves a large number of backward and forward linkages. (ILO, 1992; Field B. and Ofori, G., 1988).
- Nearly 60% of gross fixed capital formation (GFCF) is invested in structures (ILO, 1992).
- It plays a key role in the infrastructure of the economy (roads, railways, dams, power stations, irrigation, airports) and 50-60% capital formation exists in the sector.
- 60-70% construction happens in public sector and the growthcan be influenced by the policy decisions. (all above, McCutcheon, R.T., 1993).
- the sector accounts for substantial proportion of labour force (30-40% of total labour force of which 75-80% comprises occupational groups, craftsmen, production process workers).
- The relation between national developmental strategy (implications of nature, size, distribution of demand for construction, structure, operational methods and inputs of the industry) and construction industry (employment and seasonal unemployment) is two-way (Field B. and Ofori, G., 1988).

- Planning and demand management, counter cyclical planning of construction projects and technical flexibility of the sector by variety of combinant factors of production can be utilised to suit each finished product (Field B. and Ofori, G., 1988).

Country	Year	GDP per capita ($ US)	Value added / employee in construction ($ US)	Labour force in construction per 1000 population
Japan	1990	23821	47748	48
USA	1990	21569	51848	31
UK	1990	16089	32415	31
Singapore	1991	14473	27443	49
Hong Kong	1990	12560	13028	40
Taiwan	1991	8551	11839	35
Republic of Korea	1991	6334	23590	31
Malaysia	1991	2476	3755	23
Thailand	1990	1437	8177	13
The Philippines	1991	716	2358	15
Indonesia	1990	602	2733	12
Sri Lanka	1990	427	2692	11
China	1990	322	734	22

Figure 5: Construction labour in selected countries. (Source: ILO 1992; OECD, 1990-91; The World Bank, W.D.R. 1991; Statistical yearbook for Asia and Pacific. Cited: Ganesan, S. 1994)

A technology should be considered appropriate for the construction sector provided it represents that combination of resources, procedures and techniques most likely to satisfy the socio-economic goals of the sector (Ganesan, S. 1994).

Ganesan, 1994, suggested appreciation of appropriate technology in 3 key areas:

1. Clarification on the boundary of construction or construction related activities e.g. a project, a construction sub-sector such as highways of the total construction sector;
2. Strategies to maximise the productivity of scarce resources;

3. Policies to promote absorption of abundant resources, especially surplus labour.

Ganesan also did not find conclusive evidence to suggest conflict between output and employment objectives in the long-term or that in cases of such, mitigation by suitable economic and fiscal responses. Ganesan, 1994 also suggests 'that in the final analysis, all factors considered, the social and economic benefits of greater, sustained employment creation in developing countries should outweigh any disadvantages'. Ganesan, 1994 has concluded that a desegregated construction industry model, which does not ignore the informal sector, should be the basis for exploring technological choices in developing countries which evolves into a productive combination of traditional and modern technologies of varying scales.

A World Bank research "study of the substitution of labour for equipment in civil contruction" (1971-1986 cited, McCutcheon, R.T., 1993) came to the conclusion that:

1. It is technically feasible to substitute labour for equipment for all but about 10-20% of total road construction cost for the higher quality construction considerations.
2. "Labour- intensive methods are technically feasible for a wide range of construction activities and can generally produce the same quality of product as equipment intensive methods".
3. Labour productivity can be improved very significantly by the introduction of certain organisational, management and mechanical improvements. (10-20 fold increase was noted; incentives and skilled supervisors were imperative.)
4. With superior tools, high incentives and good management, productivity can be improved to the point that labour intensive methods could be fully competitive with equipment intensive methods at certain wage rates (Wage less than US $ 4.00)/ day-1982 prices).

   McCutcheon, R.T., 1993 cited various examples such as Kenya's RARP (Rural Access Roads Programme) as one of the most successful and labour intensive programmes. In Botswana better quality and more labour intensiveness (65% costs for labour) was achieved.

   The above is also supported by the review of labour intensive construction in South Africa and elsewhere, (McCutcheon, R.T., 1993).

Figure 6: Choice of Projects, (Meis de Sebestian, cited Harper and Soon, 1979)

In the matters of maintenance in Lesotho, Malawi, and others, even after utilising labour based methods and increasing the current wage rate by 47% and maintaining same quality of output labour based method achieved a saving of 10-20% re-gravelling cost than the equipment intensive methods (Guthrie, P.M., and Kirkpatrick, S.W.et al,). In road maintenance, variety of opportunities emerge by restructuring and decentralisation . These can be outlined as emergence of permanent workforce at the grassroots units, individual and collective responsibility for the maintenance of a section of road, agreement between governments and communities and use of small scale and petty contractors. (deVeen, J.J. et al 1992).

Trade union research project indicated the **following prevalent causes of failures** of public works programme (McCutcheon, R.T., 1993):

- o They are seldom scaled to the magnitude and locational requirement of specifications;
- o They are seldom scaled to the magnitude of national manpower requirements;
- o Such works are introduced in fragmented and unsystematic manner;
- o There is rampant use of inappropriate technology;
- o Works are introduced in ad-hoc manner and not linked to overall developmental policy;
- o Public works programmes are entirely dependent on government commitment for fund, research etc.

On the other hand , the **main reasons for successes** of labour intensive programmes such as in Kenya's RARP and Botswana's programme are due to (McCutcheon, R.T., 1993) :

1. Long term linkage to a national programme;
2. Sound intellectual assessment of technical feasibility and economic efficiency;
3. Technical, institutional, organisational, and socio-economic aspects received

concerted attention;

4. Strong organisations were established with good management system and balanced decentralisation;
5. Good and extensive training, focussed towards goal;
6. Long term political support;
7. Long term financial commitment;
8. Good co-ordination between government, departments, administration, local authorities, technical professionals and donor agencies.

However, highly specialised jobs, such as under water excavation, long distance haulage, very hot mixing, specialised piling etc would inevitably call for mechanisation and higher level of skills and methodology.

For construction technology optimisation,issues which needs consideration are: 1. Government policies on investment and employment; 2. choice of building materials in design (design equivalence), 3. slicing and packaging of large jobs and guaranteed role for domestic contractors in their execution, 4. development of domestic building materials industry, 5. improving supply of serviced land supply for housing, 6. an active role for private developers in urban renewal, 7. better housing financing and improved access for domestic builders to finance., 8. Construction plants and research to improve performances of existing material industries (mostly from Ganesan, S. 1994) , 9. A strategy to increase output through activities which consumes more labour and less scarce resources, and 10. large scale training of various skilled technical and managerial personnel.

Summary and conclusion: 'A key issue for any country is the extent to which the pursuit of environmental sustainability involves trade-offs with income and employment. Relative priorities will vary from one country to another depending on the levels of wealth and financial constraints, the structure of the economy, the nature and magnitude of development problems, technological options and capacity as well as external assistance' (ILO, 1992). A strategy to increase output through activities consuming more labour and less scarce resources is a feasible way forward for most developing countries and correct technology is a precondition for the expansion of construction sector (Ganesan, S.1994). Implementation of appropriate technology demands a suitable framework conditioned by the political, social,

economic and environmental factors and considerations of modern technology (Ganesan, S. 1994; Knudsen, H. 1992). Employment levels, ultimately depend on two (2) factors- choice of technology and volume of investments. A significant gain in total employment of 10-15% can be realised through restructuring and promotional policies in the construction sector (Ganesan, S. 1994). Socio-economic implications of not utilising the local resources, introduction of labour based approaches into the curricula, establishment of system and procedures, right type of hardware (tools and equipment) and Software (motivation, training, promotional policies) for execution and implementation are some issues which (Edmonds, G.A. and de Veen, J.J., 1992) call for concerted action in order to catalyse attainment of wellbeing. Developing countries should arrive at a reasonable balance between labour- intensive and capital intensive techniques. Proper emphasis should be laid on building up national/State infrastructure and promoting Human resource development, skill, training of workers and technicians, professionals and managers (ILO, 1992).

In case of developing countries, the suitable dynamics of intermediate and labour based technology and capital intensive technology in construction and construction related sectors appears to be in their best interest. In this case 'what is good for the rich may not necessarily be good for the poor' would be an appropriate conclusion.

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III. ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

" In between the two extreme types of activity; namely, (i) 'environmentally-benign' ones and (ii) 'ecologically-disastrous' ones there is a whole range of activities that have various combinations of income-generating and environmental impact potential. .....Available methodologies for EIA and assessment of income potential for precise quantitative estimates may prove inadequate, and they need to be further developed by natural resource and environment specialists and economists together." **Issues in Mountain Development ISSN: 1027-0027 1996/1.**

Introduction:

Environmental Impact Assessment (EIA) is an, "anticipatory, participatory, integrative environmental mnagement tool which has an ultimateobjective of providing decision makers with an indication of the likely consequences of theirdecisions relating to the new projects or new programmes, plans or policies" (Khann,RK, 2001). Thus EIA is a facilitative and decision making tool in formulation, decisionmaking and implementation of developmental aspects and efforts. It is a process used to predict the environmental consequences and to take ameliorative measures to minimise the impact in the immediate and long terms. Environmental appraisals and impact assessments have a core of participatory mechanisms to follow. "A *balance has to be struck between the positive benefits of consultation and public participation in ameliorating the impacts of actions, and in reaching consensus on environmental outcomes and the financial and time costs involved. The point of balance varies between EIA systems and over time but the trend towards more effective consultation and public participation is inexorable"* (IDPM EIA leaflet 10).

The steps involved are Identification, Predictions (based on models), Evaluation(existing rules, regulations,norms,etc), Mitigation(steps/ suggestions) and communication (of Results). The process in the EIA involves Screening (project and site related), Scoping(formatting) Rapid and Comprehensive EIA,Mitigative measures, Environmental Management Plan (EMP), Environmental Impact Statement (EIS), Post Project Monitoring (PPM). The Resources needed to do an EIA area qualified multidisciplinary team of experts, data about project and surrounding ecosystems, anlytical instruments(models) and an effective institutional arrangements for EIA. There are various methodologies for EIA such as ad-hoc, checklist, Matrix,

networks, overlays, environmental indexing, Cost benefit analysis.

A case study of **Lesotho Highlands Water Project,** a traditional tribal area in another continent is elicited for only flagging some issues that are pertinent in implementation of projects for environmental considerations where humanity exist and surive. Fear of more than 20,000 people losing their homes or part of their property, farmers losing farming fields because of the intense cultivable land pressure there, concerns over the possibility of conflicts due to water exports to South Africa were raised by many.

ENVIRONMENTAL IMPACT ASSESSMENT: AN ASPECT OF LESOTHO HIGHLANDS WATER PROJECT

Introduction :

Background: The first phase of the project, Phase 1A, will supply 20 cubic metres of water per second to South Africa and generate 70 MW of hydroelectricity for Lesotho. There would be construction of two dams (Katse and Muela); excavation of 82 Km (45+37) of tunnels about 5m in diameter; and construction of an underground power station. Asphalt bitumen roads (new and upgradation) will be constructed to gain access to the Katse dam and the upstream tunnelling sites. Bridges, and support infrastructure for construction related activities and other services will also have to be in place. In addition, Lesotho's electricity and telecommunications networks will be upgraded extensively. It will involve change in land-use, resettlement, additional population load of 2000-3000 of different social groups, and exposure for economic exploitation.

The information presented in this study is time specific as dating in 1998-99. In the present case study , the check list and matrix is preferred methodology in view of following advatages of the checklist method:

Advantages of checklist and Why it is used here:

1. Checklists are useful and convinient tool for EIA. 'EIAs in UK uses checklist or simple matrices or some hybrid combination. It has been experienced that simple checklist and simple matrices fare equal' (Glasson, J. Therivel, R. and Chadwick, A.1994). According to Gilpin, A.1995, Leopold Matrix suffers from a number of drawbacks: - hidden uncertainties (difficult to distinguish between a high probable low impact and a catastrophic event in low probability); no criteria for measuring magnitude and importance; can not reflect indirect or feedback events; time horizon of events are not revealed; is cumbersome; not conducive to a comparison of alternative plans; fails to handle important secondary impacts; tends to neglect social and economic values. 'Most seriously, it depends on the subjective evaluation of experts and the

judgement then is converted into the numbers and the scoping may not be truly reflected in numbers; Not suitable for public presentation; Danger that analysts may try to count the numbers to achieve the overall effects (Gilpin, A.1995). Thus it is recognised that, ' improved methods are needed to accommodate more public consultation and to recognise that EIA is part of larger political decision making process' (Nichols and Hyman1982, cited Gilpin.A.1995).

2. Checklists provide detailed definition of scope by 'detailed descriptions and record of findings' (Mock, J. and Bolton, P. 1993). Checklists, according to Barrow, C.J.1997, are useful as they order thought; aid data gathering; help ensure that assessor does not overlook a possible impact; and assist the assessor to secure large amount of data so that impact assessment can be focussed; besides, determining the importance of the impacts and aid in identifying mitigating measures needed.

3. Checklist provides a tool to enable specialist and non-specialists concerned to improve their knowledge, understanding of the environmental changes which the projects may entail. It would facilitate identification of positive and negative impacts and seeks answer for mitigation (Mock, J. and Bolton, P. 1993). Good range and variety exist (e.g. 'sectoral checklist' (ICID/ODA/ICOLD); Scaling checklists; questionnaire checklists; environmental evaluation system); from simple listing of environmental factors (USDA1990; ADB1987; ESCAP1990; World Bank1982; WHO, 1983), to descriptive approaches (Carstea et.al.1976; Canter and Hill, 1979; USDT, 1975 cited) including information on measurement, prediction and interpretation of changes for identified factors; it can be extended to accommodate quantitative and qualitative. 'Rating, scaling...checklists find greatest application in the final evaluation of alternatives and the selection of a proposed action'(Lee,1988; Cited ,Canter, L.W.1996)

4. Checklist bring together the expertise from wide range of sources concerning the environmental changes which relate to specific group of projects; allows

comprehensive framework and ensure that all aspect are looked from various angles (Mock, J. and Bolton, P. 1993).

5. 'It facilitates adaptation and simplification to meet specific situational need and to that purpose it has great flexibility and makes use of available information and resources. In this way it may be possible to conform to sensitivity of EIA in the project identification phase or in the initial stages of project planning without assembling a multidisciplinary team for EIA' (Mock, J. and Bolton, P. 1993). In doing so it takes care of the sensitivity of the grassroot and provides signals from the grassroot Mock, J. and Bolton, P. (1993) states 'checklist system as the basis of comprehensive approaches to impact identification (cited, IDPM handout)'.

6. Checklist has practical application in such a manner that detailed information requirement is focussed separately for further refinement (Mock, J. and Bolton, P. 1993).

7. Checklist is considered as 'greatest value in Tropical and Subtropical regions where environmental changes tend to be most diverse and far reaching and where data is often sparse' (Mock, J. and Bolton, P. 1993).

8. It also ensures that 'there is no misunderstanding about which environmental changes are to be considered under each item and that possible linkages and overlaps between different items are brought to the user's attention by means of various tables' (Mock, J. and Bolton, P. 1993).

9. To assist the user in assessing the overall level of knowledge and the scale of each item of impact in the checklist, the checklist must be studied side by side with the informations and data sheet (Mock, J. and Bolton, P. 1993).

10. The checklist can be adapted for specific application such as evaluation; for modernisation, rehabilitation or extension of the projects; modified for specific

type of the projects as data is comprehensive in respect of a particular location/ region; planning of cluster of interrelated projects and group of projects.

11. Responds to 'the influence of the political interactions, public involvement, prescriptive legislation, standards and regulations, the effect of recession, and environmental conflicts' (Gilpin, A. 1995).

12. Checklists can be drawn from specialist literature or created on the basis of previous experience of similar projects. PPA can yield valuable inputs for future checklists.

13. 'Of all the methodologies, checklists have tended to survive as a guide to the potential impacts of a project. Checklist may initiate preliminary analysis to provide first approximation answers, or to identify areas of ignorance; they are not, however final analysis in the sense the assessments are'(Gilpin, A.1995)

Disadvantages:

- Checklist is a facilitating tool but does not give analysis.
- 'Uncritical use of checklist can result in a blinkered approach to assessment; what is not in checklist can be ignored' (Barrow, 1997).
- 'Pigeon hole approach' may crop up as interrelations are not depicted and hence simplistic view of environment (Barrow, 1997).
- Overlaps of impact are sometime reflected in various fields and can be counted more than once (Barrow, 1997).
- Can become long and unwieldy (Rau, 1980, cited Barrow, 1997).
- Often make no indication of impacts and do not prioritise the impact (Rau,1980, cited Barrow, 1997).

1. **Screening: an Environmental Impact Study (EIA) for Lesotho Highland Water Project (LHWP) phase 1 A.**

1.1. **List of those who should be consulted:**

- The king of Lesotho; Principal chiefs; Ministers /Generals in the council of Government of Lesotho; MPs;
- The Government of South Africa and their representatives;
- The Government of Namibia and their representatives;
- The chief of the executive and planning at the National, Regional and the District level(DC); VDCs, district secretaries, etc
- The concerned line departments of Agriculture; Animal husbandry and Livestock development; Fisheries; Forest Wildlife and Environment; Soil conservation; Mining and Geology; Nodal and concerned department for Water Resources; Power; Land- use and Land records/ survey department; Department of Culture;
- Inter-Basin (River) organisations;
- Headmen of villages directly affected including upstream and downstream;
- Affected villages, host communities, specific social categories, potential employment seeker, project-related liaison groups, committees and association; Village water committees, school committees, youth groups, etc.
- The people in the villages by random sampling, with special sensitivity to vocation- wise, women headed household, other weaker sections.
- NGOs, Missionaries & other religious groups working for the areas; Opinion makers;
- University/ Research organisations working for the area;

Screening : Policies, Legislation And Treaty Obligations:

'EIA will proceed in accordance with: LHWP Treaty obligations; national legislation (only came to force in1997); Lesotho government policies, guidelines and standard practices; international commitments; policies specifically established to guide certain implementation procedures. Resettlement and Compensation to the people and communities affected by the Phase 1A project works will be guided by the Treaty on the Lesotho Highlands Water Project; the LHDA Order of 1986 the LHWP Compensation Regulations, 1990: Legal Notice No. 50 of 1990.' (http://www.oneworld.org/saep/sadc/country/lesotho/lesweb2.html).)

Natural Resource Conservation Laws:

'A number of national laws in Lesotho deal with development and conservation of natural resources such as water, land, soil, fauna, flora and heritage (cf. www..oneworld.org. as above).' Important among them are- Managed Resources Area Act of 1992; Historical Monuments, Relics, Fauna and Flora Act 1967 - this lists a number of species such as the Maloti minnow and the spiral aloe as protected and restricts collection, trading and disturbance (cf. www..oneworld.org as above). Soil and Water Conservation Policy, Policy for the establishment of Range Management Areas (RMAs) for the purpose of controlling grazing are important policies which will have to be conformed to. 'Lesotho is a signatory to two international agreements which require countries to take active steps in habitat and species conservation: these are-The Convention on Biological Diversity which includes an obligation to monitor the status of biological diversity in the implementation of large construction projects The Ramsar Convention on protection of important wetlands; currently there are no designated Ramsar sites in Lesotho'(cf. www..oneworld.org. as above)

1.2. Elements likely to give rise to significant environmental impacts:

Figure 1. *Basic Statistics for Phase 1A and 1B.*

DAM	Phase 1A		Phase 1B	
	Katse	'Muela	Mohale	Matsoku
Type of dam	concrete arch	concrete arch	rockfill	weir
Elevation at crest (m asl)	2060	1778	2085.5	———-
Height above foundation (m)	180	55	145	12
Length (m)	710	180	600	———-
Catchment area (km^2)	1866	————	874	580
RESERVOIR				
Yield (m3/s)	16.8	————	9.6	2.2
Extreme water level (m asl)	2060.2	1782.5	2084	————
Full supply level (m asl)	2053.0	1775.0	2075.0	2090.5
Minimum operating level (m asl)	1989.0	1760.0	2005.0	N/A
Reservoir area at FSL (km^2)	35.8	0.4	22.8	N/A
Total storage capacity at FSL (m^3x10^6)	1950.0	5.9	947.0	N/A
Live storage capacity (m^3x10^6)	1519.0	3.9	857.0	N/A
Environmental flow discharge (m^3x10^6)	0.5*	————	0.3*	1.7**

* set by Treaty agreement ** likely baseflow release (to be confirmed by IFR study), provision available for flood releases (Source: http://www/lesoff.co.za/lhda/eap2.htm. #top)

1. 2. A. Screening :Main construction components of Phase 1A are:

- Katse dam: on Malibamatso river, below confluence with Bokong river- 1.95 Km^3 storage capacity; concrete arch dam –180 m high with crest length of 685m.
- Katse reservoir:
- Transfer tunnel to Muella power station:
- Muela Power station(underground)
- Muela dam;
- Delivery tunnel to Axle river outlet.

Associated infrastructure:

- **Roads :** Upgrading existing road Thba-Tseka to Katse; Construction of all weather road from Piseng to Pelanengand via Matsoku valley to Katse; A new road from Ficksburg border post bypassing the town; Upgrading of existing roads in Lesotho and \south Africa where necessary for LHWP traffic.
- **Bridges :** A major bridge across the Katse Basin in the Pelanang area; Construction of an access bridge across Malibamatso river just below the Katse dam site; reconstruction of the bridges at Caledonsport and Ficksburg.
- **Rail :** Upgrading the road from Fouriesburg station to Caledonsport border post; Rail side facilities at Ficksburg and Fouriesburg.
- **Electric Transmission :** Electric power transmission lines; substations.
- **Other :** Construction of advanced construction camp facilities near Katse dam, Butha- Buthe; Construction of construction plants and works ; relocation of extension of border facilities in South Africa and Lesotho at the above crossing points; services provision –water and sanitation at the construction sites; 7 operational sites;
- **Quarries :** Various quarries 8-10 for aggregates;

1.2.B. Scoping :Various Impacts of Construction and operation activities:

The above indicate massive construction programme which in itself will affect the environment considerably. Canter, L.W.1996 described construction activities as:- clearing, grubbing, stripping, excavation; stockpiling; loading-hauling; placement of materials; grading; compaction; removal of materials; blasting; Concrete

placements; surfacing; building erection; building movement; building demolition; pavement demolition; batch and aggregate plants; temporary buildings; vehicle and equipment maintenance; restoration; filing reservoir; flood control operation. Besides, tunnelling; underground power station; laying transmission lines for electricity and telecommunication are also involved.

Figure : 2. *Potential environmental impacts of construction in this case; Source: adapted from Hitman Associates, 1974,pp B13-B18; cited Canter, L.W. 1996; underlined portion and impact shown are inserted and modified at some places).*

Construction Phase	Construction practice	Potential environmental impacts
Pre-construction	*Site inventory*	Short term and nominal.
	vehicular traffic	Dust, sediment, tree injury.
	test pits	Tree root injury, sediment
	Environmental monitoring,	Negligible if done properly
	Temporary controls,	Short-term and nominal
	Storm water,	Vegetation, water quality
	Erosion and sediments,	Vegetation, water quality
	Vegetative,	Fertiliser in excess
	Dust	Negligible if properly done
	Labour and migration	Substantial; demographic profile change; social stress and interactive forces; disease exposure.
Site work	*Clearing and demolition*:	Short to Long term
	Clearing	Decrease in the area of protective tree cover, shrub, and ground covers, stripping of topsoil; increased soil erosion, sedimentation, and storm water run off; increased stream water temperature; modification of stream banks and channels, water quality
	Demolition	Increased dust, noise, solid wastes
	Temporary facilities	
	Shops and storage sheds	Increased surface areas impervious to water, infiltration, increased water runoff, petroleum products.
	Access roads and parking lots	Increased surface areas impervious to water, infiltration, increased water runoff, generation of dust on unpaved areas, water quality
	Utility trenches and backfills	Increased visual impacts, soil erosion, and sedimentation for short periods

	Sanitary facilities	Increased visual impacts, solid wastes
	Fences	Barriers to animal migration
	Lay down areas	Visual impacts, increased runoffs.
	Concrete batch plant	Increased visual impacts; disposal of waste water, increased dust and noise
	Temporary and permanent pest control(termites, weeds, insects)	Non degradable or slow degradable pesticides accumulated by plants and animals, then passed into the food chain of humans; degradable pesticides having short biological half-lives preferred.
	Earthwork	Long- term
	Excavation Grading Trenching Soil treatment	Stripping, soil stockpiling, and site grading; increased erosion, sedimentation, and runoff, soil compaction; increased soil levels of potentially hazardous materials; side effects on living plants and animals, and the incorporation of decomposition products in the food chain; water quality.
	Quarrying for sand and stones	Substantial and long-term; blasting, noise pollution, disturbance of habitat of animals and plants; imbalances in geological formations; aesthetics; landslips.
	Tunnelling	Substantial and Long term; Geological alterations and consequences; sediments; noise; risks; Gaseous emissions.
	Site drainage	Long- term
	Foundation drainage Dewatering Well points Stream channel relocation	Decrease in the volume of underground water for short term and long term periods, increased stream flow volumes and velocities, downstream damages, water quality.
	Landscaping Temporary seeding Permanent seeding and sodding	Decreased soil erosion and overland flow of storm water, stabilisation of expose cut and fill slopes, increased water infiltration and underground storage of water, visual impacts

Permanent facilities	Transmission lines and heavy traffic areas	Long- term
	Parking lots	Storm water runoff, petroleum products
	Switchyard	Visual impacts, sediment, runoff
	Railroad spur line	Storm water runoffs
	Buildings	Long term
	Warehouses	Impervious surfaces, storm water runoff, solid waste spillages.
	Sanitary water treatment	Odours. Discharges, bacteria, viruses.
	Cooling towers	Visual impacts
	Related facilities	Long term
	intake and discharge channel	Shoreline changes, Bottom topography changes, water level, fish migration, benthic fauna changes.
	Water supply and treatment	Waste discharges, water quality.
	Storm water drainage	Sediment, water quality.
	Waste water treatment	Sediment, water quality, trace elements.
	Dams and impoundments	Dredging, shoreline erosion.
	Breakwaters , jetties etc	Circulation patterns in the water ways.
	Fuel handling equipment	Spillages, fire, and visual impact.
	Oil storage tanks, controls and pipings	Visual impacts.
	Conveying systems (Cranes, hoists, chutes)	Visual impacts.
	Waste handling equipment (incinerators, wood chippers, trash compactors)	Noise, visual impacts
	Security fencing	Long term
	Access roads	Increased runoff, destruction of tree cover; slope changes; alteration in the valley; dust and injury to plants; water quality and stream diversion, changes.
	Fencing	Barrier to animal movements.
Project closeout		Short term Noise, solid waste, dust. Storm water runoff, traffic blockages, soil compaction Short term Sediment, dust, soil compaction. Erosion, sediment. Nutrient runoff. Vegetation. Short term. Water quality, oils , phosphates and other nutrients

SCOPING : Impact due to operation and implementation of the project (phase 1A):

The project objective- Inter-basin transfer of water by diverting river course will reduce and regulate the flow and will affect the overall ecology of the Senqu and Orange Rivers, and its riparian areas. Besides, 'the impact of the LHWP on Namibia, a downstream user with critical water shortages, and impact on its any legitimate future plan for increasing its irrigated agriculture from the Orange River.' (http://www.earthfile.org.za/campaigns/other/highdam.htm) will require addressing.
'Some 20000 people may flock the area by migration and squatters camp may emerge' (http://www.irn.org/program/safrica/lhwpback.html).

Reservoirs- Upstream change from river valley to reservoir; - Downstream change in river morphology (riverbeds and banks due to sediment change); change in downstream water quality; effects on river temperature; nutrient load, turbidity, dissolved gases; concentration of heavy metals and minerals; changes of biodiversity; Changes in downstream hydrology; ecotourism / watersports. Pollution; Water use and budget; effects on fish populations.

Submergence: - Human/livestock habitat disruption; migratory and work routes alteration; Resettlement and compensatory tracts; Water quality; 'It will affect directly 2000 persons (approximately 312 households) and indirectly 20,000 persons through loss of 925 ha of arable land and 3000 ha of grazing land (http://www.oneworld.org/saep/sadc/country/lesotho/lesweb2.html). Loss of agricultural and grazing land affecting livelihood, production and wellbeing; Loss of biodiversity.

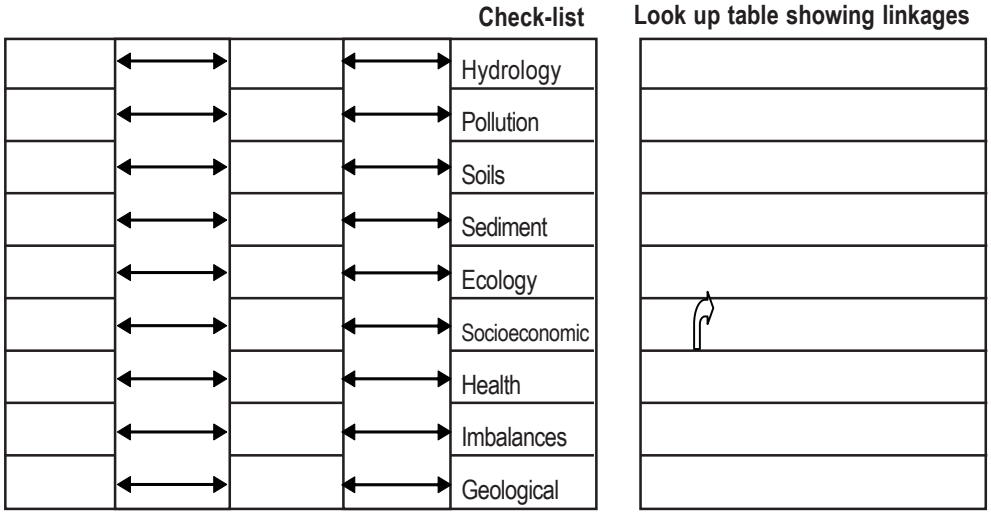
Housing/ resettlement: Human/livestock habitat disruption; new ambience and way of life; uprooting; shock; health and hygiene. Influx and infiltration of population.

Operation of powerhouse: noise pollution; electricity to change way of life and consumer durables; Airshed may be affected; besides, downstream quality and profile.

To derive these checklists such as for construction above, and available off- the-shelf can be utilised.

EIA Rapid: The checklist and Result sheet for environmental Impacts:

Impact assessment process is Two tiers process 1. Environmental reconnaissance (ER), 2. Environmental study. Based on reconnaissance a checklist should be prepared for decision making to proceed to the next stage for the study or to abandon the project. In conducting the reconnaissance and Survey it requires base information, which if not available would call for collection by adopting methodologies of survey and feasibility study in which also checklists are particularly useful. 'Check-list' may be series of questionnaire, detailed information on dimensions of project and various information sheets. 'The final output may be a Table, but behind this, is a series of structured data gathering process and notes and details ((Mock, J.and Bolton, P. 1993)' are involved.



IV. SOME ASPECTS OF WATER SUPPLY AND SANITATION

No life is possible without water. The hard facts, however show that some 1.3 billion people still lack access to safe water and some 2.5 billion access to sanitation. The crisis is more exacerbated by growing water scarcity, already affecting 132 million people in 20 countries and pollution being a major cause of diarrhoea disease (H.D.R., 1998). Providing a minimum standard of safe water and sanitation would mean 2 million fewer deaths from diarrhoea each year in children under 5 years, 200 million fewer episodes of diarrhoeal illness and debilitations (World Development Report 1992 cited: Gerhardt 1994). The Nature has potentiality to renew water resource through an interlinked chain of hydrological cycle.However, limitless interference in this hydrological cycle can threaten the processes of life systems. Water resources are unevenly distributed over the globe, and this can be a possible cause for conflicts. Increasing waste, abuse, contamination and pollution is making availability of good quality water an increasingly difficult, costly and complex task. Water is needed for physiology, psychology, ecology, sustenance, survival and productivity. Thus it touches all aspects of life including the socio-economic fabric of life.

The civilisation and cultural progress we take into reckoning when we define man as a social animal was built on our ability to make water work for us, and to sustain those production system (Leif Ohlsson, 1995). Falkenmark (1990) makes the compelling argument that no successful industrial nation came forward during the initial phase in areas where water was not readily available.

The following facts are revealing:

- 70% of earth's surface is covered with water (97.5% of this is ocean water);
- Only 2.5% of this is fresh water; a great majority of this is either frozen or deep in earth crust which is impossible in economic and technical terms to exploit.
- 0.26% of the total fresh water reserves-93000 km^3 is suitable for use. (Less than a percent of a percent of all water- Postel, 1992)
- Over 500,000 cu km of moisture evaporates.
- Only 40,000 cu km is annual precipitation (not assured)
- Only 12-14-000 cu km relatively stable source of supply exists in rivers and lakes.
- Water use is expanding rapidly and by 2025 it will have risen by 40% of the

present level (H.D.R., 1998).

- Since 1950, water withdrawal increased from 1365 km /year to3760 km in1995.
- Water availability declined from about 16800 km /capita/year in 1950 to7300 km /capita/year.
- At present rate, 5-fold increase in waste generation by 2025 is predicted.
- On a global scale Agriculture use-69%; Industry-21 %; Municipal - 6 % & Reservoirs -4%
- On a purely consumptive use Agriculture-89%: Industry -3%; Municipal-2%; Reservoirs-6%. (Shiklomanov, 1993)

Is it not clear that treating water as a natural, abundant and renewable resource, is nothing but symptomatic of 'water blindness' (Falkenmark, et.al.1990-inability to see within totality of hydrological cycle)? No doubt as we do not see many soluble/ insoluble/ microorganisms in water, we cannot imagine how valuable and vulnerable a resource water is!

Socio-economic aspect: Water for human needs has 4 (four) dimensions: 1.Energy, 2.Food, 3.Health, and 4. General (ecology, education, planning, meteorological, technological etc). Various level of service is dependent on availability of water, population density, local capability to manage water resource on a sustainable basis, willingness to pay, user preferences and other considerations which come into play. It has been established that both the consumption level and the construction costs rise with the service levels.

Sanitation, Health and Environmental aspects : There is a strong inter-relationship between the hydrological cycle and the environment, and there exists a close relationship between water, water quality and waste problem. The discharge of organic waste into surface water exceeding the self- purification capacity causes fall in oxygen content below the minimum level needed for sustaining aquatic life; besides, many faecal origin source carry pathogens/ diseases. Dumping of solid waste and discharge of wastewater is generally making ground and surface water unsuitable. Sanitation is essential to deal with waste and wastewater in an environmentally acceptable framework (NEDA, 1998). Deforestation and erosion of catchment area must be dealt in an integrated manner while considering formulation of delopment projects. There could be 5 main categories of impact in relation to water and sanitation -1.microbial contamination, 2.chemical pollution, 3.yield reduction from failing supply system, 4. Yield reduction from competing demands, and, 5.

Yield reduction from land -use change (Teun Bastemeger & M. D. Lee, 1992). Physical environment and in particular sanitary environment has long been recognised as having profound influence on health; however, the relevance of social environment is a recent recognition (Dr. V. J. Emmanuel, Sri Lanka, 1996). *"Without improved hygiene and sanitation, the cleanest water in the world won't prevent children dying from diarrhea"* (Steven Esrey).Typical effects of improved water supply and sanitation condition on diarrhoea morbidity through improved water quality,improved water availability had a direct relationship in Median reduction in diarrhoea morbidity in percentage terms (Source: Esrey and others, 1985)

The combination of safe drinking water and hygienic sanitation facilities is a precondition for health and for success in the fight against poverty, hunger, child deaths and gender inequality. It is also central to the human rights and personal dignity of every human on earth. Yet 2.6 billion people – half the developing world – lack even a simple 'improved' latrine. One in every six persons i.e. more than 1 billion of the world population, has little choice but to use potentially harmful sources of water. Our collective failure to tackle this problem has dimmed livelihood prospects for billions of people locked in a cycle of poverty and disease.

While adopting the Millennium Development Goals, the countries of the world pledged to reduce by half, the proportion of people without access to safe drinking water and basic sanitation. The results so far are a mixed bag. With the exception of sub-Saharan Africa, there is encouraging trend in meeting the drinking water target by 2015; however, progress in respect of sanitation remains tardy and depressing in many developing regions.During the period 1990-2002, about **412 million** more people have access to drinking water supply in South-Central Asia with major development in **rural** areas with a **16%** increase (+ 282 million), as contrasted to the **urban** settings where the increase has been around 4% (+ 131 million). World Water Day, 22 March 2005, reinforced the commencement of another International Decade for Action proclaimed by the United Nations General Assembly. **Water for Life** calls for a coordinated response from the community of Nations.

Meghalaya water supply position:

- There is a total of 2912 nos. of piped water supply schemes in the state as on 31.1.05, of which 2654 nos.(91.07%) are gravity feed schemes.
- Of the 2912 nos. of piped water supply schemes in the state, 2154nos. (74%) are fully functioning, 569 nos. (20%) are partially functioning and the remaining 189 nos. (6%) are not functioning.

The district wise status of watersupply schemes are as below:

Sl.no	District/ Region	% of Fully Functioning Schemes	% of Partially Functioning Schemes	% of Non Functioning Schemes
1	Garo Hills	80%	17%	3%
2	Jaintia Hills	72%	18%	10%
3	Khasi Hills	69%	22%	9%

Source : PHE Department Govt. of Meghalaya 2005.

Meghalaya Sanitation position: The position in this respect remained dismal .After the launch of Total Sanitation Campaign programme by the Government of India, two projects were sanctioned for two districts in Meghalaya viz., East Khasi Hills & West Garo Hills District during the year 2003-04 and baseline survey for all the districts were completed during the year 2004-05. This programme is underway in East Khasi Hills & West Garo Hills District. For the other districts, the project proposal is under the process of sanction. A daunting task lies ahead in the area of sanitation in the state.

The following discussion attempts to analyse on a broad canvass, the global commitment of water decade (1980-1990) and to attempt a post-mortem in order to understand some facets of water supply and sanitation.We all have to be alive to the challenges that lie ahead. The other topic is a presentation of cost estimation and other aspects in implementation of a hypothetical water and sanitation project.

POST- MORTEM ON THE WATER DECADE (1980-90)

"Dead water and dead sand
Contending for the upper hand…….
This is the death of water."

(T.S.Eliot, Little Gidding; cited, Winpenny. J.)

If water dies, can life survive? It is this knowledge and concern, which has drawn attention to the relevance and aspects of water and sanitation in our evolutionary perspectives and developmental thinking. The signs of this realisation,are reflected in philosophies all over the globe. The global collectivism was provided an initial spark in World Health Organisation launching a global water supply scheme in 1959. The inadequacies of such token and passing efforts, with growing realisation of the complexities involved in providing safe water and access to sanitation facilities, resounded further in world fora. The emerging suggestions crystallised in resolution 35/18 of 10.11.1980 of UN General Assembly declaring the decade1981-1990 as the International Drinking Water Supply and Sanitation Decade (IDWSSD). The goal was to provide access for people to safe water supply and hygienic waste disposal. The decade saw collaborative exchange of information, technical assessments and technological innovations with emphasis on environment, sustainability, community participation and realisation of integrated management concept. It also saw the impact of slowing economy, poverty, population-increase, and variances in perceptions, promise, prescriptions and practices within and across countries. It may not be rational to declare the death of an immortal issue; however, general appearance, milestones and marks (injuries) will be enlisted. Failure or success of the decade are two sides of the same coin; whether the 'glass is half full or half empty' (Shah.R.B.1993) is one and the same thing-the crux is –there is water in the glass.

SITUATION AT THE BEGINNING OF THE DECADE: The decade was sponsored by 7 UN agencies- UNESCO, UNDP, UNICEF, ILO, FAO, WORLD BANK, and WHO. In 1980, 2/3rd of developing countries' population did not have adequate access to safe water supply involving more than 70 % of rural population and 30% of urban population. For sanitation 75% of the population did not have sanitary facility- even pit latrine. In global context, population served by adequate water supply rose from 29% in 1970 to 38% in 1975 and 43% in1980.

The percentage with adequate excreta disposal rose from 27%in1970 to 33% in1975, but appears to have fallen to 25% in 1980(G. Bourne, 1984).

The thrust and focus of the programmes during the decade were: -

- Low-cost alternatives;
- Support activities for national planning of the decade;
- Information regarding countries, their plans and regarding funding source, criteria and interface; exchange of information;
- Public relations exercise, publicity - campaigns to develop and provide momentum for decade activities etc.

Figure 1 : *Situation at the beginning of water decade (HDR.1991, UNDP; cited Carter, Howsam and Tyrrel)*

	Population(millions)	Lack safe water supply	Lack adequate excreta disposal
Urban	933 (100%)	213 (33%)	292 (31%)
Rural	2303 (100%)	1613 (70%)	1442 (63%)
Total	3236 (100%)	1826 (56%)	1734 (54%)

Events and Undercurrents in the run-up and during the Decade:

1960s- Basic research by UNESCO, Administrative Sub-committee on Co-ordination of UN

Pre 1976- Limited International co-operation. Part of UN system;
WHO-close ties and links with sanitation and water; World Bank – with funding municipal water supply; UNESCO- collaborated with units of International Council of Scientific Unions.

1976- Habitat Conference in Vancouver, Canada highlighted water supply and sanitation needs.

1977- UN Water Conference, Mar del Plata, Argentina- "Action Plan" charted and suggested.

1978- Conference on Primary Health Care, Alma Ata, Uruguay

1980- Launching of Decade ; Revised Target by WHO-100% water supply; 80% urban sanitation, 50% rural sanitation

1981- Decade co-ordinator of UNDP-Peter Borne- resigned owing lack of UN support.

1982- World Bank –lending for water and sanitation drops to less than 1% of all lending (5-year average-5%)- ascribes fall in contributors' share, mainly U.S and other G7 countries; Lending for Latin America and Caribbean increases.

1983- World Water Conference, London reviews progress; WHO revised target-95% urban water supply; 85% rural water supply; 80% urban sanitation; no target for rural sanitation The TIMES, 13 July-"Water decade fails-Less than three years after its launch the UN has quietly abandoned its water and sanitation decade"

1984- Many projects awaiting donors' clearance and were on shelves in WHO.

1985- U.N report of progress- achievement and constraints listed; Based on WHO figures, realisation and admission that the goal may not be achieved without substantial acceleration. USAID closes its water and sanitation division; UNEP-approx-22% in urban area without water and 40% without sanitation; 64% in rural area without water and 85% without sanitation (almost same position as in 1970). The decade losing ground in rural sanitation

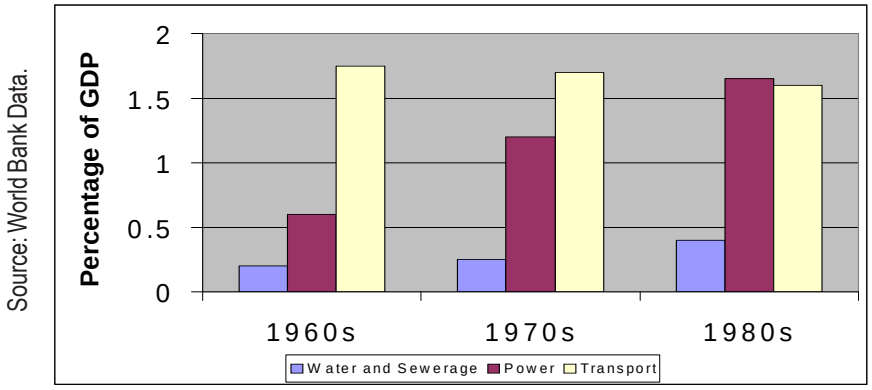
1986- World Water conference, London-2nd review; Indications that aid was flowing lopsided, probably on other considerations (more to Latin America, Caribbean, less to sub- Saharan Africa). WHO published figures: urban water spply-77% from 75%; urban sanitation-62% from 53%; rural water supply- 40% from 29%; rural sanitation-18% from 13%. WHO mentioned total coverage as distant dream Consultations between UN officials and 30 external funding agencies.

1988- UNICEF- "The state of world's children, 1989- water for all can be met in the decade of

1989- World Water Conference, London, (3rd time) – reviews progress.

1990- World Summit for children- a repetition of promise- "Universal access to safe water and sanitation by 2000"- to coincide with 'health for all by 2000'.

Figure 2 : *Public investment in Infrastructure in Developing Countries Over three Decades*



The happenings underscore the contradictions, hypocrisies and intricacies of promises of world order. In 1980, World Bank estimated and projected $600 billion (at 1978 price) for moderate level of service for water and sanitation. The Bank also obtained second opinion and revised it to $ 300 billion.

Biswas, A.K.1981 felt that this figure was less by atleast 20-30%(compared to the fact that spending was $240 million a day on cigarettes and $ 1400 million a day on armament) and doubted the commitment towards the decade.

SITUATION AT THE END OF THE DECADE: The facts that emerged midway and at the end indicated the complexity of the issues (Edward and Najlis, 1991).

Figure 3 : *Situation at the end of water decade (HDR1991, UNDP: cited Carter, Howsam, and Tyrrel)*

	Population(millions)	Lack safe water supply	Lack adequate excreta disposal
Urban	1332 (100%)	243 (18%)	377 (28%)
Rural	2659 (100%)	989 (37%)	1364 (51%)
Total	3991 (100%)	1232 (31%)	1741 (44%)

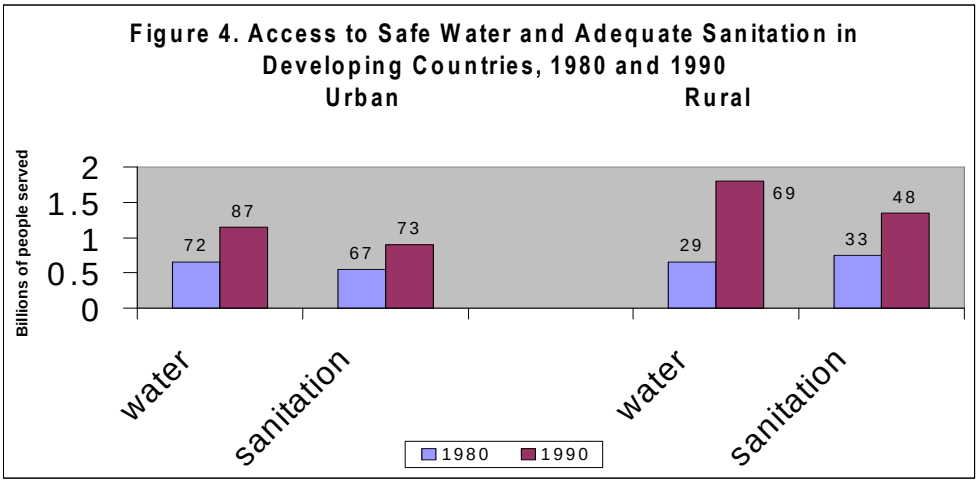


Figure 5 : *Results of the water & sanitation & decades.*

	Year	Total Millions	Access Millions	%with access	No access Millions
Water Supply	1980	323947	149283	46	174664
Water Supply	1990	399061	269795	68	129266
Sanitation	1980	323947	127359	31	196588
Sanitation	1990	399061	204342	51	194719

Source: Adapted from World Bank (Serageldin I. – 1995)

	Total	External	Internal
Africa	13.2	9.8	3.4
Americas	31.5	15.7	15.8
S.E.Asia	21.1	9.1	12.0
Sub-Total	65.8	34.6	31.2
Eastern Mediterranean	23.3	8.3	15.0
Western Pacific	44.8	3.1	41.7
Total	133.9	46.0	87.9

Figure 6 : *Total funding for Water Supply and Sanitation 1981-1990(U.S.$ billion).*

Achievements of the Decade:

1. Coverage: Number and proportion of people in developing countries increased dramatically- water supply in urban areas increased about 80% in1980s and sanitation by 50%(Briscoe, J.and Harvey. A.Gran, 1995). 1.2 billion more people had access to drinking water than in 1980; 770 million more had access to sanitation (NEDA, 1998). The coverage was more in rural areas and most of the increase attributable to Asia and the Pacific.

2. 'Water' reflected and focussed: Water as an issue reflected the enormity of the problem in the face of continuous neglect and scant respect it was given hitherto. The need for concentrated, continuous and integrated effort emerged. Need for an International system in water came to the fore and is increasingly getting louder thereafter. The 'Hydropolitics' became apparent and criticism was voiced. It exposed the weaknesses and hollowness of the world order.

3. Low cost and appropriate technologies: With more involvement of technically qualified personnel and NGOs, as the target threw challenge, - development, promotion and acceptance of modification in technology emerged. This resulted in reduced investment and operating cost to levels affordable by poor (NEDA, 1998) The costs of sanitation came to the level of US $50/head instead of $550/headUNICEF, 1990); potentialities for wider technology transfer, local manufacturing, employment generation and enterprise development in the sector emerged. Sturdy hand foot pumps, rope pump resurrected; VLOM (village level operation and maintenance) concept emerged. Technique for wells with improved rural tools, purification and filtration also became widely known. VIP (ventilated improved pit) latrine, sanplat latrines and compost latrines were successfully developed. Simple

techniques for transport and treatment of wastewater and organic waste was developed e.g. small-bore sewers and anaerobic treatment plants producing biogas (NEDA, 1998).

Figure 7 : *Aspects of Water Supply at the end of decade (Source WHO 1990 cited NEDA, 1998).*

Region	Construction costs Urban(US $/capita)		Construction costs Rural (US $/capita)
	House connection	Public stand pipe	Public supply (all levels)
Africa	91	55	44.5
Latin America & Caribbean	152.5	68.5	80
S.E.Asia	111.7	47.7	27.7
Eastern Mediterrannean	225	135	90
Western pacific	225	107	75.5

Costs by Technological level	Technology level	US $ per capita
High cost technology	Urban water supply (house connection)	200
Intermediate cost technology	Marginal urban water supply(Network with	
	public stand pipes)	100
Low cost technology	Rural water supply (wells with hand pumps,	
	gravity schemes)	30

Figure 8 : *Aspects of Sanitation at the end of decade (Source WHO 1990 cited NEDA, 1998).*

Region	Construction costs Urban(US $/capita)		Construction costs Rural (US $/capita)
	Sewer Connection	Other	Latrines
Africa	120	100	22
Latin America & Caribbean	120	70	25
S.E.Asia	151.7	36	10.7
Eastern Mediterrannean	360	65	72.9
Western pacific	600	155	38.7

Costs by Technological level	Technology level	US $ per capita
High cost technology	Urban Sanitation (Sewers & Sewage treatment)	350
Intermediate cost technology	Marginal urban Sanitation(On site sanitation)	25
Low cost technology	Rural Sanitation (On site sanitation)	20

4. Increased realisation and involvement of community and user: The decade also unfolded in growing realisation in planning and implementation of water and sanitation projects the issue of sustainability, role of users, participation, voluntary contribution and involvement of people in all stages of project cycle. It converged in contemporary thinking of 'people centred' approach of planning. (Ole Thirkildsen, 1988;NEDA, 1998). However, this realisation came later out of lessons from failures.

5. Health education - targeting and mobilising women, as an agent of behavioural change- Health education also became an integral part of water and sanitation programmes. Successful eradication of Dracunculosis (Guinea worm) supported by UNDP and UNICEF- was notable in Ghana, Nigeria, Cameroon, India, Senegal and Pakistan. Women's role as arbitrator of health behaviour in family and home was focussed. Women's increased role as stakeholder in use, management and maintenance of water supply and sanitation emerged.

6. Synergistic and Integrative: The decade saw linkages and relationships of technological, engineering, health, education, environmental concerns and poverty impact issues. The policy and planning approach saw 'shift from sequential to integrative', by the end of decade.

There emerged various spin-off from the issues listed above during the decade and brought to the fore appreciation and realisation of various challenges and barriers. Overall, 'it gave an encouraging picture, as a first stage providing the experience and the momentum' (Najlis, and Edwards, 1991) 'intended to act more as challenge and stimulus than a feasible objective'(NEDA, 1998).

THE FAILURES: WHOSE AND WHERE:

A. Target: ambitious and unmatched by action and fragmented approach: In the run up to the declaration of the decade many had expressed reservations-" although no one realistically expects such an ambitious goal to be achieved, it is expected that these figures will be dramatically changed during the period of time"(G. Bourne, K.Biswas, 1984). Ambitious and unrealistic target setting gave wrong message of being a hype and rhetoric. The fragmented handling of water and sanitation required more effort on co-ordination and consensus building than on action. The signals right from the start by UN, its agencies and the developed world were of detachment and dithering. This was coupled with lack of realistic and proper perceptions of water as finite, mobile and vulnerable resource (Falkenmark and Lundqvist, 1995).'Work on water issue in the wider sense lacks an effective forum' (Clarke, 1991). One explanation of such a response may be that water issues, due to their locality and diversity, will not fit into a convention on the lines of such as successful Montreal Protocol against ozone depleting substances (Biswas, A.K, 1993).

B. World Economic Situation: The situation of world economy during the decade was painfully disappointing (Najlis and Edwards, 1991). Many developed countries saw slow growth or negative growth in their economy. The debt of developing countries doubled during the period causing resource crunch. Sub-Saharan Africa was ravaged by drought, famine, war, and other disasters (Najlis and Edwards, 1991). The donor agencies did not commit themselves to the agenda. Sub- Saharan Africa received only 15% of disbursements in the sector. Only US$139 billion was invested, of which 66% came from own resources of developing countries. The targeted spending per annum was achieved only 25-30 %. This was also coupled with the failure of resource mobilisation and utilisation including cost recovery (NEDA; World Bank; Caster, Howsam and Tyrrel).

Figure 9 Estimated investment in water supply and sanitation, 1980-1990 (US $ billion) WHO, 1992(10% of total urban expenditure taken as peri-urban immediate system)Source: Ghosh and Nigam,1995.

REGION	WATER				SANITATION				
	Urban		Rural	Total	Urban		Rural	Total	TOTAL
	Total urban	Peri-urban			Total urban	Peri-urban			
Africa	5.1	0.5	1.9	7.0	5.8	0.6	0.4	6.2	13.2
Latin America	14.8	1.5	0.9	15.7	15.4	1.5	0.5	15.9	31.5
S.E.Asia	5.9	0.6	7.2	13.1	7.2	0.7	0.8	8.0	21.1
Sub Total	25.8	2.6	10.0	35.8	28.4	2.8	1.7	30.1	65.9
East Mediterranean	8.8		2.7	11.5	10.6		1.2	11.8	23.3
Western Pacific	10.9		15.7	26.6	14.3		3.8	18.1	44.8
Total	45.5		28.4	73.9	53.3		6.7	60.0	133.9

Of all lending by World Bank during the Decade, water projects consumed 20% of all lending amounting $35 billion of which $21 billion was allocated to irrigation and hydropower. Rural water supply projects received only 5%($1 billion) whereas for urban areas $5 billion was lent. Less than 4% of water lending during the decade went towards 'alternatives', 0.4% for small scale irrigation, 0.6% for watershed development and 2.7% for water conservation and efficiency, 76% went for new infrastructure, 11% for maintenance and up-gradation and 9% for Institutional development and technical assistance (World Bank, Cited in Waterline, 13(2), 1994). These clearly indicated deviation from the goal.

C. Population growth: The population-growth indicated no decrease. Sub-Saharan Africa had more than 3%; which meant even maintaining 1980 levels would require 40% increased service. Also,there was higher rate of urbanisation in developing countries (3.6%/year-more than twice of rural areas)

Figure 10 *Projected population growth (Source: WHO data in World Water – 1986 cited Briscoe, Ferranti – World Bank – 1988)*

Region	1980 (Actual – millions)	2000 (Projected – millions)
Africa,	330	450
Asia-Pacific	2060	2510
Latin America & Caribbean	120	130

Figure 11. Historic population for Biraben (Source : UN (1992), Shiklomanov, 1993,WRI,1994.Water and sustainability-Global patterns and long range problem (cited Raskin, Hansen and Margets, 1996).

Global Trends	1900	1950	1990
Population(billion)	1.6	2.5	5.3
Water withdrawal/capita(cum./year)	360	540	570
Water withdrawal Total(cu.km/Year)	600	1400	3000

D. Failure of commitments: Majority of the governments did not take up the challenge and the task seriously and looked up to donors. IDWSSD was an aggregate of the activities of the countries- there were many declarations by various countries-nature of scope and activities also varied widely (Najlis and Edwards, 1991). There was also vagueness as to what constituted 'adequate coverage'. Limited capacities of ministries and agencies and inter-ministerial and iter-sectoral divergences in different countries also made an impact on the committed work and coordinated action.

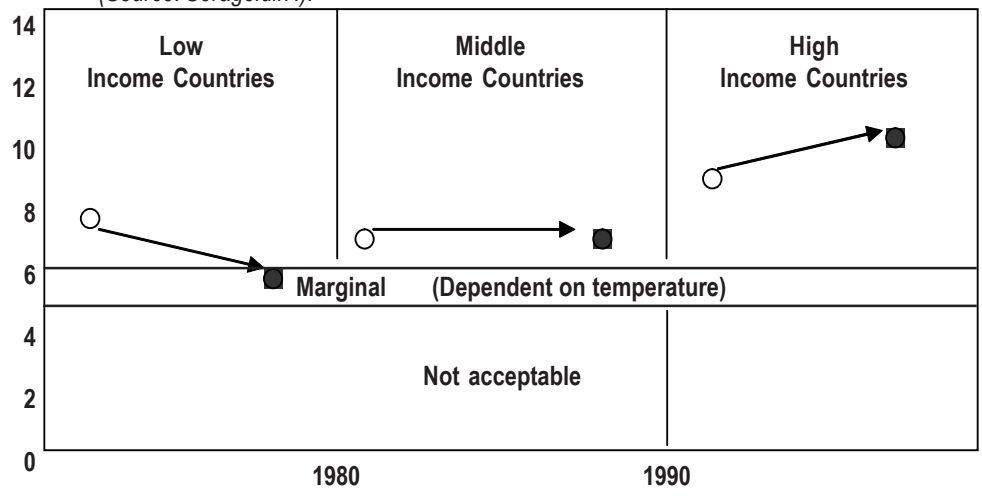
E. Other factors contributing to failures:

- Provision of water supply and sanitation was not the only priority issue in developing countries.
- Search for balance between government's involvement and its cautious with-drawal to allow and encourage local initiatives created confusion that also led to failures.
- Inadequacy of Human Resources, their distribution, suitable working environment, career prospects, needed due attention which was missing.
- A Late realisation of community participation as an effective tool was also a factor.

- Spending imbalance,more thrust in the first half in infrastructure building of water supply, disposal of solid and liquid waste was neglected. Sanitation sub-sector suffered and lagged; 85-90% allocation went to water supply.
- Later realisation of integrative aspects with environment, community, technology, health and resources.
- Fragmented sectoral policies, inadequate co-ordination, weak or non-existent institutions dealing with the matter holistically (mostly taken from World Bank, 1988; and Edwards and Najlis,1991).

The above factors and failures were also reflected in aquatic environment. While environmental quality in industrial countries improved over the 1980s, it did not improve in middle-income countries, and reduced sharply in low-income countries (Serageldin, I. 1994)

Figure 12. *Dissolved oxygen levels in rivers in Developing and Industrial countries – World Bank 1992. (Source: Serageldin I).*



Funding limitations	Import restrictions	Lack of planning and design criteria
Operation and maintenance	Logistics	Inappropriate technology
Inappropriate institutional framework	Insufficient health education support	Inadequate or outmoded
		legal framework
Inadequate cost recovery framework	Intermittent water services	Insufficient Knowledge of
		water resources
Lack of professional staff	Non-involvement of communities	Inadequate water
		resources
Lack of sub-professional staff	Lack of definite Govt. Policies	

COST ESTIMATION CASE STUDY :
Upgrading a WasteWater Treatment Plant.

Project objective is to refurbish and upgrade the existing 20-year-old wastewater Treatment plant as detailed in the project outline in the setting.

The important components of the project are: changing water distribution pipes attached with new flow meter; control and valve systems to ensure regular and equal flow to treatment tanks; sump pumps and determination of capacity; also impeller pumps and its size and diameter; reuse of old pipes for overflow pipelines.

Setting / External factors for assumptions:

For convenience of setting, the project is being undertaken in a developing country with tropical climatic conditions and congested urban areas. Corrosion rate and measures need to be understood. The tanks are metallic and reduction in the strength and thickness of the wall of the tank may require closer investigation. The steel structure for raising the tank and platform may also require closer investigation and inspection. It may be desirable to consider concrete structures. The condition of the old pipes will also be an important factor. Information concerning impeller size, capacity and diameter and requirements of sump pump will have to be associated. The area is congested, besides the old layout and design. With increasing awareness, there is apprehension regarding foul smell and mode of removal of debris, associated noise, dust and disturbance in the vicinity and prayed public opinion is sought to be assuaged. The level of expertise, organisational and financial capability of municipal organisations is generally not very high in developing countries. Since it concerns a public service, local politicians and opinion makers try to raise points and stakes. Use of local contractors or subcontractor and labour- based method will be harped for generation of local employment and business. Inter-agency co-ordination is another important facet.

List of the factors expected to have impacts on the cost for the purpose of preparing estimates:

1. The broad objectives agreed with the client in respect of defining scope, time frame, mode and manner of implementation, the mode of contract, and major constraints were defined (Time or cost or both needs deliberations; quality is

of utmost requirement as the work is associated with human health and hazard) and risks needs to be assessed; use of local labour etc.

2. The stakeholders and their functional relationships; roles and responsibility clarity pertaining planning, funding, execution, directions.
3. Process and time taken in decision- making. Extent and levels defined with adequate delegations at each level.
4. Socio-political situation, administrative practices and their implications on project.
5. Financial arrangement and flow of fund needs to be worked out in advance; separating local and offshore fund, own resource, grant, loans and programmes for the project.
6. Location and associated considerations; unhindered work site availability, safety and security; facilities on work sites.
7. The availability of basic data for planning and design; if unavailable, then additional cost for survey and compilation needs to be factored. Estimation should be done after considering all details.
8. Climatic and weather details of temperature, humidity, rainfall, wind direction, solar lighting.
9. Environmental details: Legislation and changes over time and likely trends of environmental/ water regulations; air, water, pollution levels; flora; rivers and distance of release; effluent quality requirements and standards and end-use/ reuse.
10. Design / technology criteria- to ensure untreated sewage is not discharged in the conveyors/ released; -adequate preliminary treatment to avoid sediment deposit in the conveyance system; -design conveyors (suitable diameters and gradients) to transport sediments in order to avoid sediment build up; -design conveyors to be capable of operating efficiently over a long period of time with minimum maintenance; -sufficient hydraulic capacity at the design horizon of say the year 2025; -average dry weather flows data and for 5 years past/ projected; -diurnal variations of flow and storm drainage; influent source, load and special requirements of treatments to avoid foul smelling; possibility of a tertiary system as additional requirements.

11. Logistics; operational, functional, executional, equipment and support systems; and providing contingencies.
12. Availability of resources: quantity, quality, timely, adequacy. Relative comparative costs in view of the market.
13. Material cost will follow from the detailed design and resource availability; such cost would include cost for pipes, platform and other structures, pumps, valves, flow meters, reinforcements and linings. Cost of these can be available from vendors, market price of similar projects and recent procurement records. The cost can be worked out based on standard rates for work and material items; cost of labour and wage or piece rates.
14. Capability of resources: Human (labour, organisational, technical), Capital, Community. Institutional strengths and steps for training / motivation.
15. Market factors: Demand and supply of the service, associated equipment and facilities. Current and future demand of the service- population, urban growth pattern, water consumption, waste pattern, projected level of service, system coverage, liability of flooding.
16. 75% of the installations are to remain on line, this may involve associated shut down, phasing, based on flow variations. Accordingly meticulous scheduling and of the works will have to be worked out; Standby pumps will have to be arranged.
17. Contract packages -advance works- e.g. such as design/ consulting /inspections / clearing the sedimentation tanks.

    - Civil works- tank structure refurbishing, pumping station, sludge handling and loading facilitator; interim outfall.

    - Engineering and maintenance- upgrading existing system; preliminary treatment plants; sludge de-watering facilities; pumping, E & M equipments for sedimentation tanks.
18. Work breakdown structure and allocations of responsibilities and any overlaps; arrangement for communications.
19. Types of contract; payment conditions in the contract; conditions and agreements in the contract. Amounts in the contract, after evaluation, can be utilised for revising/ updating the estimate.

20. Estimated recurring cost, maintenance aspects (as can not be done in-house) on contractual terms and mode of recovery/ funding and associated implications.
21. Schemes for cost recovery: Capital cost recovered/ not recovered; who will bear and institutional arrangements etc.
22. Arrangements for project, funding, contract, other statutory requirements, cost recovery; environmental / aesthetics mitigation measures and cost involved in these.
23. Odour development and prevention; method of removal of dried sludge.
24. Reuse of treated water and quality requirements.
25. Availability of water and costing. Impact of drainage/ storm drainage on sanitation.
26. Fixed Costs : repayment of principal amount borrowed; repayment of interests on borrowed capital.
27. Variable costs: such as – administrative expenses-salaries and wages; -repair and maintenance charges; -chemicals and consumables; - electricity charges; -depreciation charges.
28. Contingencies including control; Risk assessment and indirect expenses on engaging consultants, standby pumps; tolerances _+ 10%; Exclusions from base estimate (using 12 inches pipes); inflation; exchange rates.
29. Mechanism of cost recovery: such as – municipal tax; registration and connection charges; solid waste drainage tax. Internal cross subsidising; on time development charges; and sundry charges.
30. The expertise available in-house, continuity of staff and technical supervisors; expertise of local contractors and nature of their association with front runners; the work ethos prevailing etc.

The estimate should be based on detailed design. Terms of reference for the consultants must be clearly drafted. The Operational (resource cost) technique of estimating may be considered with incorporation of elements of factorial approach.The cost of labour, plant, equipment, and materials should be at current rates and should be accumulated as direct or indirect costs in the way they will be incurred- fixed, time-related or quantity- proportional. The operational technique

will have to take care of various uncertainties and risks which may cause delay. The technique would provide the basis for the base case cash flow; current cost/ time basis for application of inflation forecasts and compilation of a project cash flow. The cash estimate will take into account the cash flow projections. The total cost consists of consultancy, design cost, material cost, equipment cost, installations, erections, testing, and commissioning as components of base estimate. Contingencies will be added and tolerances of _+ 10% will work as overall cost estimate.

Project Execution Plan:

1.Initiation / Feasibility: Following points need to be elaborated and looked into:

- Broad objectives in consultation with the client and Constraints (defining Time, Cost, Quality axis; no compromise on quality as related to public health).
- Need assessment survey; only 25% functional dislocation.
- Establishing participatory spring flow measurement, monitoring of the undertaking.
- Completing initial inspection and feasibility report; technology choice.
- Rough estimate.
- Project team constituted and selects targets.
- Consultant engaged and mandated.

2. Stakeholder analysis/ social profiling:

- Government; agencies; local bodies and civil society.
- Community mapping; profiles; felt need, perceptions, objections, suggestions.
- Prioritisation.
- Technology choice.
- Mode of participation in financing, operations and management.

3. Preparation phase / Development:

- Managemental arrangement / administrative arrangement.
- Define objective; define beneficiaries.
- Define project; work breakdown, components, constraints.
- Define roles and responsibilities; delegations and devolutions.
- Define action plans, network, scheduling, monitoring.

4. Training / Predesign:

- Training of promoters, Management, Stakeholders, Project Team, Staff, Design Team.
- The in-house designing and estimating efforts.

5. Detailed Design:

- Project design team completes technical survey and detailed design with quantity and cost estimates.
- Design discussed and shared with stakeholders (client, funding agencies, govt, other agencies involved) and important vendors.

6. Approval:

- Detailed Project estimate and arrangement shared with all stakeholders and in principal approval.
- Proposal submitted to various agencies involved- government, local bodies, client /funding agencies.
- Project management and Technical advisors/ Consultants make presentation of design and cost estimate for donors/ client's approval.
- Discussion and agreement on design and construction and project programmes and obtains approval.
- MOU signed formally detailing commitments.
- Steps for sanction and release of funds and pursues it.
- A core Co-ordinating and Monitoring Committee involving Client and important stakeholders constituted with due empowerment to the representatives.

7. Contract and Procurement:

- Project management takes steps inviting bids for procurement and contract.
- Evaluation and appraisal of bids and award for suppliers / contractors award after consulting client.
- Involvement of local capable contractors, vendors.

Contract strategy: The work has limitations of a clear- cut definition, because in such a sensitive public work connected with health and hygiene, it is better to be

cautious and not take chances. Further, 75 % of the layout has to remain on line. Design specifications will definitely have to take care of corrosion, structure, pumps, valves, flow meters and any associated technical details; however, certain risks remain. Thus the contract strategy will address the requirement in the situation. In this case there appears to be considerable uncertainty and challenge of design and work execution requiring ingenuity and motivated action on the part of the contractor. Thus, in such situation, most suitable is Target cost contract as time is a great constraint. Adequate pre-tender design, site investigation and material search must precede. Initial target cost may be based on the most upto-date knowledge of work available and a comprehensive costed programme for the project. Management contract may also be thought of but the level of expertise of the contractor, possible delay in work and associated problems in such a case becomes a negative factor. In this case since public health and risks are involved, hence the project team, client will have to constantly monitor and supervise and work in tandem with the contractor. There will have to be consultations and good co-ordination among them. Besides, incentives can be provided for efficiency and cost effectiveness. Such a contract is of cost reimbursable type, minimising claims on account of variations, settlement becomes easier, involvement of client is collaborative and decision making is faster in the given imperative situation. Competitive bids will be invited from a pre-qualification and screened list of contractors. The evaluation of bids by comparing the market prices, detailed costing break ups and internal assessment devices and similar experiences would allow the choice to be narrowed to one or two most suitable contractors. Relevant experience and proof of expertise is paramount. Safety record of the contractor is also important, both in respect of work execution and considerations of facilities and safety towards men along-with equipment and working environment. Further, while selecting the contractor, his track record on ingenuity and capacity for executing the work in simultaneous- operation stage, restricted site access and availability will have to be considered. Thus, the Target cost contract is preferred on account of flexibility, cost effectiveness, close co-operation between client, project management and contractor; multi-contract situation such as instrumentation, pipe-works, installations and structures, constraints, restricted access and availability of refurbishing components, considerable uncertainty, timely execution etc.

Payment to the contractor will have to be on actual cost with certain incentives for risk sharing. This will have to be negotiated and agreed upon before the award and agreements. The savings, if any, will be shared, too, in accordance with the agreed mechanisms for incentives. Fee will be paid for separate payment for overheads and other costs as per contract agreement and not be covered under actual cost and profit. Change in scope and major changes and variation in design as agreed in contract condition would entail additional payments as due and agreed.

8. Implementation:

- Project works starts.
- Scheme construction- Project manager, project supervisor and contractor; (client).
- Monitoring the progress- Project manager, client, and government. (The project planning and implementation Committee).
- Testing, commissioning and opening- Project manager, client, Contractor.

Step 9. Completion and Operation:

- Workshop/ training for operation and maintenance.
- Project completion reports.
- Monitoring visits- 6 monthly after commissioning; follow ups, recommendations.
- Regular check/ monitoring of influent / effluent quality released, other important parameters and operational criteria.
- Instrumentation checks associated and regular servicing.

Step 10. Evaluation:

- Monitoring and Evaluation of functional, design, technical, organisational and other aspects for evaluating the success and forecast of projections and assessing achievements. Once after 6 months and later after 2 years.
- Recommendations for the project.
- Recommendations for future projects.

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V. MOTIVATION THEORIES AND ANATOMY OF A CASE STUDY

INTRODUCTION:

Man is a rational animal, so was the premise in deductive logic, to illustrate man. Maslow, A.H. says 'man is a perpetually wanting animal' indicating instinctive aspect in man. I am also reminded of T.S.Eliot, in 'The Rock' reflecting : ' The lot of man is ceaseless labour..", and he goes on to define man as " The perpetual struggle of mankind is man." The greatest obsession or tryst of man has been his quest for self (literally and figuratively). Whatever man has created and endeavours to create has been the consequence of this quest for understanding his self and its interaction with the environment in whic he lives and that surrounds him. One important facet of this quest (perpetual want/ struggle) has been to discover what enthuses, pumps-up or energises man? The search has taken us to all directions and frontiers - intrinsic and extrinsic, biotic and abiotic, individualistic and collectivistic, body and mind, machine and organism, drive and force, push and pull and such others. Yet all theories have been unable to answer fully that eluding facet of the quest which in organisational behaviour has been termed as motivation.

An act is performed, things happen or are made to happen. While performing, one may or may not be conscious of what makes him do or perform; similarly, in a team what makes one do which others are also attempting differently? Though 'men like watches always differ', but what makes them tick together? Is it to achieve or attain a goal, and if so is it a desire or expression of his narrow self or his expanded self? Is there synchronism or synergy in what men attempt as a group?

This essay attempts to understand a few strands of thoughts and theories in respect of motivation. A case of small action-group in the shape of District Blindness Control Society in a remote tribal hilly district of Meghalaya state of India would be illustrated from personal knowledge. In the cited case mainly the need theory of motivation has mainly been explained besides also giving sprinkle of other theories and comments.

Definition and Dimensions: The term 'motivation' is derived from Latin word 'movere' meaning 'to move' (Steers and Porter, 1991). Motivation has been defined 'as the set of processes that arouse, direct, and maintain human behaviour

toward attaining a goal' (Baron, R.A. Greenberg, J. 1990). Mitchell (1982) defines motivation as 'the degree to which an individual wants and chooses to engage in certain specified behaviours' (cited Mullins, J. L.1996) and says that 'motivation represents those psychological processes that cause the arousal, direction, and persistence of voluntary actions that are goal directed' (cited, Ford, M.E.1992). Steers and Porter (1987) believe motivation is concerned with-1. What energises human behaviour; 2.What directs or channels such behaviour; and 3. How this behaviour is maintained or sustained.

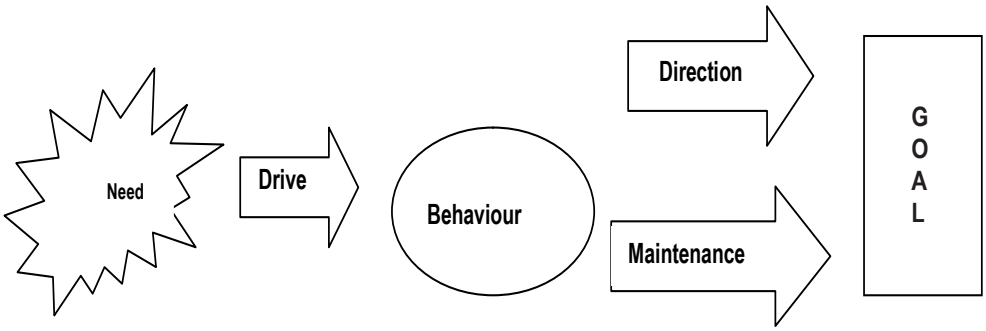

Figure 1. *Components of Motivation (Baron,A.R.& Greenberg,J).*

4 (four) common characteristics underline motivation (Mitchell, 1982, Cited Mullins, L. J. 1996)-

- Motivation typified as an individual phenomenon ('concerns human' Maslow,1943);
- Motivation is described, usually, as unintentional, ('more unconscious than conscious'Maslow,1943);
- Motivation is multifaceted with two important factors such as arousal/drive and direction or choice of behaviour;
- The purpose of motivational theories is to predict behaviour (Motivation is not behaviour and is not performance- it is collective expression of concern for action, external and internal forces influencing choice of action).

Ford, M.E. (1992) in proposing Motivational Systems Theory (MST) has defined Motivation *'as the organised patterning of three psychological functions that serve to direct, energise and regulate goal directed activity: personal goals, emotional arousal processes and personal agency beliefs'.*

Thus building blocks in generalised model of motivation can be, needs or expectation, behaviour, goals, and some form of feedback (Steers and Porter1991).

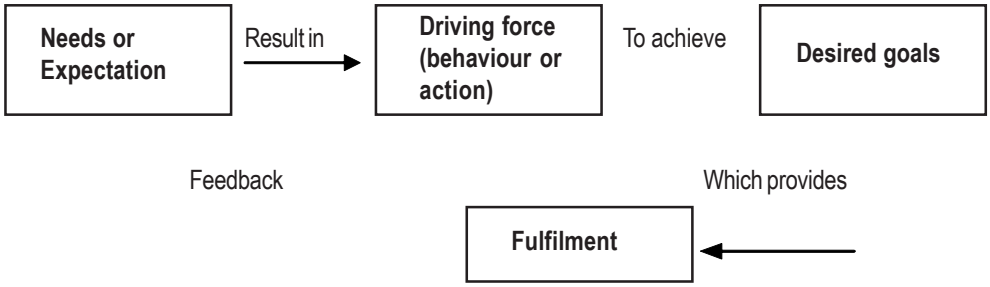

Figure 2. *A simplified illustration of the basic motivational model (Mullins, L. J. 1996).*

The underlying concept of motivation appears to be ' some driving force within individuals by which they attempt to achieve some goal in order to fulfil some need or expectation' (Mullins, L. J.1996). Carlisle considers motivation 'as a response to the tension resulting from lack of need satisfaction' (Perera, 1989).

It will be appropriate to understand the theory of human motivation propounded by Maslow (1943,1954) where basic needs have been enlisted and also other related theories in order to illustrate implicit and explicit divergences. Maslow's Basic Needs can more rationally be understood by having appreciated the preface of his theory of human motivation, as summed up below: -

1. Integrated wholeness of the organism, and all states of the organism in motivated or as motivating;
2. Non-somatic origin;
3. Motivation theory related and centred to human;
4. More on unconscious level than conscious;
5. Various cultural paths to the same goal;
6. Typically an act has more than one motivation;
7. Human needs arranged in hierarchies of prepotency;
8. Needs are interrelated and stratified; higher needs emerge only when lower needs are satisfied;
9. Not only integration of organism but relatedness and reactions exists;
10. External and internal environment must be taken into account.
11. Motivation theory not synonymous with behaviour theory- Motivation as one of the determinants of behaviour which is also determined by culture, biology and situations;
12. Classification of motivation based on goals rather than drives or behaviour;
13. Motivation classification must deal with problems of level of specificity or generalisation of the motives to be classified.

Maslow, (1943) detailed needs in hierarchical prepotency as -Physiological needs; Safety needs; Social needs (Belongingness); Esteem needs; Self-actualisation needs; further, he added Knowing and Understanding (Cognitive needs); Aesthetic needs below self actualisation and Transcendence needs above it. A need only motivates when the preceding need has been satisfied; satisfied needs are no longer a motivator and there is innate desire to move upwards in the need hierarchy. He further believes that satisfaction of these wants 'is not ordinarily altogether mutually exclusive but only tends to be.' The need hierarchies have been modified by Alderfer (1969); Mc Clelland (1965) elaborated to indicate flexibility of need states by training for strengthening and achievement.

It may be mentioned that Maslow has elaborated and admitted possibility of flexibility in respect of degree of fixity of the hierarchy of basic needs. In some self esteem is more than love needs; in innately creative persons creativeness more than any other determinant; ideals, high social standards, high values made secure in the earliest years, tend to remain secure and strong thereafter in the face of threats (Maslow, 1943,1954). It has also been stated that in reality most of human beings have varying degree of partially satisfied needs; and emergence of new need for the first time is gradual from nothingness. Thwarting of needs have dangerous consequences of psychopathic origin.

MURRAY	MASLOW	ALDERFER	CONTEMPORARY	HERZBERG	MC CLELLAND
Psychogenic: Abasement; Achievement; Affiliation; Aggression; Autonomy; Defence; Dominance, etc. **Viscerogenic:** Food, Water, Sex, Urination, Defaecation, Lactation,	**Transcendence**	**Growth**	**Intrinsic**	**Satisfiers Or Motivator Factor**	**Need for achievement**
	Self-actualisation				
	Aesthetics				
	Knowing & Understanding		**Social-interaction**		**Need for Power**
	Esteem	**Relatedness**		**Hygeine Or Maintenance Factors**	
	Social				**Need for affiliation**
	Safety	**Existance**	**Extrinsic**		
	Physiological				
Divided into two categories but not arranged according to level or importance	Arranged in a hierarchical prepotency	Arranged in a hierarchical order, but all can be active simultaneously	No order of Importance implied		

Figure 3. *Comparison of Need theories (modified and expanded from David. J. Cherrington, 1983 (cited. Steers & Porter ; & A. Sargent, 1990).*

Whereas the physiological needs and safety needs are inherent, it is the love/social need where man as social animal exhibit the dimensions of higher emotions. Affiliation, group, family, the aspects of strength, confidence, freedom, independence, prestige, self respect, recognition, appreciation, evaluation of others and self, etc is reflected as esteem needs. 'What a man can be he must be' (Maslow, 1943)- the restlessness of man to achieve and express his self takes him to higher manifestations of self-actualisation. Maslow (1954) has added Knowing and Understanding (Cognitive needs) and Aesthetic needs which were appropriately put below self-actualisation. The essential aspect of human rights and freedom which were mentioned as 'almost ends' earlier, have duly been accommodated as needs. Further, actualisation of self can not be limited to the self as the need to expand the self and merge in Cosmos has been the essence of religious philosophies in one form or the other. Hence the transformation of self to Cosmos has been accommodated, as Transcendental needs. It may be surmised, here, that these higher level needs are always in dynamic state in intelligent and perceptual persons and at that level the state of needs might be alternating or interacting continuously as constant learning and may be considered to be in 'dynamic flux' till attainment and full release. There may be criticism of need theory by behavioural mangers that it does not provide a formula for motivating men. Some would like to have things measured and proved in laboratory. The innate aspects concerning humans are proved by its long persistence of use rather than some hypothetical calculations.

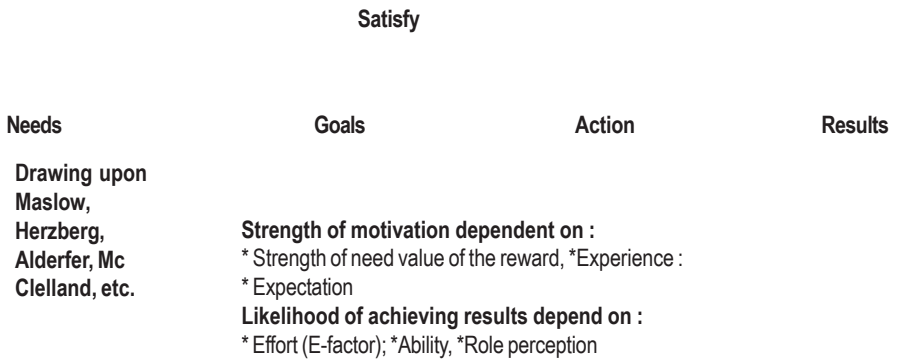

Figure 4. *The Complex model of Motivation, (Sargent,A.1990).*

Besides, need theory, Expectancy theory (Vroom, 1964); Goal theory (Locke); Equity theory (Adams) and Attribution theory (Heider and Kelley, 1973)

and Motivational Systems Theory (MST)(Ford, M.E., 1992) are some of the many theories abound describing mainly the 'process approach'. These may be dealt while explaining the case cited below.

The Case of District Blindness Control Society (DBCS), West Garo Hills, Tura, Meghalaya, India.

Some cultural facets of the district are- Predominant community- Garo (tribal; mostly converted Christian, some non-christians); Others- Hindu (tribal and Nontribal); Muslims. Garo society- Clannish, by and large egalitarian, and Matrilineal; others apparently collectivist. The topography is hilly terrain.

a. Background: Blindness control has been an important National health and social concern. National programme for blindness control was being implemented through the Directorate of Health Services in States, through normal channel of District Medical and Health Officer (DMHO) and the district Surgeon in districts. The objective was both curative and preventive. The achievement in the state of Meghalaya, a hilly tribal state in the Northeastern part of India, in the period 1983-1993 was reportedly not encouraging. The number of cataract operation undertaken totalled only 500 (more or less) during the decade in the entire state; the respective figure for the district was reportedly only 50 (more or less) and attempts to organise camps in the district had not met with success.

b. Formation of District Blindness Control Society: Instances of higher achievement elsewhere in the country indicated responsive involvement of district administration in such socially oriented programmes. This infused a policy direction for constitution of an autonomous registered society under the chairmanship of the District Collector/Deputy Commissioner (D.C.) all over the country. The society was to have a full time, qualified person as secretary; involvement of NGO functioning in related field, District Medical and Health Officer (DMHO), Surgeon Superintendent of Civil Hospital (100 bedded), Eye Surgeon and the Adviser opthalmology as state co-ordinator of the programme as members. The fund was to be released to the society after receiving the reports of progress and completion of

other formalities. Awareness building, eye screening, and operations both in camps and hospitals were programme components.

c. Administrative system-traditionally putting D.C. as representative of the state government; officials look up to him for guidance/ direction and advice; people accept him/her as such to a varying degree, also consider him as source of administrative wisdom, action and expects fairness and justice (being the head of administration of justice). As in the case of bureaucratic set up-problems of co-ordination, political dimensions and their ramifications, general motivation level may not be high, 'status-quoist', uncertainty, avoidance is high in general, lack of innovation, experimentation, can be generalised problems.

d. Changed structure, mode, roles and leadership and The process of achieving: The DBCS in West Garo Hills District was registered during 1991/ 1992 but activity had not started till May1993. No fund was received by the society consequently. The Adviser opthalmology (a lady) was the new state co-ordinator, who had a chance meeting with the D.C. (who had recently joined the district) in the state capital and discussed the necessity and opportunity in this respect. Both showed enthusiasm and resolved for action. A meeting of all concerned in the district headquarter as planned and initiated by the D.C. materialised. Superintendent of police and Commandant of Border Security Force were also invited in the meeting and made co-opted members. The state co-ordinator assured personnel and team support and also initial medicine and supply of spectacles for post- operative distribution. Initially the members were cautious and reserved in their critical analysis. On encouragement, and rapport establishment (as the D.C. had earlier served the district as ADC) the coldness melted and the reservations of members and their past experiences were listed. Mostly the problems were of planning, co-ordination and motivation. Besides, there were no focussed action in the past, responsibilities were not delineated, monitoring was poor, there was no effort to elicit people's support, there were also ego-clashes among professionals (technical persons). Motivation of all concerned was an important task. A calendar for annual action and organisation of eye-operation camps were fruitfully discussed and prepared. Full expression of difficulties, reservations, possible roles in future assignment, suggestions for improvement and possible implications of actions were deliberated in participative manner.

The meeting of the society decided to select the in-charge of 'blind school (a small but beautiful set-up run by a Christian missionary organisation) as its secretary. The person, an elderly lady of foreign origin working in the district for more than a decade, obliged on honorary basis with occasional help of staff during camps. A private eye specialist, the only other in the district, was also roped in right from the very first meeting. The private eye specialist was of foreign origin of a neighbouring country but naturalised citizen by marriage, working in other Christian missionary hospital. The DMHO was a positive person (muslim by religion) , the surgeon superintendent was a Hindu and the eye-surgeon a tribal, all from the neighbouring state of Assam. There was another philanthropic doctor from government set-up, secretary of red-cross society, a Bengali gentleman, working in the district for more than 25 years.

The first eye-camp was crucial to test the basic hypothesis that this time it will work. Since fund was not released by the Govt. of India by then, it was a major constraint. The approach adopted was to utilise equipments and infrastructure of state government, mobility by all individual resources of the members with supplement from district administration. The paramilitary force operating on the international border areas were to support logistics of cots, blankets, kitchenware and also support staffs for cooking. In order to elicit good response, especially from the poor, it was decided to provide free food (5-6 days) for the patients and one attendant per patient from the kin. It was also decided to provide free medicine, spectacles, and post-operative follow up and advice on the indicated dates on their health card , in addition to the camp cost being free. The raw materials for food were mobilised through district chamber of commerce, traders and local organisations. Volunteers were from the schools, NGOs and the Youth clubs.

The methodology adopted for such mobilisation was to have a meeting with the Local community usually 4-6 weeks in advance to explain and enthuse the community. The meeting was invariably initiated by the D.C. with core members of the society present and participating. It lead to a firm planning, delineation of duties and responsibility and indicated commitment of the groups where individual roles were complementary, supplemental and which allowed free and volentary expression of commitments. A close monitoring of progress of arrangements, publicity and awareness through media, local community, market committees, and through all

possible means with contingency for emergency and shortfalls were scrupulously palnned and managed.

e. The Achievement: The result of the first camp was an encouraging turnout of 400 an odd eye-patients and 51 operations in the camp. The society soon received the grants from the government after the reports of two camps were sent. The society having smelt success went about the task with full vigour and dedication, further refining from the feedback and arranged 7 (seven) such camps in the first year achieving 551(more or less) operations. In the second year the operations were about 400, and the activities expanded to eye screening in block areas, schools with intensive awareness building on eye-care. Organisation of essay, quiz, topical issues in the shape of debate, essays, science exhibitions, seminars, etc.. Extensive use of media campaign including through local T.V. station in local language was adopted. As an additional outcome, politicians appreciated the efforts and did not attempt to thwart it realising the people's support for such actions. Many Public Health Centres Buildings constructed but not made functional were energised (motivated) to be made functional as eye-camps utilised such buildings invariably to put positive pressure on the health authorities to make the facilities functional.

f. What 'did' the actors-Possible Motivating Factors: In the related case, Good (self) performance; Professional satisfaction for all participants from various dimensions; and search for the expression of self, driven by various need dimensions can be briefly explained as below.

NGOs- blindness related activity; wider activity area, learning and interacting; (a lump sum cash incentive besides formal appreciation to the key persons). Esteem, cognitive, aesthetic and self-actualisation needs and possibly beyond.

Professionals- non-government- alternative role, job enrichment, esteem, opportunity (suggestions from some corner to appoint the person as secretary and eventually materialising), to improve his hitherto dwindling professional image; monetary incentive.

Government- State Co-ordinator; DMHO; Surgeon Superintendent; Other physician (a compulsive philanthropic): Knowing and understanding, aesthetics, esteem to self-actualisation. Reduced pressure on hospital with attendant savings of resources; shift of responsibility and risks; power to

certify the adequacy of camp arrangement; (Surgeon Superintendent most reticent, but veered around to keep district administration in good humour and realised the promise and potential of a good work).

Eye-surgeon- direct responsibility in health sector; in the underlying conditions poor would not have come to him; a good motivation was also a vehicle(a jeep) of the society which was provided to him (on which the Surgeon Superintendent also had an eye; and generally district administration keeps such vehicle). This was a good entry point to ensure his continued commitment, else..; from time to time the vehicle was also utilised for the society activity. He was given additional responsibility of maintaining accounts, as the honorary secretary was reluctant. In this case , it was Security, esteem needs, cognitive needs, aesthetic needs and self-actualisation. (the career appraisal of DMHO, Surgeon Superintendent and eye surgeon and superintendent of police was to be initiated by the D.C. as a normal administrative action)

People- Good face to district administration as it works both ways; power display by providing community resource; community leadership roles, emergence and display; chanelisation of energy of youth, merchants projecting Good Samaritan image. Esteem, cognitive and aesthetic needs seem to interplay.

Patients- free medical care; congenial environment near their villages, free food for self and attendant; faintest hope of being able to see (even partially-many cases were blindness for more than 8-10 years); free cost of medicine and spectacles. Physiological, safety, social and esteem needs.

For family of patients – less cost (only travel), risks, and troubles; post operative care included. Safety, social and esteem needs.

For the administrator- Leadership, meeting a challenge, self-esteem (good self-appraisal for carreer sheet; an enriching experience to relate), probably a means of understanding and knowing, aesthetics, self-actualisation, and possibly beyond.

Police and paramilitary- part of administrative set-up; opportunity for pro-people face projection (esteem); closer understanding of forces in the community and aesthetics.

THE ANATOMY OF CASE RELATED :

As an enriching experience, it is embedded in the memory. One would like to moralise **" Therefore without being attached to the fruits of activities, one should act as a matter of duty, for by working without attachment one attains the supreme"** (text 19, chapter 3-Bhagwad Gita as it is).

Charity in Indian ethos cuts across religion. The cited case also indicate strategic planning by the administration (leadership) in which motivation energised the potentials of individuals involved to accentuate the outcome and effectiveness (as shown diagrammatically below)

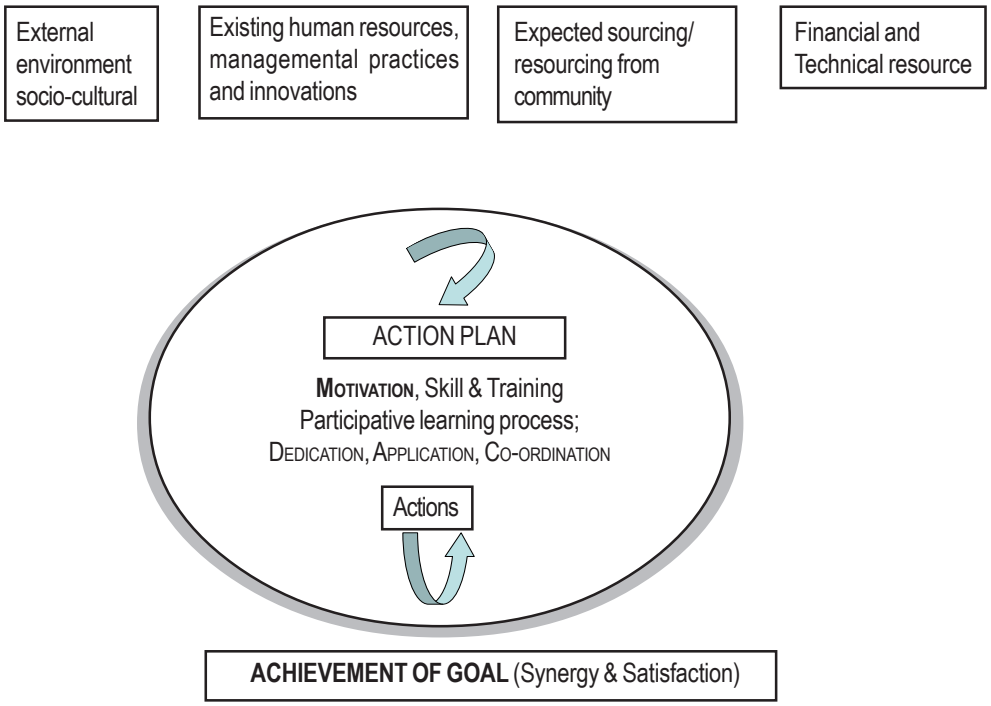

Figure 5. *Representation of relational aspect in Planning, Motivation, Action and Achievement.*

In the cited case we can see the needs as motivating factors in different strata of actors. Physiological needs (to get cured of blindness and the urge to see again by patients). Security needs from cost, care and post operative dimension by patients and family members. Overall, social needs in the programme objective, performance of the group, response from the public and general response in the turnout. Abundance of esteem needs by people, professionals and all. The aspects of aesthetics and cognitive capacities and self-actualisation shown by the

administrator, professionals, people, traders, NGO; and some individuals possibly of Transcendence. It may be of relevance that the state co-ordinator and the secretary being woman and highly motivated persons and other lady nursing staffs involved must have accentuated the cause. Organisationally the formation of society itself was need driven; so was the need for better esteem for the administration in general. Besides, we can see the sprinkle of process approach of expectation and from management point of view Mc-Gregor's theory 'X' and 'Y' operating in subtle manner. In the cited case individuals showed to a varying degree some aspects of characteristics of a self actualisation people as pointed out by Steers and Porter, (1991) such as : *1.Superior perception of reality ; 2. Increased acceptance of self, and others and of nature; 3.Increased spontaneity; 4.Increased in problem centering; 5. Greater freshness of appreciation and richness of emotional reaction ; 6. Increased identification with human race; 7. Improved interpersonal relations; 8. More democratic values and character structure; 9. Greatly increased creativity; and 10. A carefully designed system of values.*

In the cited case, the 2 characteristics which appears to be missing are-detachment and desire for privacy and autonomy and resistance to restrictive cultural norms. These are mostly highly individualistic characteristic not compatible with the nature of goal and the setting in the referred case. Steers and Porter (1975) mentions that need for achievement can influence the relationship between performance and job satisfaction. It is also found that managers having a high need for achievement also tend to be more participative, i.e., they tend to allow their subordinates to have a greater voice in decisions affecting their jobs (Steers and Porter, 1977) as was abundant in this case.

Mc Dougall and Solomon (cited: Lawson, K. Savery, 1996) suggested seven (7) working conditions positively associated with the job satisfaction which were also applicable in the stated case : *1. Mentally challenging work (with which individuals can cope); 2. Personal interest in the work itself; 3. Work which are not too tiring physically; 4. Rewards for performance in line with personal aspirations that is just and understood; 5. Working conditions which are compatible with the individual's physic needs and work goals; 6. High esteem on the part of the employee; 7. Help in attaining interesting work, pay and promotions in minimising role conflict and ambiguity.*

In a case study of NTPC, India ,Shahi (1989) mentions top five (5) motivating factors across the levels as *: a. sense of achievement; b. greater responsibility; c. avenue for growth; d. Recognition for good work; e. autonomy and freedom in work in varying level of hierarchy in the organisation.*

This order was reflected in middle and higher managerial levels though lower levels also reflected it but not in the same order. Most of these can be seen to be echoing the same in the stated case, which lead to the success in achievement.

Zender (1971, Cited Mehta, P.1994) mentions that the tendency for group achievement is similar to that of individual achievement-and members are concerned with group outcome for personal satisfaction. Members in the cited case showed strong commitment for group outcome and derived personal satisfaction from contributions of others too in a synergistic manner.It was seen that as a group everyone found his or her island of roles besides contributing to achieve the collective objective. De Tocqueville, (cited Whyte,Jr.W.H., 1989) mentions *'the more equal social conditions become.... the more men display this reciprocal deposition to oblige each other.'* Further, Whyte, Jr. (1989), mentions that '*people co-operate for substantive reasons- to achieve certain goals, and unless these are comprehended, the little manipulations for morale, team spirit and such are fruitless'*. Thus in sustaining the programme in the case cited, individual's appreciation and grasp of situation must have been the key factor.

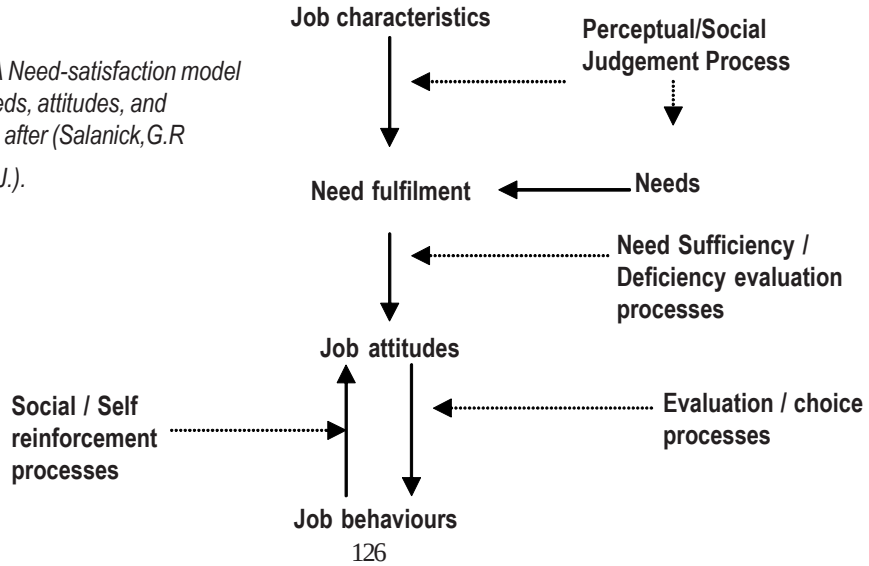

Figure 6. *A Need-satisfaction model of jobs, needs, attitudes, and behaviours after (Salanick,G.R & Pfeffer, J.).*

Mehta (1976) mentions that working people tended to show strong concern for collective goals of social achievement in ' action projects'. 'In such cases leadership quality imbued expressed significantly greater concerns for social achievement... they also showed greater democratic tendency for collaborative and co-operative action' (Mehta, P.1977). According to Mehta, social achievement is different from the *n.* achievement of Mc Clelland, as it encompasses ' the improvement of conditions and quality of life for the group or society to which one belong' against the individual focus in *n,* achievement. Bandura, (1977,1982, cited Mehta, P. 1994) has indicated 'efficacy expectation' and 'outcome expectation' and combination of these in 4 (four) behavioural situations-

Personal efficacy	Outcome expectation	Resultant behaviour
High	Low	Engage in Social activism
High	High	Work within the system to achieve their goals.
Low	High	Feel inferior and despondent
Low	Low	Resigned and apathetic

According to Dreze and Sen, (1989 cited Mehta, P.1994) "***concern with the lives of others is clearly a crucial ingredient of public action".*** Enlightened and committed field functionaries and organisers help initiate the process of empowerment of the poor and public has to be seen as an agent and not merely as patient (Dreze, & Sen, cited).

Kanungo and Mendoca (1994), while referring to Hofstede (1980) in respect of cultural dimensions of uncertainty avoidance, power distance, individualism and masculinity, mentions the environment in developing countries as relatively high on uncertainty avoidance and power distance; relatively low on individualism and masculinity; further, in respect of additional dimension of Abstractive vrs. Associative thinking (Kedia, and Bhagat, 1988, Cited) found the characteristics as low on abstractive thinking and high on associative thinking. The views of Kanungo et al appear a generalised mechanical overspread of western treatment of India as by Hofstede. The cynicism (or narrowness) of their thinking is further reflected in " Unlike in western cultures, work is not an act of self- fulfilment or self- expression, but is primarily a means to fulfil one's social obligations which begin with one's family..." It seems that in their over generalisation of the characteristics of developing

countries, Kanungo has totally missed the essence of 'Karma yoga' and has isolated one thread of the weaving to depict Indian culture and misinterpreted it. 'Everyone must engage in some sort of activity in this material world. But actions can either bind one to this world or liberate one from it. By acting for the pleasure of the supreme, without selfish motives, one can be liberated from the law of Karma (actions and reactions) and attain transcendental knowledge of self and the Supreme (Chapter 3-essence- Bhagwad Gita as it is). Sinha, D. And Tripathy, R.C. (1994) mentions in this context 'when a whole culture or society is pigeonholed in dichotomous categories such as masculine / feminine, active /passive, or loose/ tight, subtle differences and qualitative nuances that may be more characteristic of these social entities are glossed over'. Further, the authors describe that both individualistic and collectivist orientation may co-exist within individuals and cultures in particular reference to Indian situation. They mention Indian Psyche as a) highly complex-display high 'tolerance of distance'; and b) Indian selfhood is so constituted as to react highly in contextual manner. They further elaborate the distinction with the western mind "in the way boundaries are laid that define mental structures. In the western mind boundaries appear to be more stable and fixed-self and environment, mind and matter, subjective and objective, material and spiritual... *The Indian mind... is governed by boundaries that are constantly shifting and variable. The self sometimes expands to fuse with the cosmos, but at another it may completely withdraw itself from it* .The self and in-group have variable boundaries. The self does not relate to the in-group but is included in it. In western mind such dichotomies are complete."

'The concept of self as the originating agent is the basis of several important theories of motivation; human beings desire to be effective in motivation for seeking and responding to challenges, however, is also influenced by environment' (Mehta, P.1994).

Summary :

There is plethora of theories on motivation- 32 as listed by Ford, E, M.1992. Most of them as pointed out rightly by him do not provide a comprehensive cohesion and integration in the field. Various schools such as a. Rational economic man; b. Social man, c. Self actualisation man; d. Complex man; and e. Japanese man and

pursuit of excellence has been classified by Schein (1965). **In the case cited, besides applying the need theory, a sprinkle of other models, efficacy theory and expectancy theory has been mentioned in its interpretations.** Cultural application and dimensions has also been dealt to show assumptions, attitudes, personal beliefs and aspirations, interpersonal relationships and social structure which may play a great role (Skinner, 1964) in forming the underlying conditions. Motivation, skill, and other factors do interplay as intermediate conditions in order to give expression to the immediate conditions in the form of achievement, satisfaction and involvement in social actions.

The case cited illustrated the various need aspects in social action programmes. It also brought out synergy in collective action in collectivist environment providing enriching cultural media for growth and achievement of potentials. It also depicts that even within a so called bureaucratic set-up, the search for public service and social responsibility do find its expressions in actions and innovations, for and by men, which gets accentuated with peoples participation. However, this is more reflective of benevolent democratic set-up where the search for excellence transforms and expresses in reality with the continuous learning process in search and attainment of human rights, empowerment, truth, justice and equity and such higher human endeavour as one is potent to achieve. Value systems reflecting the knowledge and aesthetics provide encouragement for self-actualisation and transcendental sojourn in highly perceptible and responsive intelligent individuals.

Conclusion:

Of all these theories, The Need theory provides most cogent explanation to the basic foundation and aspects of motivation. If the need as classified and expanded by Maslow and modified by others are further expanded to mean urge, drive, expectation and is co-related to rational organism like humans, it may find the core content of motivation to follow as such. Such core content when related to the environment for providing context in the churning mill of socio-cultural milieu would find the various meaning and interpretations of Motivation (as covert part) and expressions in actions as behaviour (obvert part). It is relevant not to mix motivation

with behaviour which may be expressions of 'other determinants including motivation' (Maslow, 1943). Motivation has different contextual manifestations and expressions in different culture.

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