APPROPRIATE TECHNOLOGY: A SOCIAL MOVEMENT ANALYSIS

Dissertation submitted to the Jawaharlal Nehru University
in partial fulfilment of the requirements for
the award of the Degree of
MASTER OF PHILOSOPHY

BRAJESH NANDAN BHASKAR

CENTRE FOR THE STUDY OF SOCIAL SYSTEMS
SCHOOL OF SOCIAL SCIENCES
JAWAHARLAL NEHRU UNIVERSITY
NEW DELHI-110067
1986

JAWAHARLAL NEHRU UNIVERSITY

SCHOOL OF SOCIAL SCIENCES
CENTRE FOR THE STUDY OF SOCIAL SYSTEMS

Gram : JAYENU

Telephone : 652282
652114

New Mehrauli Road,
NEW DELHI-110067.

CERTIFICATE

It is certified that the dissertation entitled "APPROPRIATE TECHNOLOGY : A SOCIAL MOVEMENT ANALYSIS", submitted by Mr. B.N. Bhaskar in partial fulfilment of the requirements for the award of the degree of Master of Philosophy, has not been previously submitted for any degree in this or other University, and is his own work.

We recommend that the dissertation may be placed before the examiners for evaluation.

Prof. YOGENDRA SINGH
Supervisor
(School of Social Sciences)
Jawaharlal Nehru University

Prof. K.L. SHARMA
Chairman
Centre for the Study of Social Systems
School of Social Sciences
Jawaharlal Nehru University

C O N T E N T S

ACKNOWLEDGEMENTS

This work has been completed under the supervision of Prof. Yogendra Singh, whose guidance was like a mentor rather than a tutor for me. I lack words for him as he agreed to be my guide and provided as much liberty in the intellectual pursuit as a scholar can take. I am indebted to Prof. T.K.Oommen as he took personal interest to encourage me to go for higher learning and inspired through his works to see the importance of on going social movements, which is also the topic of this dissertation. I wish to thank all faculty members at the Centre for their cooperation and encouragement. Dr.M.N.Panini, having special interest in my subject, facilitated help at several occasions. I am grateful of fellow students and friends at the Centre, who have shown great interest in my topic and have helped even at odds.

I must acknowledge the cooperation extended by the library staff at JNU. My thanks are due for various voluntary organisations in Delhi, who provided facilities at their own libraries, particularly Jayshree at Development Alternatives, Vijay Pratap at Lokayan and Shri Y.K.Sharma at CORT helped a lot. Lastly, I thank Mr. Om Parkash of Dean's Office, School of Social Sciences JNU, who took extra pain in typing the dissertation in short period of time.

Brajesh Nandan Bhaskar.

B.N.Bhaskar
CSSS/SSS
JNU, NEW DELHI

LIST OF TABLES

ABBREVIATIONS

APPROTECH ASIA	- Asian Alliance of Appropriate Technology Practitioners, Philippines
ASTRA	- Cell for the Application of Science & Technology to Rural Areas, Bangalore, India
AT	- Appropriate Technology
ATDA	- Appropriate Technology Development Association, Lucknow, India
ATI	- Appropriate Technology International, USA
ATOL	- the Dutch abbreviation for 'Appropriate Technology for Developing Countries, Belgium'
CDP	- Consultant for Management of Development Progragga, The Netherlands
CORT	- Consortium On Rural Technology, New Delhi
CSE	- Centre of Science & Environment, New Delhi
CSV	- Centre of Science for Villages, Wardha, India
CTD	- Centre for Technology & Development, New Delhi
GATE	- German Appropriate Technology Exchange, West Germany
GRET	- Groupe de Recherches et d'Echanges Technologiques, France
IIT	- Indian Institute of Technology, India
ITDG	- Intermediate Technology Development Group, London

KVIC	- Khadi & Village Industries Commission, India
KSSP	- Kerala Sastra Sahitya Parishad, Kerala
LOSPASS	- Lok Swasthya Parampara Samvardhan Samiti, Kerala
MFC	- Medico-Friend Circle, India
PPST	- Patriotic & People-oriented Science & Technology, Madras, India
SATIS	- Socially Appropriate Technology International Information Service, The Netherlands
SESS	- Society for Economic and Social Studies, New Delhi
SWRC	- Social Work and Research Centre,Tilonia, Rajasthan
THE	- The Technical University of Eindhoven, The Netherlands
TNO	- The Netherlands Organisation for Applied Scientific Research
TOOL	- An AT group in the Netherlands
TRANET	- Transnational Network for Appropriate Technology
WSG	- Woodburning Store Group, The Netherlands

CHAPTER I

INTRODUCTION

The twentieth century has witnessed such a thorough change in all walks of life that is unprecedented in the history of human race. The two World Wars, the emergence of international bodies, liberation of the Third World countries from the colonial 'yoke', rise of communist states are some of the major political changes that took place in this era. Similarly other aspects of social life viz. economy, art and culture, family, religion and communities - all had to pass through a profound change. Science and technology have played an instrumental role in this process of change, to the extent that it claimed unquestioned faith for several decades in providing the basic parameters of modernisation.

The technological development that took place, particularly after the Second World War is breath-taking - Space explorations, micro-chips, bio-technology and marvellous feats of engineering and industrial technologies. Within less than two decades, micro-chips promises an era of information revolution in which the whole population of this earth will be living in a truely 'global village'. In the field

of bio-technology, a host of inventions have been made that promise an entirely new and exciting future in the food stuffs, animal and even human breeding, medicines and a host of other techniques related to industrial and agricultural activities. The exploration of the new area for natural resources is unprecedented in the history of technology.

Despite all this, the social and natural environment in which human being finds himself today, is utterly dismal. Various national and international reports on the state of environment of the blue-green globe have pointed out that if the current rate of economic growth and technological pursuits continued, the 'doomsday' for the human kind will not be far away. The growing amount of nuclear armaments and its deadly consequences makes many people frenzy and sullen at the same time. It is a recurring theme among intelligentsia that the gap between haves and have-nots is a growing rather than decreasing phenomenon. Millions in the world population are living under the animal condition of survival, while the population submerged in the plethora of goods and services, are suffering from incurable social and psychological diseases.

Many theoretical explanations have been extended for such a problem which have their own significance.

The most direct observation could be made in the way people responded to these developments. The response of people can be seen in many ways but the most convenient and authentic way to locate them is to study the social movement of the period concerned. Here is the relevance of the present study of appropriate technology which appeared at the world scene along with many other social movements. The emergence of new kind of social movements at global level is itself a reflection of structural tensions and maladies in social life that are prevailing through out the world. There is a growing concern among social scientists in developed countries to examine these phenomena particularly ecology, peace, and anti-nuclear movements. Appropriate technology is, however, still an uncharted territory. Even among the social scientists of developed countries dealing with new social movements, the focus remains confined to their own countries; they hardly endeavour to inter-relate the contemporary social movements of the Third World countries with the movements of their own countries. There is, evidently, a lack of theoretical model for social movement analysis at the global level. Given this context, the present study is an unpretentious effort to locate the responses of people to the development that is taking place in the modern world,

by examining the field of appropriate technology as a social movement.

There are many ways to look at appropriate technology phenomenon. One may apprehend it by defining the term 'appropriate' at individual level - what is suited or not to one's conditions. The individual approach is highly limited as technology emerges and operates in a social milieu; though with a wide range of choices, it is a given item to individuals, who might turn later on to change those 'given items'. The another way to look at appropriate technology is to locate it in the specific social, cultural, and geographical localities. Here, appropriate technology can be defined in terms of social values, cultural ethos, and the geographical conditions of any particular society, or natural environment and human race in general. The problematic here is to determine what are social values and goals that should be criteria for determining the appropriateness of technology. One may find the goals as given by deriving from the dominant ideologies of society in question or the dominant world view of the world in general. There is inherent danger in this approach to be the starting point in a social movement perspective, as the goals are given. The ideology and world view are not static phenomena in

human history; a social movement may well lead to change in the dominant ideology or world view. Therefore, the meaning of the term 'appropriate' must be located in the ideologies or world views of those who are advocating for appropriate technology, the constituents of appropriate technology movement.

With this perspective appropriate technology is examined in the following chapters, as a social movement. Of course, with a pre-examination what constitute a social movement. The examples in the paper are selective, but they are representative in most of the cases. By no means, this effort is given an exhaustive and comprehensive account of appropriate technology movement; it is an qualitative rather than quantitative analysis of the movement.

CHAPTER II

APPROPRIATE TECHNOLOGY AS A SOCIAL MOVEMENT

"It is fundamentally important to keep in mind that AT (Appropriate Technology), whatever else it is or is not, it is a social movement", wrote Denton E. Morrison, qualifying his argument by accounting that there are social movement organisations, leaders and followers, symbols, continuous mobilisation, and above all a 'challenge ideology' of AT.[1] AT movement may or may not be a radical social movement, but to hold appropriate technology as a social movement is certainly a radically different approach. This approach departs from commonly held view that appropriate technology refers to a set of technologies such as gobar gas plants, improved wood stoves and solar cookers etc. Taking appropriate technology as a social movement renders questions other than that of efficiency, productivity or employment generating capacity of individual technologies. These questions become secondary in social movement analysis of AT. Who are advocating for AT, what they profess, and how they attempt to bring about the changes they profess - are some of the questions which become starting point in the analysis when AT is seen as a social movement. It is here, AT is out of the investigation

based on mere technical criteria and comes to be entirely a human and social affair; hence a legitimate ground for sociological inquiry.

(i) Theories of Social Movement

There is some sort of flexibility in defining and classifying social movements among social scientists. This flexibility arises not only from the diverse nature of social movements, its spread, duration and mode of operations, but also from theoretical and methodological point of view social scientists use to analyse it. There are many theoretical perspectives to look at social movement that lead to differential emphasises in the analysis of various aspects of it. In Marxist perspective, the mode of production, class structure and contradictions in society, are of paramount importance in analysing social movement. There is great explanatory value of Marxist perspective, in terms of delineating historicity and crisis situations from which social movement emerges, but class structure and contradictions do not always account for the newly emerging movements at the global scale, e.g. peace movement, ecology movement etc.; where participation and mobilisation cut across the class affiliations and interests;[2a] where the issues involved are not confined to class phenomenon; and

where entire dominant ideologies, whether liberal or Marxist, as social paradigms are challenged. Above all, in the orthodox Marxist framework, the role of social movement in bringing about fundamental change in society is considered significant so far it leads to - 'change in property relations and transfer of power from one class to another'.[2] Thus, the continuous process of change in various structural-processual and symbolic aspects of society brought about by social movements, is either not acknowledged or considered historically insignificant.

Without going into the narratives of mode of production, there are substantial number of social scientists who use historical-structural method in the analysis of social movements. Here the significance of class structure and contradictions are not neglected, but equal emphasis is laid on the historicity of cultural and ideological forces in the emergence and implications of social movements. This emphasis render their approach to be historically more specific and concrete in the analysis. Yet, the role of tradition in the formation and mobilisational aspects of social movements has not been fully yielded in studies of social movements except in few.[3] The element of tradition can be found in another variation of the

historical-dilectical perspective, represented by the 'Subaltern approach' in the analysis of social movement through extensive uses of semiology and structuralism. Here change is located in the histories of domination and exploitation through 'functional change in sign-systems' and pluralised moments of confrontations rather than through the transition in the mode of production.[4] In this approach, social movements are seen as 'an insurgent process of discursive displacement, a continual manifestation of decomposition, negation and recomposition of discourses anchored ultimately in the consciousness of the oppressor and the opressed'.[5] One can draw a parallel of oppositions between the 'Great' and 'Little' traditions as postulated in sociology, and that of sign-systems and discourse metaphors between the oppressor and the oppressed, as postulated in the Subaltern approach. In the later case, the linkage or continuity between the oppositions is apparently absent. Thus, "the absence of linkages in the postulate of pure 'negation' weakens the sociological significance of the Subaltern approach to the study of social movements."[6]

In the line of functional approach, there are series of theoretical models for explaining social

movements - the strain theory, revitalization theory, relative deprivation theory, reference group/collective behaviour theory, and the latest one, resource mobilisation theory. In the course of time, the adequacy of the strain theory and revitalisation theory has been challenged, and the relative deprivation theory and reference group/collective behaviour theory took precedence over them as explanations of social movements.[7] New social movements particularly those emerged in the 1960's and 1970's had the wide ranging effects on sociology, leading to the reorientation of the study of social movements. These movements firmly challenged some of the assumptions of traditional models of relative deprivation theory, the collective/reference group behaviour theory, such as 'movement participation was relatively rare, discontent were transitory, movement and institutionalised actions are sharply distinct, and movement actions were a-rational if not outrightly irrational'; and the result was the major shift in the theoretical assumptions and analytic emphasises, that formalised in the resource mobilisation theory.[8] This model requires closer scrutiny as it is claimed that the present environmental, consumer rights and the general public interest movements have fit this model quite closely.[9] The AT movement, with which we are

concerned here, has more or less similar characteristics.

One of the most characteristic features of the resource mobilisation theory is that it developed through the study of the on going movements. When a number of empirical works on the contemporary social movements particularly in the U.S.A. and several other European countries, came up with evidence contrary to some of the commonly held assumptions, some social scientists began to put question mark over the validity of the earlier models as explanations of the present movements.[10] In theorising about the formation of social movement, it is commonly held that the discontent produced by the structural constraints is a necessary if not sufficient condition to an account of the emergence of any specific social movement. Closely linked with this 'shared grievances' as a precondition, is the existence of a generalised belief system which provides the explanations of the causes and determines the possible means to overcome those grievances. The resource mobilisation theory emphasises, in the light of new evidences, the role of 'entrepreneurs' in the rise of social movement.[11] They capitalise on predominant interest cleavages and redefine the long standing grievances of broad, diffuse, and disorganised collectivities, in new terms. The resource mobilisation is

not restricted to the direct beneficiaries of the social change pursued, but a diverse kind of individuals, groups and institutions are covered. They mobilise a 'conscience constituency' of adherents who may come from different strata and co-opt with institutional resources from private foundations, media, social welfare institutions, governmental agencies, universities, and even business corporations.[12] The organisations are characterised by small or nonexistent membership, full time paid staff, and with/without outside leadership. And actions are intended to 'speak for' rather than to involve the aggrieved group.

Apparently, there is nothing new in the resource mobilisation theory. In fact, it falls within the category of organisational type of movement, as distinct from charismatic and ideological types.[13] In many aspects, the resource mobilisation theory is a further elaboration of the organisational type as the structures are being examined in terms of 'Social Movement Industry'. 'Social Movement Sector' etc. and the processes in terms of co-operation and competition over the available resources.[14] However, the resource mobilisation theory has pointed out some of the important aspects of social movement. First, merely the close connection pre-existing

discontent and generalised belief system cannot alone account for the emergence of social movement. Some or other channel must crystalise these discontents and beliefs in the expressive form. Thus, a need for a multifactored approach to the problem of movement formation. Secondly, it points out the significance of the resources made available by the constituencies other than aggrieved population and the co-optation of institutional resources. However, there are many flaws in the postulates of the resource mobilisation theory. It is pointed out that theory provides no explicit framework to examine movement changes and movement-state relationships.[15] Moreover, overemphasis on the resources is based on the denial of other aspects of social movement.

Whatever may be shifts in the theoretical models, the main theme remains unchanged in structural-functional approach that the emergence of a social movement should be located in the inherent capability of social structure. And hence, the consequences of social movement should be comprehended in terms of adaptations and adjustments within the structure as well as veriegated innovations in it. Here comes the implicit notion that movement is unidirectional (preferably forward).

The concept of social movement, as seen in the context of the cultural constructs of West, is rooted in the domain of 'body symbolism', and physical notion of movement, where the 'social body or corpus' is seen to move or act as an entity. The expressive form of the entity for human collectivities as the 'body' is used in a specific way as indorsed in the symbol systems of Christianity. "The idea of Jesus Christ as God in human body was translated into the Church as the mystical body of Christ made up of Christ as the 'head' and of 'members' who participate in body by consuming the body of Christ in the sacrament of the eucharist."[16] Later on, this idea was incorporated into the domain of politics that the King had two bodies, a Body Natural and a Body Politic, the latter comprised of the King as 'head' and his subject as 'members'. One of the most significant ramifications of 'body symbolism' was the organismic analogy and unidirectional movement of human collectivities in sociological thought, that continues till today, although with a cautious warning about the dangers that come from carrying the analogy too far. The corresponding notions about the concept of social movement is also found in the physical world, as Nicholas points out - "Analysis of social movements

occasionally write in language suggestive of the determinate quality of astronomical movement, as if the vectoral forces of external bodies impel the body of the movement, with the gravitational field set by its own 'mass' to go into a certain direction. Usually, like an asteroid, it ends in a brief meteoric flash."[17]

In a different cultural context, the concept of social movement may have dramatically different meaning. For example, in Indian case Hinduism do symbolise the divisions in society as if emanating from the sacrifice of the Primeval Being, the cosmic man. In Purusha Sukta, a lately added hymns of the most ancient scripture Rig-Veda, it is said that the four divisions in society - Brahmana, Rajanya, Vaishya and Sudra, have come respectively from the mouth, the arms, the thighs and the feet of the Creator.[18] The fact, that is usually missed in sociological writings, is that the symbolic representation of society is an indispensible part of the becoming of the entire universe - 'The moon was born from his mind; from his eye, the sun...' and so on.[19] Thus, not only society, but entire universe is humanised in this body symbolism. It may be considered as a process of the breaking up of the seen whole into its parts. But in Upanisad, it is a process of

reconstructing the whole out of its several parts as given in common experience.[20] Whatever may be the way to look into this symbolism, the essential message for sociological import remains the same, that the activities of human beings in society cannot be seen independent of the happenings of the outside world as they, together, constitute a whole on a different level of cognition; that the activities of human beings are bound to have an impact on the outside world, thus an individual has obligation not only towards other fellow beings but also towards entire living beings; that the action of individual human being is of paramount importance as he is a symbolic reduction of the whole. The ramifications of body symbolism in the concrete terms reflect in the Varna model of caste system, although at the macro-structural and the ideal-typical level and in the various traditional practices which owe respect and protection of herbs, trees, birds, and animal etc.

The cultural counterpart of the term social movement can be found in the most widely used word for that phenomenon - 'āndolan'. The term āndolan does not refer to unidirectional motion, at best it can be translated as agitation in English. It refers more

to individual actions which forms collectivity than the actions on the part of any collectivity. Thus, the consequences of āndolan should be seen in the changes it brings about in the continuing collective phenomena as well as in individual's lives. As the term āndolan suggests some upheaval in the normally continuing phenomena, a shake-up in the status-quo, the notion of change is implicit in it. Some social scientists point out that social movements do not always strive for change, sometimes they seek stability.[21] A social movement might be seen as seeking stability, but from the viewpoint of participants of the movement, some or other change is always present there. To overcome this inadequacy, the notion of counter-movement has been postulated, which refers to the movements of those people who oppose the objectives of the social movement.[22] In the case of āndolan, the notion of opposition is always associated with change. Those actions or for that matter collective actions, which are complementary for the continuing social phenomenon i.e. normally occurring changes in society, cannot be called an āndolan. However, these actions can be put under the term social movement, as the notion of opposition is not always associated with change in this case. For example, the co-operative movement in

post-Independent India, can be fit into the parameters of social movement, but it never caught the popular image of āndolan. Although, in number of participants and resources available, it may outweigh many peasant and tribal movement, it remains, by and large in the present form, the part and parcel of the prevalent system.

Thus, in the postulate of āndolan the notion of opposition is inevitable and this opposition is to be seen both at the level of ideas and action. On the basis of shared grievances, or the initiation of interpeneurs or the contradictions between material conditions and social forces, alone, the emergence of social movement cannot be accounted. They all may be true in one or other sense, the essential condition for the emergence of movement (āndolan) is the realisation on the part of individuals who make it manifest, either individually in dispersed localities or collectivity. However, the comparative analysis of the two different cultural construct of the term social movement, not only differentiate what constitutes social movement, but also makes it clear that emergence and mobilisation of social movement phenomena must be seen in the specific context of its occurrance. It is also evident that the significance of social movement lies in bringing about gradual changes, sometimes far from comprehension, in individual's

life as well as in the collectivities.

(ii) Criteria for AT movement

Before examination of AT (appropriate technology) phenomenon as social movement, it must be set out what constitute social movement. As a minimal criteria, there must be:

(i) sizable number of the collectivity in the question, who realise the anomalies and discrepancies that have to be changed. There must be some thing in opposition;

(ii) sufficient explanations for those anomalies and a possible and tentative way out from that situation - what is generally called as the generalised beliefs or loose ideology;

(iii) some or other mechanism for operationalising those realisations into action, be it new or pre-existing organisation, leadership etc.;

(iv) deliberate actions on the part of individuals or groups or other collectivities in pursuance of the desired goals.

A social movement analysis of AT phenomenon must be accounted for above mentioned dimensions. There may be many individuals, groups involved in the similar activities

that of AT's, but they cannot be termed as a movement or included in the any domain of a social movement, only on that basis. They must fulfil other criteria as well. These criteria are intricately inter-related and, together, make complete the notion of social movement. Any one of these criteria should not be confused as a social movement. 'To mistake any one of these dimensions for a movement as such is to commit the error of confusing the part for the whole'.[23]

For the first criteria, the collectivity in question is the all kinds of societies through out the world. It is claimed that AT is a global movement of which leaders are the countries like U.S.A., U.K., France, and India; where a sizable number of individuals, groups and other agencies are involved, 'in one or another way', in the AT activities.[24] The small, well organised, localised, and often specialised groups, spread all over the world, are the main constituent of the AT movement. The number of such groups and individuals, is mentioned in some directories and reports. The 'Directory of Institutions & Individuals Active in Environmently-sound & Appropriate Technologies', published by the United Nations Environment Programme in 1979, lists about seventy-four institutions and seven individuals active in this field in India; and more than one thousand

groups all over the world including the agencies of national and international organisations. In the same year, 'Development Centre' of the Organisation for Economic Co-operation and Development, has mentioned more or less same number of groups in its directory with some detailed informations about them. In 1982, George McRobie, a close associate of E.F. Schumacher and his group Intermediate Technology Development Group, London, reports about various groups, although less in number than reported in directories, in U.S.A., Canada, Britain, and some developing countries, which are more prominent and established in the field, in his book 'Small is Possible'. Attempts have also been made to study these groups spread in the developing countries; A.K.N. Reddy, the director of the 'Cell for the Application of Science & Technology to Rural Areas (ASTRA) of Indian Institute of Science, Bangalore, has studied 180 such organisations'.[25] There are many more studies in this area.

There is implicit recognition in these writings that the number of participants is not large enough to make a significant debut of a social movement. At the same time, they all are apprehensive of the phenomenal growth in the number of such organisations

all over the world and coming of the organisations of other movements together with AT groups on certain issues and activities, in the recent years. Given the global context, the growth of AT organisations can be seen, at best, as the emergence of the phenomenon, which may or may not result into a social movement. Again, the number of these organisations depends on the fact that what are the criteria for their identification. For that matter, a close examination of those literature is needed, which give the informations about AT organisations.

The detailed account of the AT movement in terms of other three criteria outlined above, namely - ideology, organisation, and mobilisation or strategy, will be dealt in the next chapters to trace the trend of the movement. Here is the examination of the literature which deal with AT phenomenon as social movement. An effort is also made to set the issues of movement analysis in the perspective and the problems associated with it.

The AT movement is still an uncharted territory as far as any systematic analysis is concerned. Most of the work done in this field, are either justification for or critique of it; some project AT as a 'cultural

revolution' in development thinking,[26] other considers as providing an alternative paradigm of development, as against the existing model of development,[27] and still others think that AT is part and parcel of the effort for bringing about fundamental changes in society.[28] On the other hand, AT is criticised as second class or inferior technology on the technical and economic grounds; and the activities of AT advocates as part of the efforts to keep developing countries subservient and in a state of dependency.[29] While, others find in the AT activities, an obstruction in the smooth way to super-industrial society and a nostalgic effort to revitalise the pre-industrial forms of society.[30] But none of them has treated AT phenomenon systematically as a social movement. One of the main reasons for this, is the common notion about AT that it refers to a set of technologies. Secondly, the statistical information about organisations diffused and scattered in different localities, is not available. Thirdly, perhaps more importantly, AT movement has not taken such a stake till now, as to invite scholar's attention to venture in this hitherto unexplored area.

Thus, many confusions and misgivings are likely to prevail in this situation among general readers,

essentially created by AT critics as well as its protagonists. For critics create confusion by referring to AT phenomenon as a set of technologies as against to another set of technologies for the same task. Thus, they turn the real debate over the choice of social values to the debate over the technical and economic values by isolating individual technology for examination. Many protagonists are also parties to this fallacy. This issue will be dealt later on. Here is some of the fallacies made by those who have taken AT as a social movement.

One of the most prominent fallacies, is taking 'interest' or 'concern' as a criterian for designating individuals, groups and institutions as the part of a social movement. The basic orientation or intention which gives rise the interest in one or another appropriate technology, is often forgotten. Often, AT directories and reports mention the names of multi-national companies, big private firms, foundations and various welfare agencies having some involvement in the AT movement. Ken Darrow and Rick Pam note an illustrative example of the involvement of a major international company in the AT movement. One representative of that company approached them and proposed

that 'his organisation intends to get technically sophisticated engineers and social scientists to visit the rural areas of developing countries and design technology to fit these circumstances. Stainless-steel small-scale machine would then be produced in American factories and exported to these countries'.[31] Darrow and Pam went on to call this sort of effort as a formula for continued dependency, and 'a false consensus' on the part of AT movement.

This sort of fallacy cannot be attributed, solely, to those companies, for misinterpretation of the word 'appropriate'. It is also manifest in some of the pioneer works in the field. For example, Nicolas Jequier, a leading exponent of AT movement, includes multinational firms as an 'unconscious appropriate technology sector' at the 'periphery' of AT movement.[32] The inclusion of multinational firms even as unconscious sector is evident for a loose and extremely fluid definition of social movement held by Jequier - 'By movement we mean a set of institution, individuals and networks interested in one way or another, centrally or peripherally in any one aspect of appropriate technology'.[33] Jequier includes in the list of AT institutions the name of one multinational drug company, Ciba-Geigy, in his directory for the reason that it is

doing basic research in the area which is also a concern of AT movement. In general, multinational drug companies are accused of inadequate testing and labelling, irrational combination of drugs, and forceful marketing of those drugs in developing countries which are banned in advanced countries, as well as of very little research in the area which concerns poor most, by the activists of the alternative health movement.[34] In 1972, a suit was filed against Ciba-Geigy for its drug Entero-Vioform causing a disease SMON (sub-acute myelo optic neuropathy), among more than three thousand Japanese. After seven years, they won compensation of US $184,880 from Ciba-Geigy. In 1980, Ciba-Geigy denied compensation to SMON victims in Switzerland caused by the same drug.[35] The point here is to be noted that Ciba-Geigy also falls within the general category of multinational corporations whose prime motive is the profit maximisation not people's health.

Only 'interest' in one or another appropriate technology cannot be a criterion to include any individual or group in the AT movement. Even a most enthusiastic moderniser like Richard Eckaus gets interested in plans to develop small-scale industrial

operations viz. Schumacher's one-person egg-cartoon factory.[36] But his goals remain unchanged - maximisation of output for market, economic growth and transfer of technology etc. not the self-sufficiency, harmony with environment, the equity and social control of technology, which are some of the basic tenets of AT goals. On the other hand, there are many individuals and groups, who do not explicitly declare themselves involved in appropriate technology as such. But they hold some ideological undertones as of the AT movement, and do participate, in one or other way, in the activities for the same ideals. These individuals and groups can be found in some of the contemporary social movements like, ecology movement, feminist movement, consumer's movement, and many other local movements. The coalition between these groups and individuals and AT participants becomes more evident in the conferences, seminars and also on some common issues. Particularly, ecology movement has very close linkages with AT phenomena. In many instances, there are overlapping membership in the groups of both movement. For example, the Centre of Science and Environment (CSE), New Delhi, is an environmental group, and it is also a full member of the Asian Alliance of Appropriate Technology Practitioners (Aprotech Asia), a Bangkok based regional service

mechanism in AT. Exclusion of or inadequate reference to these groups and individuals will result into an incomplete presentation of reality in the analysis of the AT movement.

Thus, the criteria to define the universe of the AT movement, must be the basic values and beliefs they hold, not only the 'interest' in one or other appropriate technology. For it is not the particular set of technologies that distinguishes AT as a social movement, but it is social values and beliefs of a particular kind, and that should be the linking thread in finding out the collectivity of the AT movement. However, there may be a lot of variations of these values, beliefs and ideological undertones within the movement. A broader framework of objectives and goals must be found, to which participants of the movement must correspond in more or less degree, and the degree of correspondence should be the criterion for locating the 'core' and 'peripheral' sector in the movement.

By identifying basic linking forces of a social movement, in terms of a broader framework of objectives and goals the participants pursue, and the social values and beliefs they hold, the task of locating adversary or supportive forces becomes more easy.

Although, it is not easy to determine a coherent framework of ideology of such a diverse and diffused kind of movement. At best, the major ideological standpoints within the movement can be singled out and evaluated in terms of consistency between them and the declared goals and objectives.

It must be clarified here that opting for the name appropriate technology to designate the movement, is not a matter of convenience. It reflects one of the major concerns of the movement. Very ambiguity of the term 'appropriate', gives it a status of generic term to denote a wide range of technologies - Alternative technology, people's technology, low-cost technology, community technology soft technology, capital-saving technology, intermediate technology, and village or rural technology etc. There was no trace of the word 'appropriate' at the period of inception of the AT movement, which is usually fixed with establishment of the few core groups in the field, like Intermediate Technology Development Group (ITDG), London and Volunteers in Technical Assistance (VITA) in the USA. In the name of intermediate technology or technical assistance, these were voluntary efforts in the Third World, where, in their consideration, benefits of modern

civilization did not 'trickle down' to the lower strata in the developing countries, through established pattern of industrialisation. One of the convictions that led to the foundation of the ITDG, London was - "... that the source and centre of world poverty lies primarily in the rural areas of poor countries, which are largely bypassed by conventional aid and development programmes."[37] But the happenings and social movements of late 60's and 70's had a drastic impact on the thinking of the AT leaders, like E.F. Schumacher, who, in mid 70's, called in a move 'towards a human-scale technology', for the industrialised societies.[38] The shift was eventual. The oil crisis, increasing industrial hazards, ecological imbalances and many movements of the period like, civil rights, the New Left, antiwar and anti-nuclear protests, counter-culture, and environmentism - all led to a critical re-examination of the foundations of modern industrial society. In this changed circumstances, what were usually prescribed for people in the developing countries, were considered equally important for people in the developed countries.

Thus, the term 'Appropriate Technology' for the movement can be suitable to show the concern of individuals, groups and agencies throughout the world, who find anomalies and discrepancies in the existing path of

development and who want to overcome these anomalies by participating in one or another aspect of technology. It is a matter of further elaboration, as for variation within the movement, that where such anomalies are located. For the moment, as a broader framework, the opposition of the AT movement can be located in the existing technological system which is an ingredient part of the predominant model of development. The labelling of movement by AT, is suggestive to indicate the identical opposition for participants both in developed and developing countries; and it will be concomitant to the global character of the AT movement.

On the other hand, there is an inherent danger in the use of the term 'appropriate' that it can be interpreted to suit any interest, as pointed out earlier. Langdon Winner points out: "A more honest appellation now generally avoided would be 'alternative technology', which has the virtue of pointing toward a mode of technics tailored to a different set of principles about nature, humanity, and society than the modern age has thus far followed. But, evidently radicals have now agreed with such institutions as the Rockefeller Foundation and the World Bank that an 'appropriate technology' is what is needed."[39]

Langdon Winner is apt in his remark to indicate the move to create 'a false consensus' through the term 'appropriate'. But the term 'alternative' also invites a host of questions. Many people do use the term 'alternative', but it hardly ensures that they are indicating to technologies that are 'tailored to a different set of principles about nature, humanity, and society'. In the strictest sense alternative technology presupposes an alternative science which should guide technology at every level of its processes - invention, innovation and dissemination. In Kuhnian sense, it would require a paradigmatic shift. It can be well argued since paradigmatic shift is a non-rational choice, an ethical issue, a social movement may a lot to contribute in this direction. Indeed there are many individuals and groups who challenge the basic principles of modern science; but how much they are in number and what do they propose? - we have only confusing answer. But it is certain that by applying the term 'alternative' to the movement in question, a major chunk would have to be excluded who find anomalies at the level of innovation and dissemination only, if the term is applied as suggested by Langdon Winner. For this reason 'appropriate' is more apt term for such a diversed and diffused kind

of movement. As far as intention is concerned it is revealed as soon as one starts to define what constitute 'appropriate' and why.

Only identification of the opposition is not enough to define the boundary of a social movement. It is only negative way of identification. There must be something positive in nature in which participants of a movement can be seen acting in some common parlour. Sometimes, ideology can be a positive criterion to set the boundary. But in the case of AT movement and many other contemporary movements, it will require a dramatic revision in the way of looking at them. Because, ideologically, one section of a particular movement say ecology, will be identical with one section of AT movement. Likewise, other sections of a particular movement may have their ideological counterparts in other movements. Thus there will be no ecology movement, feminist movement or AT movement as such, but it will be more than one ideological movements for the same cause/causes. At the level of abstraction, it may be convenient to look at them in this manner. At the level of observation, it must be some issue, cause or any other concrete reality around which different ideologies may have their own perceptions, and degree of involvement.

In the context of AT movement, the positive criteria of identification may be three dimensions of technology - invention, innovation and diffusion. Thus any individual, group or institution who participate and share with others some basic social values in any one or all of the dimensions of technology as against the existing and prevalent pattern of technological system, may be called as the part of AT movement. For example, a group finds anomalies in the way technoogy is being diffused in society and it strives to change this according to the values it shares with some other participants in the field. Another group may find problem at the level of invention or innovation or may reject the whole complex of technological system. Both can be included in the AT movement, if they share with each other some common issues and goals, and they adopt the method of operation different from the established way to address those issues.

(iii) Review of Literature

These issues have not been raised usually in the literature that informs about the individuals, groups or institutions active in this field. Most notably, there are more than twenty international AT directories and some of them have been heavily financed by various

international and national agencies or groups. These directories are of two kinds mainly - first, general one which includes all sorts of AT organisations, and secondly, specific one which includes only those AT organisations which are active in particular field. The limitations of these directories are obvious:

(i) they do not indicate the actual number of organisations active in this field, partly because of the cursory nature of the effort, and partly because of the phenomenal growth in the AT organisations recently, which make them out-dated within no time;

(ii) they provide often confused and inflated idea about AT organisations and activities, as they don't furnish rigorous definition and classification of organisations which ranges from international agencies to local small voluntary groups;

(iii) they provide, in many instances, sketchy or no account of the functioning of these organisations.

However, the name of two books can be mentioned, which give rather more comprehensive account of the movement; 'Small is Possible', by George McRobie and

'The World of Appropriate Technology', by Nicolas Jequier and G. Blanc. 'The World of Appropriate Technology' is, exclusively 'a quantitative analysis' of AT movement, based on most sophisticated mathematical techniques of analysis, and graphical representation of data, about the AT organisations, linkages and affiliations, activities, funding, and co-ordination - almost every dimension a quantitative analysis may cover. This book is based on the data provided by the directory prepared by Nicolas Jequier in 1979, the limitation of which in terms of loose definition has been pointed out earlier. Secondly, this directory includes only those organisations which show explicit 'interest' in appropriate technology. The method of data collection is equally limited, as only a detailed questionnaire by post has been used and responding sources were held as responsible ones, 'who had no interest in providing data other than objectively'. There are many lapses in the coverage of the movement. For example, in India, the organisations like Sulabh International, Patna, Voluntary Health Association of India, New Delhi, Kerala Sastra Sahitya Parishad, Kerala, and many others, who are prominent in the field, and have a long standing did not get a place in the directory.

This sort of orientation to the study of AT movement cannot be attributed to authors only, but parental organisation also, in which they are situated and works. The study in the form of directory and the book 'The World of Appropriate Technology' based on that directory have been completed under the auspices of the Development Centre of OECD, which stands to work on the problem of mutual interests of industrialised and developing countries. The OECD has not a chequered history in this regard, for example, the OECD member governments have voluntary exchange of information on the exports of dangerous drugs and chemicals since 1977, but it's not for public access, nor for the countries outside the exclusive Western OECD club.[40]

The another work is 'Small is Possible', written by George McRobie, co-founder of the core AT organisation, Intermediate Technology Development Group (ITDG), London and consistently working for the same cause. This book gives an account of almost all core groups, except few important ommissions as mentioned earlier in the case of India or might be elsewhere also. It covers Britain, Canada, U.S.A. and many developing countries including India. The problem here again, is of methodology - no criteria has been fixed to limit the area of movement. In consequence, a wide range

of organisations, from communes, training centres, co-operatives and voluntary groups in different fields, to government bodies and international agencies, got place in the book. In descriptive way these organisations were reported, infused with a lot of informations about them. As it is expected, there is one sided representation of reality, McRobie hardly gives any account of other side, in which failures, inabilities and limitations of these organisations can be seen. It is a propaganda work on the part of movement to proclaim that 'the alternatives movement has arrived'. There are more writings, examining the functioning of AT groups and their experiences in the field, in the shelf of ITDG.[41]

In India, too, some efforts have been made to study the organisations involved in AT activities. A.K.N. Reddy has made a study of AT groups spread in Asia, Africa and Latin America, through a detailed questionnaire, sent to 180 groups out of which only 75 responded.[42] Anil Date has examined the functioning of about 27 voluntary groups involved in the field of technology in India by visiting those organisations and dealing with the documents provided by those groups themselves.[43] Claude Alvares has evaluated the working pattern of some core AT groups in India.[44] There are many other writings which deal with one or other groups.

What emerges from these studies is that most of the work done in this area, are 'insiders' account of the movement. The bias in favour of self-esteem, and optimism, is likely to be there. Despite these limitations, such studies do provide vital informations about AT organisations and their phenomenological importance cannot be denied. But they hardly provide any systematic analysis of AT movement.

(iv) Methodology of the Study

Since AT is an on-going movement and still in the state of evolving, any systematic analysis has to face quite different and unique sort of problems. Adequate informations are not recorded, even where it is systematically recorded, might not made available to public access. The most suitable method of study of on-going movement would be direct observations, which provides opportunity to go beyond the ideological formulations and policy proclaimations of the movement leaders, to the real situation where phenomenon is still happening. The study of on-going movement has certainly an advantageous edge over the ex-post facto study of social movement, as it not only provides opportunity of direct observations, but also an access to some records which are yet to be released or left

behind counting as unimportant or too important to be released in leaders point of view. There are some ethical dilemmas in the methods of direct observation, which will be present in the study of on-going social movements. On the other side, as the phenomenon remains in a state of flux, continuously changing, it is not possible to make any definite statement regarding the movement, but only a trend can be traced out. /

This study is entirely based on the secondary sources of data, mostly produced by the persons or organisations related to the movement in one or another way, that include - books, directories, occasional papers, reports, periodical, pamphlets, brochures, newsletters etc. Effort has been made to examine those data in a systematic way, as outlined earlier, in the following chapters - 'ideologies', 'organisations', 'strategies' - to trace the trends of AT movement. In absence of sufficient data and comprehensions from direct observation, the study is likely to be limited to a considerable degree. But a perspective can be evolved for further study in this area, along with the delineation of historicity and the context of the movement.

References:

1. Morrison, Denton E., "Soft Tech/Hard Tech, Hi Tech/Lo Tech: A Social Movement Analysis of Appropriate Technology" in Sociological Inquiry, vol.53, No.2/3, 1983.

2. Desai, A.R. (ed.), Peasant Struggles in India, Oxford University Press, 1979 (p.xviii).

2a. Kuhring, H., "On the Social structure of the peace movement" in Sociology & Social Policy, Academy of Sciences of the G.D.R. Special Issue No.1, Paper for the 11th World Congress of Sociology, New Delhi, August 1986.

3. Singh, Y., Indian Sociology: Social Conditioning and Emerging Concerns , Vistar Publications, 1986 (p.70).

4. Spivak, G.C., "Subaltern Studies: Deconstructing Historiography" in Ranjit Guha (ed.), Subaltern Studies, vol.IV, Oxford University Press, 1985.

5. Singh, Y., op. cit. (p.69).

6. Ibid. (p.71).

7. Rao, M.S.A. (ed.), Social Movements in India, vol.I, Manohar, 1978.

8. Jenkins, J. Craig, "Resource Mobilisation Theory and the Study of Social Movements" in Annual Review of Sociology, vol.9, 1983.

9. Ibid.

10. Marx, G.T. & Wood, J., "Strands of Theory and Research in Collective Behaviour" in Annual Review of Sociology, 1975.

11. Jenkins, J.C. & Parrow, C., "Insurgency of the Powerless: Farm Workers Movement" in American Sociological Review, vol.42, 1977.

12. McCarthy, J.D. & Zald, M.N., "Resource Mobilisation and Social Movement: A Partial Theory" in American Journal of Sociology, vol.82, 1977.

13. Oommen, T.K., "Social Movements" in Survey of Research in Sociology and Social Anthropology, ICSSR, 1985.

14. McCarthy & Zaid, op. cit.

15. Gale, Richard P., "Social Movements and the State: The Environmental Movement, Counter Movement and Government Agencies" in Sociological Perspective, vol.29, 1986.

16. Nicolas, Ralph W., "Social and Political Movements" in Annual Review of Anthropology, vol.2, 1973.

17. Ibid.

18. Ghurye, G.S., Caste and Race in India, Popular Prakashan, 1968.

19. Hiriyanna, M., Outlines of Indian Philosophy, Blackie & Son Publishers, 1983 (p.45).

20. Ibid. (p.45).

21. Oommen, op. cit.

22. Gale, op. cit.

23. Oommen, op. cit.

24. Jequier, Nicolas, Directory of Appropriate Technology, OECD, 1979.

25. Reddy, A.K.N., "National and Regional Technology Groups and Institutions: An Assessment" in A.S. Bhalla (ed.), Towards Global Action for Appropriate Technology, 1979.

26. Jequier, N. & Blanc, G., The World of Appropriate Technology: A quantitative analysis", OECD, 1983.

27. Morrison, op. cit.

28. Dickson, David, The Politics of Alternative Technology, Universe Books, N.Y., 1975.

29. Arghiri, Immanuel, Appropriate or Underdeveloped Technology.

30. Toffler, Alvin, Future Shock, Pan Books Ltd., 1971.

31. Darrow, Ken & Pam, Rick (eds.), Appropriate Technology Sourcebook, vol.I, A Volunteers in Asia Publications, 1981 (p.15).

32. Jequier, op. cit., 1979.

33. Ibid. (p.10)

34. Phadke, Anant, "Multinationals in Indian Drug Industry" in Medico-Freind Circle Bulletin, Jan-Feb 1982.

35. Lachkovics, Eva, "The antidote to drug companies" in Protecting Tomorrow's World Today, an IOCU (International Organisation of Consumer's Union) Publication, 1983.

36. Eckaus, Richard, Appropriate Technology for Developing Countries, National Academy of Sciences, Washington D.C., 1977.

37. McRobie, George, "Small is Possible," Abacus, 1982 (p.33).

38. Schumacher, E.F., "Good Work," Abacus, 1980.

39. Winner, Langdon, "Building a Better Mousetrap: Appropriate Technology as a Social Movement" in Franklin A. Long & A. Oleson (eds.), Appropriate Technology and Social Vlues, Ballinger Publishing Company, 1980.

40. Tiranti Troth (ed.), Protecting Tomorrow's World Today, IOCU, Penang, 1983 (p.18).

41. Whitecombe, R. & Carr, Marilyn, "Appropriate Technology Institutions - A Review", Occasional Papers 7, ITDG Publications, 1982.

42. Reddy, A.K.N., op. cit.

43. Date, Anil, "Works in the Field of Technology by the Voluntary Sector in India", Academy of Development Science, Maharashtra, 1981 (unpublished).

44. Alvares, Claude, "India's Rural Technology Experiments", CORT, 1984 (unpublished).

CHAPTER III

IDEOLOGIES OF THE MOVEMENT

In the context of social movement, as it is the case here, the term 'ideology' - is usually referred in the positive sense to mean a world view expressing the values of groups, individuals and other agencies constituting the movement. At this level, it is more useful to refer this term in plural sense "ideologies" - thereby meaning, "the opinions, theories, and attitudes formed within a class in order to defend and promote its interest."[1] The spokesmen, leaders, activists and to some extent all participants of social movement, develop and share, more or less, a consistent set of ideas what can be called a ideologies or "constitutive ideas" in order to justify their aims and objectives. These are used not only to justify their goals but also become the guiding principles in their action programmes, policy matters and organisational network. At a different level, these constitutive ideas provide the basis for a generalised system of beliefs which not only binds members together but also gives a motivational force in their activities.

As social movement is the product of social change of the changed circumstances in which long

established relationships are no longer seen as appropriate, the ideologies of movement essentially provide a critic of the existing institutions and structures governing those relations. A developed ideology has to play a double role in this context, on the one hand, it provides a critique of society by explaining how people are deprived of and by pointing out important anomalies for that. On the other hand, it provides a vision of future society by proposing a change that will rectify those anomalies and a way to achieve it.

To find out a coherent body of doctrine in the AT movement at this stage, is a futile effort, because it is still emerging, evolving and making continuous corrections in some of the perceptions based on the actual experiences in the course of time. The global character of AT movement renders essentially diverse ideologies to operate in its 'world'. AT movement emerges and operatesin such diverse and different contexts that it becomes imperative to have different issues and demands, different priorities in dealing with the problem at hand, and ideologies having location in respective tradition of symbols and sign systems.

What is common among them? The first and foremost commonality among them is that their ideologies emerged

in response to the ideology of industrialisation.[2] However, there are different standpoints in the critique of the ideology of industrialisation, among AT participants. Secondly, their involvement in one or other aspect of technology is an unique characteristic of AT participants, manifesting their concern about the immediacy of the problem. In other words, they are having a distinct notion of social change in which long term objectives cannot be used to sidetrack the immediate and urgent problem. Thirdly, they are having some common preferences of social values like decentralisation, self-reliance/sufficiency, meaningful participation of people, use of local skills and resources, harmony with nature and so. Morrison has summarised their common concern in the following way:

"...productive system that involve light capital, are small in scale, decentralised, resource-conserving, and resource-indigenous are appropriate because have desired impacts. They create meaningful work for all, supply the basic needs of all, promote self-sufficiency at all levels of social organisation, and create an ecologically sustainable higher quality of life. Ordinary people participate fully in such production systems."[3]

There may be many more common features among them, but to count those without locating them in one or other tradition would be meaningless.

AT and Anarchism

It is not easy to locate a tradition in the strict sense as a source of concern about appropriate technology. It depends upon the context and what one counts. But in a sense, AT has a close connection with anarchist tradition particularly in terms of political and social values. Anarchism has taken different forms in different historical contexts. In Western Societies, anarchism got expression through various political groups and communitarian movement. The communes are social experimentations or social innovations, in which people, disillusioned with the modern way of life, found an answer, at least in the sense it may provide a prototype for future society. In India, Gandhi and later on Sarvodaya Movement under the leadership of Vinoba Bhave and Jay Prakash Narayan provides another example of quite different tradition having some elements of anarchism.[4] To what extent AT movement derives its ideological requirement, adopt strategic point of view and organisational framework from anarchist tradition and Gandhian tradition is a matter of further examination,

but one thing is certain that the major ideological theme of AT movement springs from these traditions.

In the context of Western Societies, as Langdon Winner suggests, the ideological source of AT movement can be found in the following:

"Robert Owen and other nineteenth century utopians, William Morris, Peter Kropotkin..., the Spanish anarchists, the guild Socialists, the Co-operative movement, Lewis Mumford, and the American decentralists, the followers of Rudolf Steiner's brodynamic agriculture, back-to-the-land movements, and whole generations of tinkers and crackpet investors."[5] Each one of them is typically variations within the anarchist tradition. Even system supporting exponent of AT, Nicolas Jequier, acknowledges that the immediate source of AT movement can be found in the student movement of late 60's, the counter-culture and environmentalism in the developed countries.

Anarchists, both old and new, never had a consistent view about science and technology. Some anarchists have believed that man should return to primitive life with tools and techniques which they can use with their own hands. But persons like Tolstoy, Godwin and several others were convinced that technology will one day liberate rather than enslave man. Paul Goodman marched

with the black flag of anarchism in 1968, pronouncing that: "anarchism does not reject technology rather it propounds a technology of decentralisation, in which it should be possible for a very small units to maintain their own source of energy, their own small scale industrial units, their own computerised agriculture and so."[6] What remains constant in anarchist's position that individual should be placed in such an environment that he will be capable of regulating himself without any external authority. Community life, small and local level of production and distribution, and co-operation are some of the part of that environment. And the most distinguishing feature of anarchist way to achieve their goal is to translate those ideals into concrete form, here and now, even in the face of mocking reality against them.

Radical examination of technology in the Western countries got new impetus in the late 60's and early 70's and continues till now. Writers like, Herbert Marcuse, Theodore Roszak, Jacques Ellul, Eric Fromm , and many other, made technology as the foreground of social criticism. The holy alliance between advancement of technology and the unlimited horizons of human "progress" was ruthlessly shattered down by these writings. Marcuse's 'One Dimensional Man' held that both Capitalist and

Socialist societies represent a vast, repressive technological civilisation that reduces every aspect of humanity into one direction that leads to the perpetuation of that civilisation.[7] Ellul's 'Technological Society provided a strong and thorough critique of industrial society portraying that every aspect of human life in 20th century - politics, psychology, symbolic-culture, economics and so on - had came under the domination of 'la technique'.[8] Lewis Mumford started his critique much more earlier, in 30's and continued to write on the theme throughout of his life. His book "The Myth of the Machine: The Pentagon of Power" is a sad commentary on the material culture, that is corrupted by the authoritarian power structure of megatechnies and by the spiritual hollowness of expertise.[9] In the same vein, however from different point of view, Roszak, Fromm, and many others wrote about the maladies of modern life and found their causes in different entities - mechanical world view, human aggressiveness, particular type of rationality, epistemological dualism', working of the second law of thermodynamics, 'institutional inertia' and so on. The basic theme of these works have a resonance of a theory and criticism that goes back to far early stages of industrialism, luddites, utopians and many other.[10] Those themes were renewed

and reformulated in more precise words and evidences this time and popularised through mass media to wider audiences. They held either modern civilisation that is something abominable or particular varieties of modern artifice were wrong one, in the sense that these generated destructions so vast as to undermine the very benefits of technological progress. The latter vision is predominant in AT movement which gives an impetus that appropriate technology is something that can be 'invented' or "discovered", in most western advocates.

The wind of despair and the gloomy picture of future society that got best expression in George Orwell's 1984 and Huxley's 'Brave New World', was replaced by an exorbitant optimism. Herbert Marcuse, in response to the dismal situation he sketched in One Dimensional Man, came out with 'technology of liberation' in a later work "An Essay on Liberation". Marcuse contended that technological progress is needed for freedom, but it has to be set in different direction and goals than present one. He makes it clear that such situation is possible "only after the historical break in the continuum of domination".[11] And the vehicle of this break will be, Marcuse expects, a

combination of traditional working-class grievances, repressed middle-class, minorities in developed nations and the struggles for freedom and social justice in the Third World Countries. Marcuse's effort can be seen to make a bridge between the critical theory of Frankfurt School and the possibility of an alternative technology. In a similar sort of work "Where the Wasteland Ends", Theodore Roszak presents a vision of alternative society - the "visionary Commonwealth", that could overcome the anomalies of technological society. The proposal is to create decentralised, rural, and self-sufficient communities, and innovation toward broad range of technical and social forms. His proposal includes, "the proper mix of handicraft labor, intermediate technologies, and necessarily heavy industry... a new economies elaborated out of kinship, friendship and co-operation... non-bureaucratized, user-developed, user-administered services."[12] Typically manifesting the unique characteristic of anarchist to stand against the hard reality contrary to their visions, Theodore Roszak wished to face the risk - "I can think of forty reasons, why none of projects can possibly succeed and forty different tones of wry cynicism in which to express my well-documented doubts. But I also know that it is more humanly beautiful to risk failure

seeking for the hidden springs than to resign to the futurelessness of the wasteland."[13]

The political and social values that nourished by communitarian movement of this period had great bearing on the one section of AT movement. The social ideals to which new communitarian movement was directed, were, by no means, homogeneous. They all found it difficult to continue in the mainstream society. The one unmistakable feature of these communes was to attain an 'unalienated society' in which man would realise his own worth and affection, empathy and understanding from others without any fear or authority.[14] On the part of some communes, there were efforts to redefine labour and live accordingly, particularly in terms of Marx's early writings in which labour is seen as an essential quality of human species and their creativity.[15] Herbert A. Otto who studied the communitarian movement in the United States identifies sixteen types of communities in terms of their leanings and objectives. The profound among them were - 'agricultural', based on the principle of self-sufficiency "political", uniting their members around a common ideology (Otto found three most prominent ones- Anarchist, Socialist and pacifist), "spiritual/mystical", which strove for inner perfection, "environmental", which advocated

support of the ecological system and unity of man and nature, and various other commune having stakes and emphasises on different themes like craft, art, education etc.[16]

This communitarian phenomenon and other radical movements of this period are best represented in the work of Theodore Roszak - "The Making of a Counter-Culture", widely referred book in the context of AT movement in the Western countries. He identifies, at the root of maladies of modern life, the reductionist thinking. This thinking interprets the needs of human society as a function which can be solved technically and hence technological development and achievement in all fields are justified. Thus, the modern militarism, urbanism, consumerism, bureaucracy and technocratic mentality are seen as pervasive sickness of modern civilisation, by Roszak, from which people particularly youth wanted to distract and to make out their own culture - the Counter-culture.[17] Although Roszak's work in pioneering one in this field, it lacks rigour and sufficient explanations of the phenomenon it deals with. He takes those things out of consideration which he personally dislikes. For example, widespread use of drug and nureotics, violence, and even Rock Music are condemned by Roszak without examining them properly.[18]

In fact the use of violence as tactics as well as moral right of individual is one of most important phenomenon of Western anarchist tradition, both old & new. Bakunin is most prominent among them. Only recently they have come to denounce violence in much louder voice.[19] Their rejection of violence and gradually turning to technology is rooted in a general disillusionment with routine politics that was suppressed by the mighty radical hands of the system. Thus they turned to do some kind of "socio-technical tinkering" - co-operatives, organic farming, roof gardening, solar collectors, windmills and various other things. Instead of fighting with the system or overthrowing it, they agreed to reform it through social and technical inventions.[20] This sort of activities got enlisted in 'The Whole Earth Catalog' edited by Stewart Brand. The Catalog, in its statement of purpose, anounces that "a realm of intimate, personal power is developing - power of the individual to conduct his own education, find his own inspiration, shape his own environment and share his adventure with whoever is interested." The Catalog includes items "if it is deemed: (1) useful as a tool; (2) relevant to independent education; (3) high quality or low cost; (4) easily available by mail."[21] The Catalog assumes that a lot of people will be moving out of cities to form community and simple life; and in that the choice

of technology would be a critical one. Thus, in Western countries particularly in the United States anarchists are involved in the pursuit of appropriate technology in one or another way. Whatever insignificant they may be in number, they were able to project some social values which influenced many other participant in this area.

Gandhi and Appropriate Technology

In the context of India, many elements of anarchist tradition can be found in Gandhian thought, but it would be wrong to take them as identical tradition. The 'constitutive ideas' in Gandhian thought came directly from Indian tradition of philosophy wherein knowledge constructed by rational thinking is given inferior position to acknowledge derived from self-experience of the unity between self and the outside world. Whereas anarchists, having roots in the Protestant ethics, take anchorage in the rational order of knowledge for justifying their goals. Gandhi surpasses many dilemmas which many anarchists may find in fighting a profound rational order with their own rational, humanistic thinking. Thus, coupling Gandhi with anarchists in the context of AT movement is a matter of convenience to show some identical opposition in concrete form. The followings are similarities and

differences between anarchists and Gandhi at general level.

Like anarchist Gandhi saw modern state with its claim to a monopoly of the legal instrument of coercion, as a great obstacle to free co-operative social order in which man could really practice "Swaraj" (self-rule). For Gandhi the duty of individual is to obey his own conscience and the moral authority in maintaining social control and cohesion must come from individual's compliance, not compulsion. Like Tolstoy, Gandhi insisted on the abolition of distinction between mental and manual labour, and the dignity of human labour. Like decentralists, the basic unit of social order for Gandhi, remained village community with the conviction that social power must be widely dispersed, if tyranny and exploitation are to be avoided. And this must be matched by a de-centralised economy. The most distinguishing characteristic of anarchists that any fundamental change has to be pursued through direct actions by the people themselves not through established political structure, is most conspicuous in Gandhi's strategies.

The differences between Gandhian ideology and Western anarchism are also profound. In West, atheism and anarchism appear as natural bed-fellow, 'the twin

offspring of Protestantism, if taken to its logical conclusion'.[22] But Gandhi categorically based his ideas on religious foundation, with lone counterpart in the Western anarchism - Leo Tolstoy. However, Gandhi's notion of religion remained catholic in nature--Sarva Dharma Sam Bhāva (Equal respect for every religion). Gandhi arrived at his 'constitutive ideas' by redefining various notions of Indian tradition, of which 'ahimsā' (non-violence) was pivotal one. Gandhi's contribution lies in making ahimsā a norm for collective action, which earlier in the religious tradition considered to be related to individual's responsibility only. His notion of ahimsā is a moral categorical imperative, quite distinct from those who advocate to practice non-violence on rational utilitarian ground as tactics. Closely attached to this notion is the endmeans relationship, where Gandhi emphasises on the means to be based on the principle of ahimsā, because ends are always open, unpredictable. Means are never instrumental;they are always end creating and this is the place one can objectively operationalise one's own principle. In contrast, some anarchist in the West went on to justify even stealing, as a legitimate action. Indian ethos does not echo the Western anarchist's plea for sexual freedom or unrestricted indulgence in worldly affairs;

quite contrary to it, complete control over the senses is considered to be righteous path for self-liberation. Although the anarchist never appealed to a particular class, they remained far behind from Gandhian appeal to each and every individual irrespective of class affiliation. At least they never expected to enlist the oppressor, the powerful and the privileged ones in the cause of revolution as Gandhi did.

Gandhi's view on science and technology changed considerably during his life time - from his uncompromising opposition to all machineries of early period to the admittance that science and technology has to play some role in appropriate condition. Gandhi wrote in Hind Swaraj (1908) - "machinery, the symbolic expression of modern civilisation, represents a great sin."[23] In 1934 he wrote "mechanisation is good, if the hands are too few for the work intended to be accomplished... The problem with us is not how to find leisure for the teeming millions inhabitants of our villages. The problem is how to utilise their idle hours..."[24] In response to Ram Manohar Lohia's letter inquiring what kind of industries he wanted in independent India, Gandhi wrote - 'If I can convert the country to my point of view, the social order of the future will be

based predominantly on the 'Charkha' and all it implies. It will include everything that promotes the well-being of the villagers. I do visualise electricity, ship-building, iron works, machine-making and the like existing side by side with village handicrafts. But the order of dependence will be reversed. Hitherto, the industrialisation has been so planned as to destroy the villages and the village crafts. In the state of the future it will subserve the villages and their crafts. I do not share the socialist belief that centralisation of the necessaries of life will conduce to the common welfare..."[25]

Gandhi's prime concern was not this or that type of science or technology, but a kind of society in which man can live with dignity of his labour and can achieve self-realisation in this way. Science and technology must be tailored according to this goal. Seven social ills that Gandhi enunciated as far back as 1924 and still displayed on the entrance of his āshram at Sewagram, read - 1. Politics without principles, 2. Wealth without work, 3. Commerce without morality, 4. Education without character, 5. Pleasure without conscience, 6. Science without humanity, 7. Worship without sacrifice.[26] Thus for Gandhi, whatever may be type of science it must be purposive. Science and

technology cannot be separated from society, it is as integral part of society as religion, politics and constructive works are. For him big industries and the piles of armament are not two distinct sort of development. Thus he wanted to reorient all scientists and technologists to different goals. This is vividly clear in his inaugural address at the establishment of All India Village Industries Association in 1934. In his speech, Gandhi mentioned that he sent questionnaire to renowned physicians and scientists asking about the chemical analysis and probing the nutritional value of polished rice, Gur (jaggery), sugar and other food items commonly used by people. He was very disappointed to know that no research has been done on these issues. He lamented that no scientist was even able to tell him the chemical analysis of most common thing like, 'Gur'.[27] There he called on scientist to change their priorities in the research.

Gandhi's notion of society is deeply informed by the inter-relatedness with the environment. Here, he formulated an impossibility theorem that found best expression in his statement - 'there are enough resources for man's need but not for his greed."[28] It is only in recent years scientists and scholars have beginning

to realise the validity of the theorem so presciently articulated by Gandhi half a century ago. The above mentioned statement is often repeated by the AT participants and advocates of ecology movement; many periodicals in the movement publish it regularly on the cover page.

Gandhi's notion of social change through basic education is concommitant to the gradual and thorough going social reconstruction - a thing coming from within, not a superimposition. His basic education emphasised learning through craft that was only way to understand environment and development of creative intelligence by taking problem of immediate relevance. In Gandhian scheme, education, livelihood, justice and self-creativity, all circumscribed in one and the same path in a organic way; and this path, according to Gandhi, would be "the spearhead of a silent social revolution frought with most far reaching consequences."[29] Gandhi himself strived ceaselessly to experiment with changes in technology that suited to the society of his vision i.e. revitalising traditional Indian village community with new dynamism. "Charkha" was the most symbolic technology that he popularised to get self-sufficiency at the village level, as well as to defy the foreign

rulers by attacking at the very root of their interests. He established all India institutes to revive old cottage industries. He experimented with the use of human waste as organic manure for agriculture. In all, he made in detail several suggestions about different dimensions of village industries. In all this, his criteria for chosing and developing technology was simple one that villagers can make, afford and operate those technology.[30]

After Gandhi, his ideology got expression through different channels. The ideals of the 'Father of Nation' got place in the Constitution of independent India, although in the section of directives of the state policy. Through Khadi and Village Industries Commission (KVIC), Community Development Programmes and Panchayati Raj, Gandhi's ideals were sought to be realised. However, it remained within the realm of conventional political action of which Gandhi was quite sure to be ineffective in realisation of his goals. The another channel was the formation of 'Sarva Seva Sangh' to carry out Gandhi's constructive programmes by uniting specific association like Spinners Association, the Village Industries Association etc. Many other voluntary organisations like the Kasturaba Memorial Trust and

the Harijan Sevak Samaj, which were concerned to promote specific aspect of the Constructive Programme of Gandhi, remained independent and did not join the umbrella like organisation Sarva Seva Sangh.

It can be said that Sarva Seva Sangh, of which Vinoba Bhave, 'the Spiritual heir' of Gandhi was the leader, represented most radical path of Gandhism, much in the line Gandhi made more explicit in his later life. Bhoodan-Gramdan Movement led by Vinoba Bhave, to re-address the existing land relations along the Sarvodaya ideology. Soon it became clear that the movement lost its initial vigour and became "system maintaining device."[3] It met the fate of "legitimate anarchism".[32] The difference between Jay Prakash Narayan and Vinoba Bhave over the relationship with government became more intensified in the wake of rising discontent among people particularly from students and youth. Decline in Bhoodan-Gramdan movement did not mean that Gandhian tradition lost in the history, it got manifestation in other movements. Jay Prakash Narayan led student movement of 1974, which along with immediate objectives promoted the idea of 'Total Revolution'. This time, quite contrary to earlier instance of co-operation and promotion from government in Bhoodan movement, the

student movement was suppressed through the declaration of "Emergency" in June 1975. While Jay Prakash Narayan, along with several other national leaders, was behind the bars, Bhave declared "Emergency" as 'Anushasan Parva' (the festival of discipline). Consequently, the party in power led by Mrs. Indira Gandhi, had to face massive defeat in the parliamentary election of 1977. The another example of resurrection of Gandhian tradition is the Sarvodaya leaders like Sundarlal Bahuguna and Chandi Prasad Bhatt, who supported and mobilised the spontaneously arisen movement of Garhwali women - chipko movement.[33] Many other action groups and voluntary organisations can be found in this tradition, dispersed and dealing with the local problems.

AT movement in India has close linkages with this tradition. Jay Prakash Narayan was instrumental in inviting E.F. Schumacher to India and setting up the Appropriate Technology Development Association at Gandhian Institute of Studies, Varanasi in 1972.[34] During Bhoodan movement, the initiative was taken to set up the Proyog Samiti in Ahmedabad, the Agricultural Tools Research Centre was founded at Bardoli in 1959.[35] Chipko movement leaders are also in quest of small scale industries and technologies that can meet the

requirement of local population and be compatible with the ecology of the area.[36] The exhibition of appropriate technology like solar cookers, and smoke-less improved chullah, will be a part of 'Pani March' (Water Rally) in Rajasthan led by Sarvodayites like Sidharaj Dhadha.[37] Dharmpal, a Gandhian, who writes extensively on science and technology, believes that for an alternative society envisaged by Gandhi, must take it departing point in the search of technology, in the society that existed before European dominance - "The problem of India Today, as perhaps for many other land which are still recovering from the effects of eighteenth and nineteenth century European dominance, is how to achieve and increase such innovation and creativity. Such innovation and creativity can however arise only from a widespread indigenous base... For that, Knowledge and Comprehension of how they functioned before the beginning of this dominance seem to be essential."[38]

The quest for appropriate technology, in Gandhian tradition as in other anarchist tradition came, by and large, as the consequence of the search of an alternative society. They find much in traditional social structure, and technology to counterpose

'Western civilisation', both in terms of total critique of existing society and also a way out of it. Thus, it provides a broader spectrum in his quest of appropriate technology can find expression at different levels. At the level of dissemination, appropriate technology may have relevance in the strengthening the base of "agents of change", fighting for the cause of immediate problem of deprived and weaker section, as well as in giving resistance power to deprived masses in the process of struggle. Many Gandhian voluntary organisations, trapped in the problem of resources, turned to generate their own resources through participating in production processes themselves, by using appropriate technologies.[39] It has a demonstrative effect in the dissemination of appropriate technologies. Even an activist of 'people's science movement' in India, taking different standpoint from Gandhian ideas recognises the relevance of appropriate technology at this level - "When combined with such a role, initiatives to develop "appropriate technology" analytically determined jointly with the masses in accordance with the requirements for the struggle for social change, can be of considerable value. Struggle for social change is a hard course to take, and a combination of economic

initiatives to give greater staying power to the masses in this struggle, if this is possible, will certainly help. Search for appropriate technology with this political perspective is therefore valuable."[40]

At the level of innovation, this tradition can be guiding principle for selection and development of wide range of technologies as well as social organisations. In this endeavour traditional element plays an important role. Agriculture, cottage industries, education, health and various other cultural activities, are the areas where innovations, in the line of Gandhian principles could take place. In the area of agriculture, the convention as Organic Farming organised at Sevagram, Wardha, in 1984, gives a detailed account of thinking in this field - "full utilisation of manures, indigenous breeds of cattle and local species of trees and crops" are seen as alternative to modern agricultural practices.[41] A leading Sarvodayite thinker, Acharya Ram Murti is of opinion that agriculture is not merely an economic activity, a process of producing raw materials, it is a complete way of life.[42] Cottage industries and agricultural tools are the areas perhaps widely covered by Gandhian organisations. In the effort of social reconstruction at the village level, the works of N.K. Bose in Bengal villages[43] and Jay Prakash Narayan's

Mushahri project in Bihar can be cited.[44] A wide range of scientific and learning institutions can find a way in this direction, with a different orientation to develop appropriate technology.

At the level of invention, Gandhian ideas can lead to the emergence of new ideology. This possibility is reiterated in the debate over alternative 'science'. J.P.S. Uberoi finds that the renewed interest in the relationship between man and nature, from a different vantage point, has already been stated and practiced by Gandhi - when he talked about 'new mode of being' and his pursuit of Satyagraha - 'the pursuit of truth as a way of life, as a way of cognition or knowledge, so that the practice of politics can be seen as a pursuit of truth."[45] C.V. Seshadri, director of the Murugappa Chettiar Research Centre in Madras, also found the clue to the solution of serious problems with existing concepts in science, in Gandhi's assertion of 'the impossibility of a human being independent of his actions, thus refuting modern science's major plank of value neutrality. Seshadri went on to find out the source of crisis in the formulation of the second law of thermodynamics and attempted to develop another theory based on a new notion "shakti - a new

energy-quality maker."[46]

Thus, Gandhian tradition provides a broader framework, in which the operation of appropriate technology can be found at different levels. In this tradition social values takes precedence over the debate on the inherent qualities of particular technology and makes the criteria of choice more explicit, and a precondition in the selection of technology. Seen in this context, in Gandhian tradition the search for appropriate technology is a part of the movement for an alternative society, not a movement in itself. Technology per se is not a starting point of social criticism, rather it becomes the part of the criticism directed against, Western domination and its continuity in different walk of life till today. Renewed interest in the tradition, as a way out, is direct outcome of the confrontation with the Western civilisation in its totality. Thus, any criticism of the Western civilisation which challenges the very base of industrial society, is likely to have some concommitance with Gandhian critique of modern society. But Gandhi involved the critique by using traditional sybmolism, as well as fundamental categories.[47] While Western anarchist tried to change the society through social innovations in the form communes and other similar arrangements, for Gandhi

the new future society was already there, in the form of village community. To which Charles Matcaf℮'s famous statement is most expressive - "The village communities are little republics having needy everything they want within themselves; and almost independent of foreign relations. They seem to last where nothing else lasts. Dynasty after dynasty tumbles down; revolution succeeds revolution... but the village communities remain the same."[48]

Gandhian ideas and anarchism have a profound influence on the contemporary AT movement, as well as some other movements particularly the Ecology movement. In the 70's, AT movement got a new dimension through heavy infusion of international organisations, national organisations and state agencies. This move indicates an implicit recognition, on the part of modernist 'developers', of the failure of existing model of development. Thus, they 'tuned' their concepts and methodologies of action in the light of criticism come from these quarters. In the words of the Chairman of the US Atomic Energy Commission then, Glenn T. Seaberg - "Feedback from such a counter-culture is absorbed and the best of it will have a good and lasting effect on our society."[49] The direct manifestation of "feed back" was the inclusion of "appropriate technologies"

in the list of development packages for the Third World countries. Charles Weiss (Jr.) informs - "Several U.S. Congressmen have indicated a further special interest in 'capital saving' technology as the key to meeting the needs of the poor and have added provisions to foreign aid legislation to ensure the use of such technology... Support is needed for both governmental and non-governmental efforts (such as those of informal 'appropriate technology' groups who are frequently in close touch with poor) to develop and apply such technology at the grass root level. Such groups can in some countries help to overcome the social and cultural distance between scientists and technologists, trained along Western lines, and the poor people in slums and villages."[50] Appropriate Technology International (ATI) was formed in 1978 as a private, non-profit making corporation, with an annual aid of $5 million from the U.S. government's Aid Administration - "to promote the development and dissemination of technologies appropriate for developing countries".[51] Many other international agencies including United Nation's Agencies, like FAO, IBRD, ILO, UNDP, UNESCO, UNICEF, UNIDO, WHO and United Nations University etc. got involved in the activities in 'appropriate technologies'

in one or another way.[52] Many national governments of Western countries particularly, Britain, Netherland, France, Germany and others, as well as some Third World countries like India and Pakistan got involved in AT activities in the same of vein of 'corrective policy' for development packages for the downtroddens, in developing countries. This move is seen as propagation of AT movement from narrow concerns of earlier exponents of AT to a broader one by Nicolas Jequier - "the search for alternative patterns of development is no longer the preserve of a few small groups working against 'the system', but a legitimate activity carried out by the establishment."[53]

This enlargement in the constituencies of AT movement is an ideological shift in an indirect manner. This shift comes through redefining 'appropriate technology', essentially as a policy matter. It is an implicit recognition of the fact that existing model of development can't be pursued in the same way as it operated earlier - big industries, capital intensive technologies, transplantation of 'trunkey projects', and neglect of local resources including people, can't be carried out for long. The prevailing model of development was not only seen as abrogating social responsibilities but also as an uneconomic

proposition. This sort of argument was placed to invite more involvement of private industrial firms.[54]

This shift cannot be seen only as establishment's move to co-opt the movement. There is also some sort of willingness on the part of AT movement to move in this fashion. For them it is a matter of great success, they were able to influence establishments to take interest in appropriate technology and problematic for them, now, is how to integrate the propositions of AT in the national policies of development and aid agencies' agenda.[55] The 'establishment's growing concern in appropriate technology can be explained in many ways - failures of existing pattern of development, growing gap between haves and have-nots, oil crisis and depletion of other natural resources at the rate faster than their regeneration, stagnation in the economy, and a wish to exploit the resources of hitherto untouched area in a more sophisticated way and many other reasons can be sought. But, on the part of AT movement, to exploit institutional resources of the 'establishment' for the cause of movement and seeking their greater participation in the movement, lies primarily in the ideological dilemmas of AT participants. This fact can be best shown through the exposition of

two most important phenomena in the AT movement - first, E.F. Schumacher and his AT group ITDG, taking as the representative of transition in AT movement from small groups to the 'legitimate activity' of establishment, and second, the emergence of new group of professionals in the movement - "the technologues."

Schumacher and Intermediate Technology

E.F. Schumacher is the personality, who is synonymous with AT movement. No discussion is possible on AT without reference to his works, as he devoted his life after 60's till his death in 1977 for this cause. He was instrumental in popularising the concept of intermediate technology and alternative model of development through his best selling book "Small is Beautiful". He also tried to translate his ideas into action by establishing 'Intermediate Technology Development Group' in London with help of some likeminded friends.

Schumacher has drawn much from Gandhi, to the extent that "Gandhian-Schumacherian" tradition can be said in the AT thinking.[56] But this is apparently only so, when taken in totality Schumacher's ideas and actions are quite apart from Gandhi in several ways. And there arises dilemmas, where 'enlightened modernists'

finds a way to include AT phenomenon in the legitimate activities of international,national and private agencies, not as a tool in the hands of oppressed helping in their struggle, but as a way to help poor to fulfil their 'basic needs'. Schumacher's ideas should be seen in relation to Gandhi for its evaluation.

As a critique of modern industrial society, Schumacher develops by and large from Gandhi's vocabulary. The absurdities of modern economy and economies has been counterposed by "Buddhist Economics".[57] The 'metaphysical blindness', fragmentary methodology and carving for unlimited growth of modern economies have been counterposed by the simplicity, non-violence and wholistic vision of Buddhist philosophy. The attack on modern industry, organisations, and education also falls in this line. The essential endeavour of Schumacher in these efforts, is to find out a 'middle way' "between materialist heedlessness and traditionalist immobility". Thus, he poses questions not in either-or propositions but "the-one-and-the-other-at-the-same-time".[58] Gandhi, too, didn't propose solution in 'either-or' terms, but he takes starting point in the rejection of modern world view by formulating some fundamental categories of social practice, like ahimsā, satyagraha etc., which can be taken as the standards in judging modern science and

technology, if not rejecting them. Schumacher, although speaking loudly for non-violence, spirituality and 'Right-livelihood', takes starting point in 'technology' - "The modern world has been shaped by its metaphysics, which has shaped its education, which in turn has brought forth its science and technology. So, without going back to metaphysics and education, we can say that the modern world has been shaped by technology."[59] Thus, it becomes easy to formulate problem in technological terms - "The technology of mass production is inherently violent, ecologically damaging, self-defeating in terms of non-renewable resources, and stultifying for the human person. The technology of production by the masses, making use of the best of modern knowledge and experience, is conducive to decentralisation, compatible with the laws of ecology, gentle in its use of scarce resources, and designed to serve the human person instead of making him the servant of machines."[60] The need for an 'intermediate technology' was sought by Schumacher, as a matter of 'technological choice', that will bring forth the social and political values he thought desirable; not as a social choice, which after sufficient articulation will bring about the existence of intermediate technology possible, or will grow simultaneously in the process of articulation.

The problem of metaphysics, spirituality and all questions pertaining to world views were side-tracked, by making sharp distinction between science and technology by Schumacher and his group ITDG. McRobie notes - "It will be apparent from what has been said that the Group, insisting on technological choice, makes a sharp distinction between science on the one hand and technology on the other, or, to put it differently, between knowledge and its application. The knowledge of scientific principles, of 'laws of nature', of materials, and of methods is, in a sense, absolute... there is nothing absolute in technology, which, to be fruitful, must fit the actual economic and social conditions within which it is intended to operate..."[61] For Gandhi, it would be difficult to make such a distinction. Thus, quite contrary from general appearance, Schumacher is pole apart from Gandhi in perceiving the solution of the problem, although much of the criticism is drawn from him with due acknowledgements. Schumacher, then, could be seen as instrumental in the process of 'absorbing' into the mainstream, what has been 'good' in the criticism provided by the contemporary social movements.

In the working of Schumacher's AT group ITDG, this fact is more manifest and conspicuous,as this

group started with the conviction that - 'the source of world poverty lies primarily in the rural areas of poor countries, which is being bypassed by aid agencies; this will continue unless efficient, small scale technologies are made available to them; the donor countries and agencies do not have the necessary organised knowledge to assist them; the real problem is choosing the right "level of technology"; and the technologies most likely to be appropriate for them would be in a sense "intermediate" between - to speak symbolically - the hoe and the tractor, or the panga and the combine harvester.[62] Once the objectives were set in this manner, the next task of implementation requires resources - both human and material. With the help of friends and supporters, usually experts in different fields - administrators, business people, academics and members of other voluntary groups - in short Schumacher's 'ABCD combination' - the ITDG strived to prepare specific 'fundable' work programmes.[63] When the business was set properly, the resources were provided by many "international agencies, governments and other aid agencies for help in identifying needs and defining appropriate technologies". Various panels of technical experts were formed and they went to Third World countries with the help of resources provided by other

agencies. They did all those things which were not performed by conventional aid programmes, or left untouched earlier - this ranges from management training, research and development of small scale, low-cost technologies either scaling down modern one or upgrading traditional one, to devising efficient way of dissemination of those technologies. In short, these efforts were "to fill the 'knowledge gap' by developing a series of programmes on technologies which are basic to rural life: agricultural tools and equipments, health and water supply, building materials and methods, energy, transport, small manufacturing and the like."[64] It is quite clear from the works of ITDG that their effort is another variation of development "packages", with a new perspective, a new approach - 'don't try to change those poor people, but change technology to suit their condition'. But the direction of flow in this process remained as earlier, the developed nations are givers - experts, resources, know-how, software, havolware and the poor nations at the receiving end of the process. As it was earlier in the development package, the question of reverse flow from poor countries to industrialised countries in the form of raw materials, human labour and other processes that is basic to asymmetrical relationship between poor and rich countries, is not touched by

ITDG. The prime objective of the Group is to assist the downtrodden people in Third World countries, the question of metaphysics, education, simple life and other pronouncements made by Schumacher, albeit loosely, in the book - 'Small is Beautiful', are set aside or left to be tackled in the future. But in Gandhian approach helping the downtrodden people is part and parcel of attacking on the very cause of their condition.

Thus, Schumacher and his group ITDG represents another variation in the AT movement. This variation is indicative of a transition in which social and political values are transformed in technical values. Technology is directly seen as violent, centralist and ecology degrading. The men and organisations behind these technologies are simply bypassed, thereby facilitating the integration of intermediate technology, now appropriate technology, into the agencies, which were responsible to create a condition where appropriate technology emerged as an alternative. It can be argued that it is a cultural revolution in which privato industrial firms, governmental and international agencies are changing their course of action in direction of the proposals of AT.[65] This is far from reality. This variation of AT movement is the extension

of entrepreneurial and managerial skills, consumption pattern and other values rooted in Western technological rationality, in a more sophisticated manner - "intermediate technology says, No, if I want to help I must be genuine about it and become a poor man myself to understand it, and then I quickly realise what fits."[66]

Despite radical pronouncements made by Schumacher in his critique of industrial society, the operationalisation of intermediate technology incorporates all those against which critique was made. David Dickson has aptly characterised "intermediate technology" as 'little more than a formula for small-scale capitalism' - "It is ideally suited to the growth in the underdeveloped countries of a Western-oriented elite or bureaucracy, many of whose members are rapidly becoming its fervent supporters. In addition, development policies that stress the need for intermediate technology are frequently legitimised by the activities of international development agencies, whose ideology is itself built of Western ideas of technology rationality and the apparent neutrality of technological development".[67] Ivan Illich warned as early as 1971 that "the cultural revolutionary must... be distinguished from the promoter of intermediary technology who is frequently merely a

superior tactician paving the road to totally manipulated consumption."[68]

This variation in AT movement, tends to become part of the conventional development planning. This trend is well expressed by Nicolas Jequier, in 'the major policy issues' of appropriate technology, which identifies problems of the process of development of Third World countries, in the adoption of "a carbon copy" process of development that is prevalent in industrialised countries.[69] Accordingly, the recommendations went on to reorient universities to familiarise with the rural problem instead of performing only professional activity in the modern world; government bodies were sought to formulate their planning on regional and decentralised basis in technology policy; the inherent inefficiency and red tapism of bureaucracy should be overcome by taking help from voluntary agencies; more and emphasis should be given on the needs of poor people living in rural areas. One may find nothing new in these policy recommendations, if he/she takes pain to go through the different Five Year Planning drafts of Indian Government. What is new in this approach is to scale down the whole process of modernisation, credit, investment, industries,

planning, workplace, and of course technology of modern world and to upgrade the traditional processes where modern world has nothing to offer.

Formulating social problem in technical terms is not confined to this variation of AT movement. This is also characteristic of a new phenomenon in the AT movement - emergence of 'technologues', a wide range of modern professionals in different field, educationists, scientists, technologists, academicians and so on. But, here, one can divide 'technologies' into two main strands - one section who identify AT phenomenon as a policy matter i.e. given the existing political and social structure appropriate technology will be able to solve the problem and consequently it will bring better social condition; the other section, who identify AT phenomenon as to provide a basic for a fundamental change in the society; appropriate technology must be devised according to the social value they held for the future society.

The Technologues

One important consequence of the movements of the contemporary period, is the emergence of a new group of ideologues . Alvin W. Gouldner calls them - "technologues", in the context of ecology movement,

to denote scientists, experts and technicians of different specialities, who by-passing bureaucracy and their own instrumental rationality, relate themselves to wider social and political values.[70] Thus, defying Daniel Bell's claim of 'the end of ideology', new ideologues are coming from the scientific community, which was taken for long as nothing to do with ideology. The term 'technologue' is more useful in the context of AT movement, as it is directly related with technology; a little more expansion is needed to include, educationists, academicians, and other professionals dealing with vital part of public life, viz. medical practitioners, etc.

As the idea of appropriate technology caught up public attention in the early 70's, many technical specialists began to do research in a new style in science and engineering. Having backgrounds in biology, physics, engineering, medical sciences, architecture and other field, they knew well about these specialised fields, in which they were placed, and direct their energies to solve the problems of public life. They sought to redefine, in the light of new purposes, the context in which scientific research and technological innovation can take place. The new purposes invariably came from new social movements of the period.

The example of New Alchemy Institute, at Cape Cod in North America, vividly exemplifies the emergence of new ideologue - the technologue. Many young biologists, when got tired of attending international conferences and seminars on the problems of the planet, in form of pollution, overpopulation and ecological imbalances, without having any recourse how to solve these problems, turned to form the New Alchemy Institute in the early 70's.[71] Of course, the initiative was taken by scientist/doctor John Todd and his wife Nancy. They do research in bioshelters, aquaculture and organic farming, solar energy and windmills, with demonstration and extension services. While they accept the standards of experimentation and and evidence prevalent in modern research, they reject the notions of objectivity that conceal the social purposes of science. Their objectives are clearly stated in each volume of their annual journal 'The Journal of the New Alchemists' - "We seek solution that can be used by individuals or small groups who are trying to create a greener Kinder world. It is our belief that ecological and social Transformation must take place at the lowest level of society if people are to direct their course toward a saner tomorrow."[72] However, not all technologues commit to same philosophy as John Todd and his group do.

Amory Lovin's views on appropriate technology is suggestive that it is fully compatible with capitalism, provided enough fund is allocated to follow the "soft energy paths".[73] Most of international development agencies and aid agencies share with Amory Lovins as pointed out earlier in the case of Jequier Nicolas. The most unique feature of this section of AT movement is that they want to solve problem by another sort of "technological fixes" whether it is "intermediate", "soft" or "self-help technology". As pointed out earlier, in the case of Schumacher and his group ITDG, despite radical pronouncements in their agenda majority of AT groups falls in this category - their actual practices reflect some sort of welfarism, a charity work as the part of their basic goal, not a fundamental change in the society. Many groups, established in this manner, are utterly confused in what constitutes appropriate technology. In a recent study made by A.K.N. Reddy on AT groups located in developing countries, out of 75 responses, 50 per cent th ought that appropriate technology should be appropriate to the area, 40 per cent to the poorest section of society and 10 per cent to the sector.[74] This is the condition of majority of AT participants, when Jequier Nicolas recommends to make a jump from the "first generation"

to the "second generation" in appropriate technology - "The first generation can be characterised by the paramount importance of moral and ideological consideration in the debate about development styles, by the seminal role of a small number of marginal groups in bringing these issues to the forefront of development thinkings and at the technological level by the experimental nature of innovations in hardware... it has reached its natural limit." Second generation in AT is the "Institutionalisation or de-marginalisation"; the effective linkages between innovation system in appropriate technology and the financial and investment system; "developing national and international technology policies focusing specially on appropriate technology"; and "the role of appropriate technology in meeting the basic needs of the hundreds of millions of poor people in the less developed countries."[75] It is nothing less than Daniel Bell's proclamation of the "end of ideology". Jequier's jump to second generation of appropriate technology is suggestive to the fact that ideological debate has been settled down by incorporating appropriate technology in many national and international development planning, now time has come to forget about social and political values inherent in their ideology and take part in the renewed development planning.

Many Gandhian groups, as they attach themselves to Gandhi, also fall within the same category, as they also transformed radical ideas into a complementary process of existing development model. Anil Date informs that voluntary groups involved in the field of technology in India, inspired by Gandhian tradition, are no longer functioning according to the tradition - "A great many of them have certainly been inspired by the Gandhian tradition, but their way of functioning are very different."[76] Many groups makes only salutory reference to Gandhian ideas, by emphasising one aspect and forgetting others. The "Resource Development Institute", founded by Mr. Goswami Gajanam Puri, former Engineer in Chief of Madhya Pradesh, tries to bridge the resource gap and expertise gap by some 'relevant' technologies like solar cooker, low-cost housing etc. developed by most qualified experts. They have this quotation of Gandhi on their magazine. "The rich are the trustees of the poor and so are the intellectuals and professionals, the trustees of the mute masses of India."[77]

The entry into the "second generation" of appropriate technology is very profound in some AT groups influenced by Gandhian ideas apart from those

which were born in the age of second generation. The example of Sulabh International, a voluntary group in health and sanitation, will tell most of such stories. From Bhangi Mukti Cell of the Gandhi Centenary Celebration Committee in 1967 to Sulabh Shanchalaya Sangathan in 1974 to Sulabh International now, can be said a pioneer work in the field of sanitation by its founder and propagator Mr. Bindeshwar Pathak. This organisation provides, water sealed latrine construction to private users with fifty per cent subsidy from the government and public latrines and bath facilities in urban area on contractual basis with the respective municipality or corporation.[78] Picked up the idea of water sealed latrine from a WHO publication, Mr. Pathak went on to implement the low-cost technology with government's help in the urban and semi-urban areas of Bihar, to replace dry latrine and erect new one where there was none. Now, Sulabh International employs a staff of over 15,000 workers "all of whom receive monthly honorarium or amounts which are marginally better than equivalent government salaries. Their turn-over in work today exceeds Rs.10 crores (US $ 8.3 millins) per year and government and conversion contracts are increasing."[79] Now it is claimed that Mr. Pathak did a Herculian task of liberating scavengers from

a degrading job in the line of Gandhian tradition. The liberated scavengers needed rehabilitation programmes from the extra earned money of the Sulabh International, but without any security of job or occupation. They did not get absorbed in the staff of the Sulabh International, instead they got training in typing, shoe-making and different vocations. On the other hand, the low-cost sanitation technology constructed by the experts of Sulabh International didn't come upto the proclaimed benefits, instead they performed worst in several cases. Apart from these considerations, Sulabh International can be said a successful entrepreneur, which by capitalising on the Gandhian idea of liberating scavengers, mobilised institutional resources of government agencies and foreign aid agencies, and built up a huge organisation with well paid staff. Instead the technology going into the hands of people, the organisation retains its expertise and makes money out of contracts based on those expertise. The biography of the entrepreneur, Mr. Pathak is not less interesting. When he started as an entrepreneur, he was simply a graduate and a school teacher. After he achieved successes in mobilising resources, he got two gold medals in the

field of education too. His cards reads now - "Dr. Bindeshwar Pathak M.A. (Gold medalist) Sociology, M.A. (Gold Medalist) English, Ph.D., Action Sociologist & Social Reformer, international expert on low-cost sanitation, bio-gas & Rural Development." His dynamic personality was so influensive that he got a University Professor and the Head of the Department of Sociology, Patna University to write down his biography - "When the history of the social change in Indian society of the second half of the present century is written, Dr. Pathak will be accepted as the equal of Mahatma Gandhi."[80] Dr. Pathak is not confined to make innovations in the area of appropriate technology, he ventured into the discipline of Sociology as well what he calls "action sociology". A national seminar was held on this topic in 1986 and passed resolution to include "action sociology" at the post-graduate level in all the universities of India. The list of topics included - "short hand and typing, Sulabh Shanchalaya, Bio-gas, smokeless chullah, maintenance of water supply, Driving light and heavy vehicles, tailoring, wood work, paper plates, Adult education, Rural Development Programme, and Ecological problem and Environmental Sanitation and so on."[81] This sort of understanding in the AT movement is not the reflection of inability to understand

the theoretical complexity involved with the problem, but a willingness to atune their ideas with the mainstream development process by infusing their innovative skills. What seems radical, revolutionary from outside, turns to be another formula of development packages to people, in the content. Many organisations in the field of appropriate technology can be found which are attached to Gandhian tradition only by name, or by using his name. Nevertheless, there are organisations and individuals in the Gandhian institutions and outside it who genuinely want to bring about some thing new, and try to advance Gandhian ideas.

The other kind of technologues are those whose ideas and activities are informed by some visions of social and political changes. Even in this category, sub-division could be made on the basis of their identification of the problem and the proposed solution. Some find the cause of the problem in the elite structure of science and technology, in which it is not disseminated to the masses, thus exploitative structure continues to dominate the poor people. Once science and technology is in the hands of people in proper manner, they will be able to fight back the exploitative system on their own. This conviction is shared by people's science movement in India led

by Kerala Sastra Sahitya Parishad (KSSP), Kerala.[82] They don't find any problem in the content of science and technology, but in the way it operates in the existing condition. Thus, by popularising science among masses, they seek to fight the contemporary problems of development. They are quite distinct from modern 'diffusionists' in that their educative and disseminating programmes become the part of overall social change. Their way of actions, whether they recognise or not, fall within the theory of 'conscientization' formulated by Paulo Freire and to some extent Gandhian way to pursuit of knowledge and pursuit of struggle as the same phenomenon. They find their counterparts in other parts of India, in the Lok Vignyan Sanghatana of Maharashtra and the Uttarakhand Sangarsh Vahini in U.P. "whose activities correspond broadly to the content of a PSM (People's Science Movement)."[83]

Other groups identifies problems at the level of innovations and in the working of existing institutional network in the field. They intervene in the process themselves to provide examples of alternative approach in respective fields. The example of Kishore Bharati and Eklavya in the field of education; ASTRA (Cell for the Application of Science and Technology

to Rural Areas) of Indian Institute of Science, Bangalore in the field of technology; and the Medico Friend Circle, in the field of medical sciences. The stated objective of Eklavya, "is to spread the method of self-discovery and inquiry in the field of education. The aim is to help, promote the acquisition of skills and abilities which contribute to the creation of a society wherein individuals attain an attitude of critically for recognising social inequalities and domination, and attain the courage and confidence to overcome servility."[84] For this end they participate in the innovative 'Hoshangabad Science Teaching Programme', initiated by Kishore Bharati, Training of Teachers, publication of bulletin and "initiating, testing and diffusing innovative ideas in both formal and informal education" through field centres. Similar concerns can be found in the efforts of ASTRA, which has the mission of "the generation and diffusion of technologies appropriate for rural development, and the promotion of the sciences underlying these technologies."[85] Thus in ASTRA approach, "the selection of technologies appropriate to rural development cannot be left to 'wise' men in ivory towers; it must be the culmination of a process of interaction with the prospective beneficiaries".

Recognising their limitations, they'concentrate on technology generation' and assign the task of diffusion to the participation in multi-institutional terms. They make intensive studies on natural resources, energy agriculture, water, building etc. at Ungra Extension Centre by interacting with villagers and develop technologies accordingly to diffuse them at micro level at extension centre and wider uses, all that signifies - 'democratisation of innovation and diffusion', and 'a powerful method of conscientization of scientists'. Most of the AT institutions fall within this category, who are mainly concerned with the 'promotion and diffusion of appropriate technology', with differing approaches and perspectives. What distinguished ASTRA from many other, is its clear cut perspective on the development of appropriate technologies and a thorough critique of existing policy and institutional framework of science and technology, which are unequivocally urban biased, elite and west oriented - "The environment is the best teacher" rather than "the West is the best teacher".[86] However, ASTRA does not have any alternative view of society, the implicit recognition of national ideology, provides a framework.

The third kind of groups are those, who identifies problem in the Western world view which guides science

and technology, economy and other cultural values of the Western civilization. Their critique of existing social structure often becomes total, and the counter-measure comes from tradition redefined in the new context. In this case, the example of PPST group, Madras and the works of C.V. Seshadri at Shri A.M.M. Murugappa Chettiyar Research Centre, Madras can be cited. The PPST (Patriotic and People-Oriented Science and Technology) is a small group of some concerned scientists and intellectual, who popularise their ideas through publication of a bulletin. Every issue of the bulletin until the PPST Foundation was established in 1986, printed it objectives on the cover pages - "It is the objective of the Bulletin to attempt a re-evaluation (from the point of view of the Third World) of the modern Western science and technology; and of the non-Western cultures. This re-evaluation we hope, will raise the possibility of the development of an alternative S & T: an alternative based on more humane values; an alternative that would lead to a better, self-reliant and non-exploitative social order, thereby constituting a Patriotic and People Oriented S & T."[87] Now PPST Foundation is dedicated to "evolving the basis for a science and technology having its roots in the Indian scientific and technological traditions

and oriented towards meeting the needs of the Indian People".[88] Since PPST group is involved only in the realm of ideology, it is able to be critic of modern civilisation, from which emerges fine pieces of redefinitions of many concepts and categories, as well as new ideas. But when it comes to translate into the reality, they disperately look into the various movements and protests - chipko movement, environmentalism, Jaipur Foot, organic farming; and they look back into traditional sciences and technology. Thus, by formulating problem into two models of modern and traditional, as incommensurable entities, they seek paradigmatic changes as a measure to solve the contemporary problems. Apart from ideological gearing over the contemporary issues, one sided critique of modern civilisation and uncritical projection of tradition, little can be said about their achievement towards genuine paradigmatic shift. Nonetheless, their efforts reflect the need of such paradigmatic shift in most urgent way. C.V. Seshadri, on the other hand, attempts to change modern paradigm by attacking specific basis of modern sciences, for example, second law of thermodynamics, as pointed out earlier. But he derives out of it something for action - integrated bio-technology systems to grow food items from algae in the nearby village Inchambakkam,

and biodynamic method of gardening for small holdings.[89]

An alternative paradigm is also coming from organic/natural farmers, who find agriculture not merely the activity of growing crops, 'but the cultivation and perfection of human beings'. Leading exponent of this trend can be found in the Masanobu Fukuoka of Japan, who turned to be an organic farmer from a laboratory scientist. He practiced farming without ploughing, using chemical fertiliser and pesticides for last twenty five years and he produced as much crops as 'the top harvest in the whole country'.[90] Fukuoka treats his subject in its wholeness, that include both what he knows and what he does not know. What he fears in modern applied science is its disdain for mystery, its willingness to reduce life to what is known about it and to act on the assumption that what it does not know can safely be ignored. His paradigm is based on undiscriminating knowledge which does not make such distinction. Discriminating knowledge is derived from the analytic, willful intellect in an attempt to organise experience into a logical framework. Mr. Fukuoka believes that in this process, the individual sets himself apart from nature. He does not reject modern science totally - "In the West natural science developed from discriminating knowledge; in the East

the philosophy of yin-yang and of the I Ching developed from the same source. As temporary expedients or as directional makers they could be acknowledged as valuable... but they should not be considered as the highest achievement."[91] The highest achievement is living by experience only, not using intellect, thus, Fukuoka's extreme position prescribes such goals that could be hardly shared by others. However, Fukuoka's method of farming is of great importance in the existing condition. It is being experimented by Friends Rural Centre, Rasulia, M.P. successfully in the recent years in the name of 'rishi kheti'.[92]

Apart from going back to traditional science and technology or philosophy as an alternative paradigms, the arguments and evidences coming from the technologues to support the cause of deprived people, is a markable phenomenon of the current development. Whatever position they take, the technologues are formulating deprived section's problem in technical terms and justifying their cause in more precise scientific terms than political and science terms. This can be illustrated with the examples of A.K.N. Reddy's, the director of ASTRA group and C.V. Seshadri's position. Both have divergent views about second law of thermodynamics, hence about science basically. C.V. Seshadri holds

that the second law of thermodynamics, as developed in the modern science, is based on such axiomatic principles and isolated systems that favours mechanical superiority over the biological processes, 'a total preoccupation with processes which produced mechanical work - the useful work'.[93] This was commensurable with the industrial development's preoccupations - useful work and efficiency. Thus, the second law of thermodynamics mainly serves as a guideline for extraction of resource and their utilisation, by transforming the concept of 'energy' in value which can't be separated from its use, which favours modern industrial process at the cost of the food consumption needs of the people. The biological processes, which are of great significance from the viewpoint of food and nutritions, is of very little importance for the second law of thermodynamics since they occur at ambient.[94] The use of chemical fertiliser as against organic fertiliser pesticide and agricultural machinery are favoured in accordance with the bias in the second law of thermodynamics. It is more efficient to convert molasses into alcohol than into yeast that has food value for humans and animals. In an example Seshadri illustrate that "it is possible to produce, from one square mile of sugarcane, enough molasses (and protein

through yeast) to supply nutritional diets to one million children. But molasses were made use of to produce alcohol and not yeast! Thousands of man hours were lost due to drunkenness and Alcohol, of course was a great source of revenue for the state. Prohibition in such a situation was a technological necessity."[95]

On the other hand, A.K.N. Reddy does not find such bias in the second law of thermodynamics, but in the wasteful use of energy in the western life style.[96] He defines the law in conventional way - "Every energy source that can be harnessed to human ends can be characterised by a quality called 'available work'. This available work is always consumed by irreversible dissipation in any energy based task or activity. Thus the useful work is such a process or activity, at best, can be equal to the available work; invariably dissipation results in the useful work being less than the available work." Significance of the law, for Reddy, is that (i) every energy must be associated with a grade or quality e.g. electricity or mechanical energy which correspond to infinite temperature, as the highest quality, fossil fuels comes second to them; (ii) for a given task, it is the maximisation of second law of efficiency that determines the

minimisation of fuel consumption and of capital cost; and (iii) To maximise second law efficiency, sources and device must match the task. And the 'thumb rules' in determining technical appropriateness of the energy technologies are - (i) Don't use a higher quality energy source than the task deserves e.g. for heating water by high grade electricity is an unwise practice; (ii) For a given source, choose the device which consumes the least available work i.e. which generates the most useful work or heat". From this perspective in the second law of thermodynamics A.K.N. Reddy, after examining various alternatives in energy technologies, concludes that it is political choice to choose the technologies - "Finally, the technologies considered appropriate for a simple overall growth in total energy production (and therefore, per capita energy consumption) without regard for the distribution of energy, are most likely to be the very large scale, centralised power plants - nuclear, thermal, hydroelectric - even though it has been proved that such concentrated power rarely flows to rural areas which need it. In contrast, the technologies appropriate for a growth, biased in favour of rural areas, may well turn out to involve small scale decentralised power - biogas, solar, wind, energy forests - with supplementary power coming, if

necessary, from electricity grid. Thus depending upon the magnitude and structure of the energy target, there are two fundamentally distinct strategies and technologies of energy production."[97] Reddy even goes to justify traditional agricultural practices on the basis of energy criteria. For comparison, South East Asian countries by traditional practices in agriculture produce 50 calories of food with the input of 1 calory, whereas in U.S.A. five to ten calories of input is used to produce one calory of food.

Despite their vital differences of opinion about the second law of thermodynamics, they arrive at the same conclusion; both refer to Gandhi although in different context. Reddy is suggestive to the fact that there is nothing wrong in the laws of modern sciences, problem lies basically in the choice and he prefers Gandhian ideas to take the side of rural people, to generate technologies suitable to their condition. On the other hand Seshadri takes Gandhian ideas as the starting point to challenge the value neutrality of modern science. By altering the preference in grade or quality, Seshadri wants to give primary importance to biological process which is more akin to life necessities rather than high efficiency or infinite

temperature of electricity. Thus, one wants to make science responsible to social realities and to define social problems and its solutions as scientific and technological necessity, while for other it is only a matter of choice, science retains its autonomy. It is on going debate in the academics, but in the context of social movement such debate assumes special significance because they are followed by actions, and changes in value preferences. The only route for paradigmatic shifts.

Thus, there are wide range of interests and perspectives involved in the AT activities. Despite this obvious fact, many observers have tried to put the notion that AT is a homogeneous phenomenon. For the 'second generation' of AT, Jequier formulates an extremely fluid criteria of identification - interest in one or another appropriate technology - that allows him to dismiss the claims of its prophets and visionaries - "the issue today is not to develop new pieces of hardware to prove the validity of the AT concept, or to create a micro society of anti-establishment institutions, but rather to develop the methodologies, institutions and mechanisms which will allow the 'system' (i.e. government agencies, research centres, educational institutions, banks, industrial firms or

community organisations) to translate its commitment to AT into new technologies, new way of doing things and new organisational structures."[98] For the 'first generation' of AT, David Dickson presents a picture of homogeniety in the case of utopian technologists. He reproduces Robin Clarke's comprehensive list of soft technology criteria to denote 'a coherent system that can only be interpreted as a whole' - the soft technology criteria include "ecologically sound, small energy input, low or no pollution rate, reversible materials and energy sources only, functional for all time, craft industry, low specialisation, communal units, village emphasis, integration with nature, democratic politics, technical boundaries set by nature, local bartering compatible with local culture, safeguard against misuse, dependent on well being of other species, innovation regulated by need, steady-state economy, labour intensive, integrates young and old, decentralist, general efficiency increases with smallness, operating modes understandable by all, technological accidents few and unimportant, diverse solutions to technical and social problems, agricultural,emphasis on diversity, quality criteria highly valued, food production shared by all, work undertaken primarily for satisfaction," and so on; and on the other hand

hard technology criteria was arranged just reversed in character.[99] By making such an astounding list, arranging goodies and badies in simple and non-contradictory manner to provide a whole, Dickson confuses the role of social criticism and utopian thinking. The characteristics of hard technology are essentially a critique of existing social order and soft technology is a proposal for future society. By presenting them in juxtapostion, it becomes simplistic and implicit recognition that utopian technologist are more or less homogeneous in character. The kind of "soft technology" attract various interests and perspectives as outlined above.

Such diverse perspectives and beliefs, focused on a single issue, is also characteristic of several other contemporary movements spread at the global level. In that, AT movement share with them ideologically as well as in actions. Without reference to this sharing, any analysis of AT movement would not be complete. Many observes want to analyse AT movement as if it is concerned with only technological problems, and engaged in promotion and diffusion of appropriate technology. True, AT movement consist of those groups and individuals who are directly related with any aspect of technology, as against the mainstream

technological pursuit. But there are many ways to look at technological problem and in practice technology involves many more aspects than technical one, hence they are essentially placed to confront those situations. Thus, different social movements in contemporary period might be focused on a particular issue, they have to deal with problems and issues which are not their primary concern. In this context sharing with other social movements become all important to see them in a broader perspective - inter-relatedness.

Sharing with other movements

The period in which AT movement became more manifest, was also the period when a lot of other movements emerged - ecology, feminist, peace, anti-nuclear and varieties of local movement which sought to solve problem not through conventional political method i.e. party politics. Certainly, the cause of their emergence could be traced in the historical developments that took place in the 20th century. In a way, their emergence was a challenge to the existing dominant paradigms of social discourse pointing out the inabilities and inadequacies to deal with the situation. Whether these challenges will be abated out by problem-solving methodologies of the prevailing

paradigms or would lead to a paradigmatic changes is a matter to be proved by the history in the course of time. For the present those movements are still continuing, going through different phases of their life-cycles. But one thing is certain that contemporary social movements are raising fundamental questions which requires not only structural changes in society but also a redefinitions or replacements of concepts and categories on which they are based. The demand of such changes are coming not from all sections of a particular movement, but there are sharing of such demands by certain sections of different social movements.

With ecology movement, AT is related more intricably than any other movement, perhaps because of the fact that technology is a deciding factor for relationship between human society and natural environment. Thus, the quest for alternative or appropriate technology can be seen as simultaneous with the growing concern for the ecological degradation, all over the world. There is a close link between AT and ecology movement both ideologically and in ranks and files. Jonathan Porritt, an influential leader of ecology movement in Britain, identifies that there are mainly three types of environmentalists - conservationalists or traditionalists, Radical or Libertarian, and reformists.[100] Radical or

libertarian are those, who follow the same ideology as earlier explained in the context of AT movement, as followed by the anarchist tradition. They are usually held as "green". Reformists are those, who don't challenge the dominant social paradigm; they are fast moving to be 'green', as seen by Jonathan. They correspond to those sections in AT movement who do not profess any alternative social values, but seriously concerned to the problem. And among the activists of Green politics are - "small holders, organic farmers, bicyclists, vegetarians, ardent recyclers, the small is beautiful brigade, those into alternative medicine or appropriate technology and many of those who work on co-operatives and the alternative economy."[101] When a noted Ecologist Barry Commoner defines ecology in terms of four basic laws - "everything is connected to verything else, nature knows best (i.e. interference with ecological systems can be equivalent to poking a peneil at random into the back of a watch); everything must go somewhere; and there is no such thing as a free lunch,"[102] he is not far away from too many prophets of AT movement. Cotgrove and Duff, also, pointed out the heterogenous character of the ecology movements, but as a general

denoter, they described the social paradigm of environmentalists as follows - opposition to economic growth, little confidence in science and technology, decentralisation, participation, harmony with nature, rationality of means not ends, integration of fact, value, thought and feeling, etc."[103]

In the context of India, same could not be said about inter-relationship between ecology movement and AT phenomena, because ecology movement here is of different dimension. What is in West a 'safety issue', 'risk control' in India it is a matter of 'survival', directly resulted from modern technological pursuits, destroying the habitat, culture, livelihood and social organisations of those people who remained outside the mainstream of development. Seen in this context protests and movements of those communities against the application of modern science and technology is not new, these are taking place since early period of colonisation. What is new, is that their protests are seen in a new perspective; scientists, technologists and intellectuals are coming forward to justify their long standing demands in more subtle and precise vocabulory and arguments in the light of new perspective. For example, in Garhwal Himalaya, or for that matter many hilly regions, there were continuous protests and movements against

the application of forest laws and forestry sciences, since early part of the 20th century.[104] They were never got support from intelligentsia, rather their way of life was characterised by 'superstitions'. But now there are scientists like Vandana Shiva and many more to say that, "Forestry science needed the Garhwal women and the tribal people to see that catchment forests were not mines of timber but a source of water and genetic resources;" and to relate their struggle with their own - "Ecology movement like chipko are not merely protests against exploitative and destructive resource use, they are movements against biased and restrictive science".[105] Similar thing can be said in the context of AT movement, as search for alternative technology began during the freedom struggle, and continued through some institutions. Now, in the wake of new emerging situation and perspective technologies turn to those ideologies in the justification of generating appropriate technologies.

Whatever may be differences because of contexuality and historicity, no advocate can be seen defining appropriate technology without reference to ecological concern, whatever their perspectives might be. It is rather historical forces that combine AT movement with

ecological movement, than ideological considerations, thereby rendering identical ideological counterparts in both movements. In such a circumstance, AT movement must be seen in relation to ecological movement that gives a broader historical context for analysis.

In comparison with Ecology movement, Feminists have loose links with AT movement particularly in the actions. However, in the West anarchist tradition has a good standing in the form of 'anarcho-feminism' but there is less proximity even with their male counterpart in action.[106] Perhaps because of the fact that the very basis of feminist movement ponders on the seggregation. For those feminists who want greater participation of women in every walk of life with equal rights without having any critique for present technological order, AT has perhaps nothing to offer. But it is fascinating to see that many AT advocates direct their critique of existing technological society from feminist point of view. They attach gender relationship with the notion of soft and hard technology - hard technology is macho:destructive, dangerous, dominant, aggressive, and soft technology is femine - recessive, benign, life-saving, etc.[107] Arnold Pacey went on to characterise hard technology related to the Greek's artisan-god Hephaistos which represents

the virtuosity value - promoting adventure, risk, mastering natural forces, etc., while soft technology is seen as exemplars of the Greek Goddess Pallas Athene representing user or need values - responsibility, risk avoidance, care for nature and people, etc.[108] This is again an attempt to confuse the role of wishful thinking and social criticism. Technological order does not exist in such simple and non-contradictory arrangement. The same sort of projection is made by James Robertson in the context of AT movement. He develops a notion of future society touching the feminist sentiment, what he calls - SHE future (sane, Humane, Ecological) and this paradigm is characterised by intutive knowledge, community politics and direct democracy, the gift and barter economy of households and local communities, personally shared experiences, caring personal relationship, personal spiritual experience."[109]

Whatever the projection of AT advocates might be, there is a dominant thinking among feminists that modern technology has liberated women from feudal drudgery and the entrance of women in the space programme, into the echelons of the military, business, administration and industry is not considered

as a setback for them. But there is a striking difference of opinions particularly in the context of Third World countries where women and weaker sections are unmistakably victims of modern path of development. Even among feminists, there is growing demand for the recognition of household works, and reproductive role, and more participation of women in the decision making process of technological choice. It is an indirect attack on the prevailing paradigm of technological order. Govind Kelkar in his study shows that Green Revolution in India did not result in the betterment of women, instead it reinforced "the androcentric development", and there is a need to 're-feminise technology'.[110] A female AT activist formulates the case for women in a most confident way - "A woman is probably one of nature's most developed creatures. She is a miraculous form of software that produces babies... The mind is still the better gift to women, more valuable and more creative than the uterus. That mind can construct and can produce technologies that can change this world and make it more egalitarian to both sexes of the human race."[111] There are others who find 'sexism in modern medical practices - "The interpretations medicine offers are basically to

legitimise the discrimination of women and their continued oppression under the guise of biological determinism."[12] Overall consideration makes it clear that feminists do not formulate their problem in technological terms, but in many ways their concerns make an indirect but fundamental critique of the technological order of the society.

There are many other movements with whom AT shares, in more or less degree. The consumer movements at the international level which is led by the International Organisation of Consumers' Union, has some thing important to say in AT phenomena. They introduced a new concept in AT movement - "appropriate product", on which they held a seminar in 1982 - "By now it should be clear that appropriate technology cannot be discussed in any meaningful way without paying attention to the product mix that is chosen: ...Thus the promotion of appropriate products will often also lead to more appropriate techniques and therefore to more local employment... before appropriate technology can be selected... - the country first needs an appropriate product policy."[113] However, this concern is not reflected in the national consumer societies in India, but IOCU participates in AT phenomena in various ways - opposition to hazardous industries of

pesticides, drugs and other, campaigning against inappropriate products like baby food, unhealthy food times etc. They also participate in AT conferences and exchange their informations and views. In the context of peace movement, anti-nuclear movements, the same ideological diversity can be found as it is prevalent in AT movement.[114] AT movement finds collaboration with many localised groups and movements in various contexts, after all they are the basic constituencies of ideological pursuits.

The ideological concerns of native movements often remain undocumented because of their specific way of articulation and language, along with other reasons. There are rare examples in these movements, when leaders are so articulative to project their own ideology in the wider context. But, the example of Russel Means, a prominent leader of American Indian Movement, is notable here. There is startling similarity between Russel Means and those proponents of AT who wish to proceed with changes in world views. The starting point, for Means, is his own society - a collection of tribes like Lakota, Hopi etc. collectively known as American Indians, which has been culturally and politically oppressed for over two centuries.[115]

Recently, a larger section of their habitat has been declared as a 'National Sacrifice Area' by the US Government for the extraction of uranium deposits and dumping of waste by-product. Russel Means is of opinion that at the root of these problems of his society is expansionist and destructive qualities inherent in the Europian tradition. As Means says - "I do not believe that capitalism itself is really responsible for the situation in which American Indian have been declared a national sacrifice. No, it is the European tradition; ...Marxism is just the latest continuation of this tradition, not a solution to it. To ally with Marxism is to ally with the very same force that declare us an acceptable cost.[116] Like Gandhian movement, the use of local resources and indigenous technology for a self-sufficient community is simultaneous with struggle for social and political rights in American Indian movement.

There is no weight in the claim that AT movement is having more or less homogeniety at the ideological level. Diverse and often incompatible interests are operating in the realm of AT phenomena, devising, popularising and advocating for same sort of technologies, which gives an illusion that they are same. When

their concern for appropriate technology is examined a little further, the intentions and interests behind it becomes manifest. To portray AT movement as if having no contradictory claims in the movement, is a theoretical bankruptcy to look at a social movement, or an implicit endeavour to make prominent a particular ideology.

The ideology of AT movement, necessarily emerged in the opposition of the ideology of industrialisation. The most expressive form it got was in the anarchist tradition, in developed countries and in Gandhian tradition in India. The Indian case provides a unique example among Third World countries, as a specific ideological critique of modern World view basis of which coming directly from its tradition - in the form of Gandhi. It surpasses the Western anarchist tradition at the level of fundamental and consistent categories of critique. The practibility of future society provided by those traditions, is still under suspicion, as both communitarian and Gandhian movement failed in their efforts to bring forth their ideals in concrete form. Still their ideas are primary source for many AT groups operating in the field.

The other section of ideologists who does not stand against the ideology of industrialisation too

turn to "the first generation" in order to sharpen their concepts and methodology of operation. But certainly they are more prominent in number and resources, now, particularly after the infusion of international and national agencies of 'establishment' in the AT phenomena, what can be called - institutionalisation of the movement at global scale.

References:

1. Larrain, J., The Concept of the Ideology, BI Publications, 1979 (p.14).

2. Dickson, David, Alternative Technology and the Policies of Technical Change, 1974.

3. Morrison, Denton E., "Soft Tech/Hard Tech, Lo Tech/High Tech: A Social movement Analysis of Appropriate Technology" in Sociological Inquiry, vol.53, no.2/3, 1983.

4. Ostergaard, Geoffrey, "Indian Anarchism: The Sarvodaya Movement" in David E. Apter & James Joll (eds.), Anarchism Today, Doubleday & Company Inc., NY, 1971.

5. Winner, Langdon, "Building a Better Mousitrap: Appropriate Technology as Social Movement" in Franklin A. Long & A. Oleson (eds.), Appropriate Technology and Social Values, Ballinger Publishing Company, 1980.

6. Stafford David, "Anarchists in Britain Today" in Apter & James (eds.), op. cit.

7. Marcuse, Herbert, One Dimensional Man: Studies in the Ideology of Advanced Industrial Society, Beacon Press, 1964.

8. Ellul Jacques, The Technological Society (trans.) John Wilkinson, Knopf, 1964.

9. Mumford, Lewis, The Myth of the Machine: The Pentagon of Power, New York, 1970.

10. Kasson, John F., Civilizing the Machine: Technology and Republican Values In Ameria 1776-1900, Penguin Books, 1976.

11. Marcuse, Herbert, An Essay on Liberation, Beacon Press, 1969 (p.19).

12. Roszak, Theodore, Where the Wasteland Ends: Politics and Transcendence In Post-Industrial Society, Anchor Books, Doubleday NY, 1973, (p.396).

13. Ibid. (p.394).

14. Batalov, Edward, The American Utopia, Progress Publishers, Moscow, 1985.

15. Perlin, Terry M., "The Recurrence of Defiance" in Terry M. Perlin (ed.), Contemporary Anarchism, Transaction Books, 1979.

16. Otto, Herbert A., "Communes: The Alternative Life Style" in Saturday Review, April 24, 1971, (pp.17-19).

17. Roszak, Theodore, The Making of a Counter-Culture: Reflections on Technocratic Society and Its Youthful Opposition, Doubleday, 1969.

18. Lerner Michael, "Anarchism and the American Counter-Culture" in David E. Apter and J. Jolls (eds), op. cit.

19. Ehrlich, H.J. et. al. (eds.), Reinventing Anarchy: What are anarchists thinking these days, Routledge & Kegan Paul, 1979.

20. Hess, Karl, Dear America, Morrow, NY, 1975.

21. Steward Brand et. al. (eds.), The Whole Earth Catalog, Nowels, California, 1968 (p.1.).

22. Ostengaard, Geoffrey, op. cit.

23. Gandhi quoted in Charle's K.S., "Modern Technology and Gandhian Economics" in Khadi Gramodyoga, vol.29, Oct. 1982.

24. Gandhi, M.K., Harijan, 16 Nov. 1934.

25. Gandhi, Harijan, 27 Jan. 1940.

26. Radhakrishan, J., "Gandhi Ashram lies Forgotten" in the Statesman, 2nd Oct. 1985.

27. Dharmapal, "Memory of an Old Important Debate", in Lokayan Bulletin (Hindi), No.2, 1985.

28. Gandhi, M.K., Harijan, 30th Nov. 1935.

29. Bose, N.K., Selections from Gandhi , Navjivan Publishing House, 1957 (p.297).

30. Bhatt, V.V., "The Development Problem, Strategy and Technology Choice: Sarvodaya and Socialist approaches in India" in Franklin A. Long and A. Oleson, op. cit.

31. Oommen, T.K., Chavisma, Stability and Change: An Analysis of Bhoodan-Gramdan Movement in India, Thomson Press Ltd., 1972.

32. Ostergaard, op. cit.

33. Mishra Anupam & Tripathi, Satyendra, Chipko Movement, Gandhi Peace Foundation, 1978.

34. McRobie, George, "Small is Possible", Abacus, 1981, (p.199).

35. Alvares, Claude, India's Rural Technology Experiment, CORT, 1984 (unpublished).

36. "Interview of Chandi Prasad Bhatt and Sundarlal Bahuguna" in Lokayan Bulletin (Hindi), vol.3, no.3/6, 1985.

37. Pani Chetna Samiti, Pani March - What, Why and and how (Hindi), Jaipur, 1985.

38. Dharmapal, Indian Science and Technology in the Eighteenth Century, Academy of Gandhian Studies, Hyderabad, 1971 (p.54).

39. Dharshan, Shankar, "Increasing Difficulties of Voluntary Organisations", Lokayan Bulletin, no.3/1, 1984.

40. Rahman, M. Anisur, "Reflections on Science and Social Revolution" in Science as Social Activism, KSSP, Kerala, 1984 (p.160).

41. "Reviving Sustenable Agriculture - A Report of three Conventions" in Lokayan Bulletin, vol.3, no.4/5, 1985.

42. Suman, Surendra, "Search for appropriate Science and Technology for Agriculture", in Lokayan Bulletin (Hindi), vol.3, no.4, 1985.

43. Bose, N.K. in Contemporary Relevance of Gandhi, (ed.) M.P. Sinha, Nachiketa Publishing Ltd., 1970.

44. Franda, Marcus, Voluntary Associations and Local Development in India, Young Asia Publications, 1983.

45. "Reports of Dialogues: Science, Technology & Society" in Lokayan Bulletin, no.5, 1982.

46. Seshadri, C.V., Development and Thermodynamics, Shri A.M.M. Murugappa Chettiyar Research Centre, Madras, 1982.

47. Rudolph, L.I., "The Modernity of Tradition: The Democratic Incarnation of Caste in India" in American Political Science Review, vol.LIX, no.4, 1965.

48. Matcafe quoted by B.K. Madan, "The Economics of Indian village and its implications in Social Structure" in Joginder Singh & Desh Raj Goel (eds.), Spiritist of Our Time, Movies Press, Delhi (undated).

49. Seaberg, Glenn T., "Shaping the Future through Science and Technology" in Raslansky John D. (ed.), Shaping the Future, 1972 (A discussion at the Nobel Conference, 1971).

50. Charles, Weiss (Jr.), "U.S. Policy Toward Scientific and Technological Development in the Developing Countries: the case of mutual benefit" in A.H. Teich & R. Thornton (eds.), Science, Technology and the Issues of the Eighties: Policy Outlook, Westview Press, 1982 (p.163).

51. McRobie, G., "Small is Possible", Abacus, 1982 (p.70).

52. "Directory of Institutions & Individuals Active in Environmentally Sound & Appropriate Technologies", UNEP, Reference Service, vol.1, 1979.

53. Jequier, Nocolas & Blanc, G., The World of Appropriate Technology: A qualitative analysis, OECD, 1983 (p.26).

54. Ibid.

55. Jequier, Nicolas, Appropriate Technology: Problems and Promises, OECD, 1976.

56. Eckaus, Richard, Appropriate Technologies for Developing Countries, National Academy of Sciences, 1977.

57. Schumacher, E.F., " Small is Beautiful", Abacus, 1974.

58. Ibid. (p.202).

59. Ibid. (p.122).

60. Ibid. (p.128).

61. McRobie, op. cit., (pp.34-35).

62. Schumacher, E.F., "Good Work", Abacus, 1979 (p.95).

63. Mc Robie, op. cit. (p.37).

64. Ibid.

65. Jequier & Blanc, op. cit., 1983 (p.162).

66. Schumacher, op. cit., 1979 (p.133).

67. Dickson, David, op. cit. (p.152).

68. Illich, Ivan, Celebration of Awareness, London, 1971 (p.181).

69. Jequier, op. cit., 1976.

70. Gouldner, Alvin W., The Dialectics of Ideology and Technology, McMillan, 1976.

71. Winner, Langdon, op. cit. (p.38).

72. The Journal of the New Alchemists, vol.1, 1973.

73. Lovins, Amory B., Soft Energy Paths: Toward a Durable Peace, Ballinger Publishing Company, 1977.

74. Reddy, A.K.N., "National and Regional Technology Groups and Institutions: An Assessment" in A.S. Bhalla (ed.), Towards Global Action for Appropriate Technology, Pergomon Press, 1979.

75. Jequier, Nicolas, "Appropriate Technology: Some criteria" in A.S. Bhalla (ed.), op. cit.

76. Date, Anil, Works in the Field of Technology by the Voluntary Sector in India, Academy of Development Science, Maharashtra, 1981 (unpublished).

77. Narayanan, K.P., "Technology at the Doorstep", in The Hindu, 11 Oct. 1986.

78. Pathak, Bindeshwar, Sulabh Shanchalaya: A Simple idea that worked, Amola Prakashan, 1982.

79. Ribeiro, Edgar F., Improved Sanitation and Environmental Health conditions: An Evaluation of Sulabh International's Low Cost Sanitation project in Bihar, Sulabh International, 1985.

80. Ahmad, Ziauddin, Dr. Bindeshwar Pathak: His Life and Work: The Biography of an Action Sociologist, 1986.

81. Proceedings and Papers of "National Seminar on Action Sociology in India" (28-30 July 1986), organised under the joint collaboration of the Department of Sociology, Patna University & The Sulabh International, Patna, 1986.

82. "Science as Social Activism" Reports and Papers on the People's Science Movement in India, KSSP, 1984.

83. Ibid. (p.xi).

84. Eklavya, Annual Report 1982-83, Bhopal (pp.2-3).

85. "Science as Social Activism", op. cit., p.164.

86. Ibid. (p.172).

87. PPST Bulletin, Serial no.8, May 1985.

88. PPST Bulletin, Serial no.9, Dec. 1986.

89. Date, Anil, op. cit.

90. Fukuoka, Masanobu, The One Straw Revolution: An Introduction to Natural Farming, Rodale Press Inc., 1978.

91. Ibid. (p.126).

92. "Friends Rural Centre" Rasulia, M.P., Annual Report, 1985.

93. Sahasrabudhi, Sunil, "Freedom From the Degrading laws of Degrading Order: A recent exploration of alternatives to Thermodynamics" in PPST Bulletin, serial no.9, Dec. 1986.

94. Seshadri, op. cit., , 1982.

95. "Science and Technology Alternative - the third dialogue" in Lokayan Bulletin, no.9, 1983.

96. Reddy, A.K.N. & Prasad, K.K., "Technological Alternatives and the Indian Energy Crisis" in EPW, Special Number, 1977.

97. Ibid. (p.1500).

98. Jequier and Blanc, op. cit., 1983 (p.169).

99. Dickson, David, op. cit., 1975 (p.104).

100. Poritt, Jonathan, Seeing Green: The Politics of Ecology Explained, Basil Blackwell, 1984.

101. Ibid. (p.6).

102. Commoner, Barry quoted in David Dickson, op. cit. (p.108).

103. Cotgrove, S. and Duff, A., "Environmentalism, Middle Class radicalism and Politics" in Sociological Review, vol.28, no.2, 1980.

104. Guha, Ramchandra, "Scientific Forestry and Social Change in Uttarakhand" in EPW special Number, vol.XX, Nov. 1985.

105. Shiva, Vandana, "Ecology Movement in India" in Development: Seeds of Change, vol.3, 1985.

106. Leighton, Marian, "Anarcho-feminism" in Ehrlich H.J. (ed.), Reinventing Anarchy, Routledge & Kegan Paul, 1979.

107. Morrison, op. cit.

108. Pacey, Arnold, The Culture of Technology, The MIT Press, 1983 (pp.97-102).

109. Robertson, James, The Sane Alternative: A choice of Futures, River Basin Publishing Company, 1978, (p.80).

110. Kelkar, Govind, "Tractors against Women" in Development Seeds of Change, 1983:3.

111. Polistico, Rachel V., Towards a feminine appropriation of technology" in Women and Appropriate Technology: A collage, Approtech Asia, July, 1985.

112. Sathyamala, C., "Is Medicine Inherently Sexist" in Socialist Health Review, vol.1, no.2, 1982.

113. James Jeffrey, "Appropriate Technology and Appropriate Products" in Appropriate Products: Consumer Craft III, Report of the IOCU Seminar on Appropriate Products, March 8th to 12th, 1982.

114. Ladd, A. et. al., "Ideological themes in the anti-nuclear movement: Consensus and diversity" in Sociological Inquiry, 53, 1983.

115. Means, Russel, "On a new consciousness of the American Indian Movement", in Lokayan Bulletin, no.7, 1982.

116. Ibid. (p.50).

CHAPTER IV

THE ORGANISATIONS

The issues involved here are basically questions - how they organise themselves in order to translate their objectives into actions? What structural and processual courses they take in this pursuit? Is there any consistency between their ideological utterances and organisational framework? However, in the absence of any concrete study and reliable data, the task of dealing with organisational framework of the movement will be highly limited. Nevertheless, their own account of the organisations and its functioning tells a lot in this direction. The biographical importance of these account cannot be denied, but it may be far from reality in many stances, for obvious reasons. Self projection and a tendency to leave out those things which they consider insignificant or harming their interests are some of the reasons.

A typology of AT organisations can be made on the basis of their affiliations. In this typology there would be three main types of organisations - first those organisations which are independent, they might be called voluntary organisations, however, not in strict sense in many cases; secondly, organisations

affiliated with government department, institutions and agencies as well as international bodies of UN; thirdly organisations affiliated with private concerns, research centres and foundation etc. Further, they can be subdivided on the basis of these organisation's concern for AT - first those whose concern is primary in AT activities and others whose concern is secondary. A further subdivision can be made on the basis of their constituency - those who are working in the developing countries, domestic or foreign and others who work for industrialised countries, mostly domestic. The other kind of typology of AT movement can be made, like this - organisation independent or affiliated with private concern or research centre or institutions, can be put together under the term non-governmental organisations (NGO's), on the other hand, those attached to governmental agencies including international bodies of UN, can be called as governmental organisations. The latter typology is being preferred by some AT participants. It is important to note here that transnational corporations too come under the term NGO, by definition. However, special meaning is bestowed to N.G.O. to mean - "all independent organisations, which are different from the state apparatus, are organised and managed on a voluntary and non-profit basis, and aims at various,

often development oriented goals."[1]

However, the distinction must be made between independent, voluntary organisations and organisations affiliated with any private concern or institution, because not only funding, infrastructure and other structure will be different, but also commitment of the participants in AT movement. Again inclusion of governmental agencies in the AT movement raises many questions. For example, in India many governmental agencies can be involved in the AT activities - AT centres at various IITs, AT Unit at the ministry of Industry, Department of Science and Technology, and various other governmental or semi-governmental research centres. AT programmes are very much in Indian government's agenda. They develop and promote appropriate technology such as gobar gas plant, solar cooker, improved chullah, and various other agricultural tools, low cost housing, publish directories of those appropriate technology and give subsidy in the adoption of those technologies, grants in aid to voluntary organisations for the dissemination of appropriate technologies. Should not, then, the Government of India be called a participant of AT movement? If we take appropriate technology only as set of particular type of technology, as seen even by many AT advocates,

then the government is very much a party of the movement. In the same way as it is party to Prohibition Programme, with a cautioning note on every bottle of liquor "Consumption of Liquor is Injurious to Health", and issuing licences and providing molasses to wine manufacturing companies, and distilleries. If we take political and social value associated with AT historically, then Indian government cannot be a party of AT movement, because its structure, functioning and overall policy goes against those values. Collaboration, co-operation with and opposition to the government is one thing and taking government and its agencies as party of the movement is entirely a different matter. At best, adversary or supportive forces can be located in government's echelons, agencies and policy, not more than that, if AT is taken to be as a social movement at all.

Therefore, the Organisations dealing with appropriate technology primarily or marginally and which are part of state apparatus should be seen as adversaries or supportives not as a part of AT movement. For example, the Organisation Appropriate Technology International (ATI) established by the US government, as a private and non-profit making corporation, should be seen as supportive to all those AT organisations who believe that they have some role to play in

developing countries for the development & dissemination of appropriate technology. At the same time ATI might be an adversary force in the AT movement for those who think that AT must be 'an obvious conclusion of the predicament and circumstances of developing countries and the product of their own effort. Thus, taking government agencies as the constituent of movement in the social movement analysis would be fallacious as pointed out in the second chapter.

The 'core' organisations of AT movement is considered to come under the category of N.G.Os. There may be two important types of NGOs - first, those organisations which are based on the local population and often represents grass root movement, and secondly urban based organisations which are often specialised in mobilising resources for development purposes and in designing, studying and implementing related projects and programmes. It is the second type of N.G.Os. which can be said to be prominent in the 'core' group of AT organisations, e.g., ITDG, VITA, and many others in industrialised countries and ATDA, ASTRA, etc. in India.

These 'core' groups are invariably built of qualified scientists, technical experts, and in some

cases social scientists, too. Along with them there are staff to do office job like typing, documentation, accounting, etc. And they are managed by one entrepreneurs, or a small group of them, who steer the whole activities of the group. They are the leaders of the group, very often they take the position of director or president in the organisation, they take the role of spokesman, planner and mobiliser for running the whole business of the group. In many cases, these groups become identical with such leaders, e.g. ITDG with Schumacher, ATDA with M.M. Hoda and M.K. Garg (M.K. Garg later on went to form his separate group Garg Consultants),[2] ASTRA with A.K.N. Reddy etc. No study is available to inform what relations exist between these leaders and their fellow scientists and staff. Do they have the same vision about the problem as their leaders have or do they participate in AT activities just because they are paid for that or assigned that task? An indirect reference to this aspect is made in the study conducted by A.K.N. Reddy in the developing countries AT groups - "With regard to incentive for such work on appropriate technology, there is a vast difference between voluntary organisations on the one hand and the established institutions of education, science and technology on the other. Whereas former are able to attract manpower with extraordinary

commitment, most of the latter have to deal with personnel the majority of whom have come in the institutions without a significant commitment to appropriate technology."[3] A.K.N. Reddy can say better about the commitment of scientists and experts attached to scientific and educational institutions for appropriate technology because he himself is a leader of such group ASTRA attached to Indian Institute of Science, Bangalore. In fact, it would be wrong to call ASTRA a group, because it is only a programme of Indian Institute of Science, Bangalore, in which members of existing faculty participate; there is not a single faculty specifically appointed for the ASTRA programme.[4]

Schumacher's ABCD formula for AT organisations tells much about their way to organise themselves - "A stands for the administration, people from government. Let's have some of them on the working group, as persons, not representing governments. They know how to pull strings, and they control a lot of money; they are tax-gatherers and spenders... B stands for business. Now the business intelligence is the intelligence, the discipline, to make thing viable so that they can survive. To create a thing that cannot

survive is a waste of time. We need this intelligence. The C factor are the communicators. The people of the word, research people, people who have got time to think and to write... But never let them act alone, because they are playful little souls. They like a problem, whether it be a chess problem or a problem that means something, and when they have solved it they mark it 'top secret' and file it away somewhere and turn to the next problem. But if the 'B' factor is sitting next to them, the business man, he says, "we spent money on this. We must now bring it out and make it viable". So this is a healthy combination. And 'D' are the democratic organisations of society, they are the labour union people, the women's organisations, the ecological people; happily every country is full of them."[5] This formulation Schumacher spoke out at his last speech, after all his experiences in AT organisations. What does it tell? Combine or bring together administrators, businessmen, scientists and technologists and democratic organisations of public, into one place, to solve a problem - a complete miniaturisation of the existing polity. The essential message is that existing systems of polity, bureaucracy economy and science and technology are running apart, in their separate barracks - that is the problematic.

Administrators have control over economy, but they are elitist, they don't have enough intelligence to make thing viable and they don't have knowledge how to solve problem. Scientists have knowledge but no social responsibility and practical skill of market, business men have such skills, but they need scientists and administrators help to make thing viable, and democratic organisations are the most effective way to reach the people. Is this an organisation for alternative development or alternative approach to development?

The organisation and working of ITDG provides sufficient answer of this question. E.F. Schumacher, the economist, George McRobie the journalist, and Julia Perter (who was running the Africa Development Trust), concieved the idea to form an action group to do something about intermediate technology themselves.[6] Some more like minded people joined them and the Intermediate Technology Development Group Ltd. was registered as a non-profit company and a registered charity in 1966.[7] They arranged a two-roomed office in London's Covent Garden and "with no money but a growing number of friends and supporters, we started by drawing together, round each subject, a team of experts to advise us, and help us to prepare specific

'fundable' work programmes".[8] The first panel was formed to deliver a training programme to upgrade the management skills of small building contractors in Africa. Soon they were able to form panels on water supply, agriculture, health and co-operative. In 1969, "the Group's first subsidiary company, Intermediate Technology Consultants Ltd. was started in response to the growing number of requests from international agencies, governments and other aid agencies for help in identifying needs and defining appropriate technologies. By changing fees for the services, the Company was able to pay its own way and also contribute to the cost of the Group's charitable activities, "the income for which had up until then come wholly as grants from foundations, voluntary agencies, companies and individuals."[9] Later on they set up another subsidiary company to handle publication - Intermediate Technology Publication Ltd. Now (i.e. in 1980) there were more than fifty permanent staffs and "between consultancies and field projects the Group is now typically working at any one time in at least twenty developing countries."[10]

It is crystal clear now that ITDG is nothing more than those organisations who are specialise in mobilising resources and designing, studying and

implementing projects and programmes for donor or assistance providing institutions. In such activities they become agents linking 'donors' or assistance providing institutions to their so called "target population". This sort of NGO's can be found in almost every field of development process. What is distinctive of ITDG is that it is concerned with appropriate technology, with a profound philosophy in its background. Otherwise it is a part of 'professional volunteerism' - a kind of social innovation in response to the growing tensions between bureaucratism and professionalism, in which professionals identify the major problem in the bureaucratic delivery system, planning and organisational inefficiency and want to bypass them by direct relating themselves to the 'target population' for development in all processes from conception of planning to implementation. They do not challenge the very content of 'development', the basic philsophy underlying it. The best example of this sort of "professional volunteerism" in India can be seen in the well known 'Tilonia experiment' in Rajasthan, organised by Social Work and Research Centre (SWRC), a brainchild of Sanjit ('Bunker') Roy. He attracts 'doctors, engineers, geologists, soil chemists,

biophysicists, economists, teachers and professional social workers - plus a staff of 25-30 other people... who know a great deal about health and hygiene, mechanical gadgets, principles of engineering, markets and management, the methods of government bureaucracies and bank, and other facets of the modern complex world outside the village, and who are willing to live in 'below the usual standard of living of most missionaries'.[11] With all that, what they are doing there in remote village of Rajasthan - running schools, para-medical services, promoting pasture land or kitchen gardens and various crafts, for villagers, and doing surveys, distributing seeds and fertilisers and nutrition programmes on behalf of government and international agencies. With all esprit de corps of the professionals, Tilonia experiment represents an 'unique potential as communications link between government and international agencies and the clusters of villages in which its centres are located."[12] Highly dependent on grants and aid SWRC leadership often think in terms of expanding their work in the line of Amul Dairy Co-operative in Anand, Gujarat.[13] In all its sincerity 'Professional volunteerism' is an alternative approach to development, not an alternative development. ITDG also falls in this category. The most of the organisations of the

'second generation' in AT resembles with ITDG's pattern of organisation with more or less variation according to their locations and purposes.

It can be argued that in AT movement, these organisations are not identical with other professional volunteers group, instead they are converts to AT ideology, as being argued by Nicolas Jequire.[14] As it is demonstrated above with the help of example two different sort of professional volunteers - one foreign based group dealing with poors in the developing countries and a village based group of professionals - their way of functioning, organisations are identical. The process of conversion of AT groups to AT ideology as it is coming from its original prophets and visionaries, can't be assessed by their utterance of those ideas. This can be assessed only through their actions otherwise it will be identical with those phoney religious conversions in which merely declaration of faith in different 'god' is supposed to alter the whole situation. The crucial aspect of such conversion to AT ideology is to see in what way they are performing those ideas in the action. Organisations represents one of most important aspects in which ideas are translated into action. In that aspect the AT movement particularly

the 'second generation' is identical with professional volunteerism - an alternative approach to development, not an alternative development. This aspect becomes more clear when they are seen in the concrete activities, that will be dealt in the next chapter.

The organisations that are partners of the grass root movements closely linked to them, particularly in India, have not appropriate technology on their agenda, as a main activity. In the context the example of chipko movement and KSSP can be cited. The "Dasauli Gram Swarajya Sangh" a leading group in chipko movement, had adopted a 3 kilowatt generation run by water turbine in their area and its leader, Chandi Prasad Bhatt is interested in those technologies that can reduce the arduous task of daily life in the hilly area and provide better amenities like health care, education etc.[15] KSSP is not a AT group in the strictest sense of AT defined earlier, if it is expanded a little to include "science" along with technology then KSSP is very much a AT group, disseminating science as "social activism". The success of KSSP is widely recognised and considered "at the vanguard of a unique people's movement based on science popularisation".[16] In fact, many people frame the problem in term of people's science

movement, not in terms of appropriate technology. People's science movement is considered to be operating mainly in education, health, science popularisation and appropriate technology. The popularisation of the term people's science movement is sole contribution of KSSP. KSSP held two national conventions of organisations engaged in the People's Science Movement - which includes a wide range of organisations - Lok Vignyan Sanghatana, Maharashtra, Medico Freind Circle, PPST, ASTRA, Kishore Bharati, Vidushak Karkhana, Shahdol (M.P.), Centre of Science for Villages, Wardha, Shramik Sanghatana, Maharashtra, Vigyan Shiksha Kendra (U.P.), Bhoomi Sena Movement, Maharashtra, Audyogic Jeevan Manch, Bombay, Society of Young Scientists, New Delhi and many others .[17] Only three or four organisations could be found in this convention, interested in AT directly like PPST, ASTRA, Centre of Science for Villages if strict sense of AT is applied. But many people don't like to see appropriate technology in that sense. Romesh Diwan has defined AT by four characteristics - ATs are people themselves, location specific, holistic and future oriented, following the Gandhian tradition.[18] Even then, they are bewildering mix of ideologies, social composition, working styles and funding and support sources. Harsh Sethi finds

commonality among them perhaps in right manner - "most of these activities do spring from a similar context, a similar concern, and in many ways represent a common tendency. Most of the groups... emerged after 1965, having internalised the experiences and critiques of official development strategies, as well as the experiences of the political parties - of both the Right and the Left. These groups are organisations composed mainly of sensitized radicalised middle class youth working for and with the exploited and oppressed strata with view to transform society... these are attempts to reinfuse vigour in and redefine politics and development."[19] Similarly, varieties of organisations involved in co-operative, community programmes, organic faming, training, technology etc. could be seen in Western countries particularly in the USA, when George McRobie describes them in the context of "Small is possible" but he is able to find out only ATDA and similar groups in the context of India. In a way, the old British anthropological tradition continues in the works of new generation of British AT advocate.

Schumacher's A3CD formula for organisation is not being followed by these organisations, however in some cases, Gandhian institutions could be seen as transformation of Gandhian ideas as Schumacher did.

In most of the cases ABCD's are broadened by including the members of the target population. In the case of KSSP, 'a cross section of people from different walks of life such as Scientists, Doctors, Engineers, Social Scientists, Teachers, Students, Workers, Peasants, Technicians form the base of organisations'. It has a membership of over 10,000 with around 600 units spread all over the state of Kerala - "At the base are the units above the unit level there are the regional councils and the regional committees and then there are the district councils and the district committees Members from the units and other councils are elected on a proportional basis to form the State General Council which is responsible for all policy decisions of the organisation. The General Council elects an Executive Committee and a number of programme committees for the planning and execution of activities."[20] KSSP is a transformation of a small group of scientists who took the task of popularising science through books and periodicals in Malayalam, into a mass organisation. In the background of Kerala, there are Gandhi's inspired Library Movement and Teachers Movement in the 40's, peasant struggles in Malabar, and several other radical political movements. KSSP might be unique case in India, but many other organisations are following its example.[21]

Even the professional's groups like ASTRA, Kishore Bharati, Eklavya and Medico Friends Circle don't reflect ABCD formula in their organisations, to carry out development plans in a sophisticated way. ASTRA programme, although not having a single staff appointed for this purpose, attracts 35 faculty members from 6 departments of the Indian Institute of Science, Bangalore, due to well defined and significant mission - "appropriate rural technology is advanced high technology (and not primitive low technology) if the advanced/'high' character of a technology is to be judged by the extent of modern scientific and engineering thinking and not by the trivial criterion of scale of production of "western" origin".[22] Through its extension centre at Ungra, ASTRA surveys, develops, lests and disseminate appropriate technology in the close proximity of its user and their felt needs. Through the help of government bodies like Karnataka State Council for Science and Technology, it diffuses tested and proved technology at a larger scale. Though ASTRA approach is not an alternative development, it is a special variation in the alternative approach to development, certainly not of ABCD formula. It is a conscientisation of scientists placed in the scientific indicating their importance in the fundamental research and development of appropriate technologies. ASTRA's

willingness to participate with organisations involved in grass root movement reinforces its stated mission. Similarly, small groups like Eklavya and Kishore Bharati, in the sphere of education collaborating with government departments and projects, are not providing an alternative development, in education, but an alternative approach in education, which according to their view, will lead to a greater changes in the society. They challenge not only the methodology of existing educational institutions, but the very content of curriculum also. In all these efforts of ASTRA, Eklavya, etc. one can find notions not directly related to alternative development, but a basic question mark on the delivery system of goods and services in the existing institutions as well as the 'content' of delivery. And in this process they are faced by an organisational dilemma - they find placed themselves in the very organisation or institutions, which they want to change. Reddy's inability to get a proper organisational infrastructure for ASTRA programme and general complaint for the lack of the commitment among scientists and experts located in such institution is an indicative of such fact. Eklavya's and Kishore Bharati's endeavour to take part in larger issues of social problems, like 'Bhopal Gas Kand' and others, is an indication of that dilemma.

This dilemma is more visible and apparent in the case of Medico Friend Circle. The Medico-Friend Circle is a group of "loosely knit, composed of friends from various backgrounds, usually medical to start with, often differing in their ways of thinking and in their mode of action. But the understanding that the present health services and medical education system is lopsided in the interest of the privileged few and must change to serve the interests of the poor people of India is a common conviction."[23] Their single common activity is the publication of a monthly journal Medico-Friend Circle Bulletin to signify that MFC is mainly a 'thought-current'. The annual meet of the members gives an opportunity to share their experiences in different health projects and topics. An intensive debate went on within the organisation about its role and objectives. Majority of members realised that "socio-economic changes were pre-conditions for improvement of health conditions. How to address those issues which fall outside their own profession? This formed the basis of debate. Some people argued that MFC being a 'non-political organisation' cannot take lead in the socio-economic struggle, rather it can support masses in their struggles through providing mass based health case system, and educate them through

various media about "the irrelevance of the existing health system and the possibility of alternative approaches." On the other hand, others argued that it is not possible to build a mass-based, people-oriented health care system without touching the socio-economic and political issues, therefore medical practitioners must involve themselves in those broader issues for their conscientisation, as well as to change the situation. This debate marked a organisational crisis in MFC which led them to change its objective making more oriented towards social and political realities, which reads now - "It works to evolve a pattern of medical education and methodology of health care relevant to Indian needs and conditions; and these efforts are undertaken with the specific understanding that such efforts must necessarily be part of a broader effort to improve all aspects of society for a better life, more humane and just in its contents and purpose."[24] Such organisational dilemmas are likely to be there in any serious attempt to go beyond the professional ethics. The efforts of such groups can be called as of "institutional reformer" - who address larger issues although being situated in particular institution or profession, and try to reactivate their own institution or profession to

solve those problems. They are quite different from professionl volunteerism in that they re-examine their own role vis-a-vis other broader issues. In the 'professional volunteerism', profession's own ethics are never put into the doubt, the responsibility of problem is transferred to bureaucracy, people's inability, superstitions and other thing. The process of conscientisation is remarkably absent in professional volunteerism, they are just sensitized to the problem. Thus, there are two radically different variations even in the alternative approach to development among professionals.

The form and content of professional volunteerism and ABCD formula is apparent in many Gandhian organisations of those days and in some Marxist groups as well. In the Gandhian tradition, the name of Centre of Science for Villages (CSV), Wardha, Appropriate Technology Development Association (ATDA), Lucknow, who are at the forefront of AT activities and in Marxist tradition, the example of Centre for Technology and Development, New Delhi can be cited. The CSV was established in Magan Sangrahalaya, the museum for rural industries founded by Mahatma Gandhi in 1937 at Wardha. It started functioning in 1977 at the initiative taken

by Vinoba Bhave with a sutra (formula), science+ spirituality=Sarvodaya (welfare of all)."[25] Its director, Devendra Kumar formulated a line of approach which was 'approved and consigned by Acharya Vinoba Bhave'. The main feature of this approach, is the mobilisation of three forces - "The need of the day is to bring about a forceful movement by establishing co-operation between the voluntary organisations, the scientific institutions and the industries, for the benefit of the less fortunate section of the society."[26] And understanding of co-operation from individual sector is based on following conviction - "The industrial sector should not only look for increasing production, but also be responsible for the welfare of the weakest and the removal of disparity in the land."[27] BCD elements of Schumacher's formula is there in different form. Such understanding of movement and tackling of the problem of poors, is not merely reflection of present director's own idea. It can be found in Vinoba Bhave itself, as early as 1955 when he declared "I will not mind using even atomic energy for the Ambar Charka. If there is any power which is found superior to atomic energy I will have that also. My only stipulation is that the use of such energy should not lead to unemployment

and should not result in economic exploitation."[28] Vinoba himself operated Magan Charkha by electric power. When asked whether it's Khadi, he replied, "Yes, if we don't sell it." The importance of means is certainly being uprooted in Vinoba with the consideration of end. This sort of ethics can be seen in Bunker Roy's indomitable quest of funds for village upliftment in Tilonia; One member of Tilonia remarked, over the endeavour to raise funds from Oxfam, Catholic Relief Services and the Ford Foundation etc. - "Bunker Roy would apparently take money from the devil of it would develop his villages."[29] Vinoba might be unaware of the implications of nuclear energy, but it reflects concerns for end primarily. He was not unopposed of this view. Pyarelal, who was Gandhi's secretary for some twenty five years, in his message to the 1962 Vedchi Sarvodaya Sammelan, said - "I am afraid that the lure of Ambar Charkha, of the use of mechanical power in the village industries for handicrafts, of government-aided plans of propping Gromodyoga, and the loose talk of making use of "even atomic energy" has given a wrong twist to our thinking, our mind off the humble way of patient collection of tiny grains of sands out of which the power of non-violence is built. To my mind, we gave a go-by to Sarvodaya

not on the firm foundation of takali but even where the foundation was lacking, and in fact as a substitute for it."[30] The ideas of Pyarelal have not found acceptance with Gandhian engaged in the constructive work of Khadi and village industries. They are very much impressed by E.F. Schumacher who appears in Gandhian magazines more than any other Indian magazines or periodicals. It is not to say that all Gandhians and institutions are moving by these transformed ideas. But in the field of appropriate technology, it is evidently clear that for CSV industrialists, scientists and voluntary organisations gains a superior role in the movement, and the mass of people is to be approached like a 'target population', which is weak enough to take any risk in technological change - "Since all changes require some capacity to take risk, and the weak and the poor have this capacity in the least,... the youth of our country lack not only the experience in productive activity, but more than that, a sense of entrepreneurship," wrote the Director of CSV, Devendra Kumar in his strategy for rural development through technological input.[31] What is difference between above lines and modern 'diffusionist' theory of development? Perhaps nothing, except Gandhi's name is associated with CSV.

Appropriate Technology Development Association (India) was formed on the initiative of Jay Prakash Narayan and E.F. Schumacher, as a wing of the Gandhian Institute of Studies in Varanasi in 1972.[32] How ATDA oved from its original place to Gandhi Bhavan at know? No information is available in this regard. its thinking is no better than CSV on appropriate hnology - "Khadi and Village Industries Commission d a yeoman's service to appropriate technologies. milarly, other government institutions and research aboratories and voluntary agencies carried out research nd experiments for improving the methods, techniques nd processes of small scale manufacture for rural s well as urban areas."[33] The impact of E.F. Schumacher and his methodology is more than obvious. The director (communication) and General Secretary of ATDA Mr. M.M. Hoda has worked with Dr. E.F. Schumacher as project officer of ITDG London.[34] In the organisation of ATDG, there are project director, energy consultant and technical experts along with a social scientist. Interestingly enough the director of CSV, Devendra Kumar is one of members of executive committee of ATDA. ATDA's collaborating agencies are ITDG, London, Inter-Church Coordination Committee for Development Project; Netherland, ATI, Washington, Swiss Development Corporation,

Switzerland, SATIS, Holland, Brace Research Institute, Canada, Gandhi Smarak Nidhi, India, Organisation of the Rural Poor, U.P. (India), Planning Research & Action Division, Government of U.P., Council of Science & Technology, Government of U.P., Ministry of Industry, Government of India, Department of Science & Technology, Government of India, Commission on Additional Sources of Energy, Government of India, and KVIC, Government of India. Fairly clear is the emphasis in the collaboration 6 agencies are foreign based groups, similar number is of governmental agencies and the voluntary organisations are two only. ATDA has also collaboration with foreign organisation for sending technical exp rts - one from Switzerland, 4 from U.K., 2 from Germany.[35] ATDA is not a purely research organisation, besides exhibiting and demonstrating appropriate technologies it 'specialises in action research on the field level by establishing pilot projects. Even it imparts training to AT practitioners, orientation course in appropriate technology to trainee officers of the State Government. All this makes amply clear that socio-economic issues of poor people is not on their agenda except alleviating 'their condition through technological inputs, often designed by 'active technologists' from outside.

In the Marxist tradition, in India or perhaps elsewhere, the Centre for Technology & Development (CTD) can be counted as a single and unique group of appropriate technology. Marxists are well known for their critique of appropriate technology, of both traditions in AT we have outlined in the chapter on ideology. The CTD is a part of broader organisation, The Society for Economic and Social Studies (SESS) which is a voluntary non-profit organisation "initiated by a group of concerned individuals with expertise in various scientific, technical and social scientific fields seeking to apply their collective experience and capabilities to the problems of socio-economic development."[36] Majority of the Governing Council are well known Marxists, including Secretary D. Raghunandan who is responsible for CTD. CTD does not mention the word appropriate instead they prefer 'rural/adaptive' technology, meant for self-reliance - "Vast resources of skills and innovative experience exist among artisans which however, are being rapidly eroded in the pincer between atomised household production and large-scale capital intensive industries." Thus CTD strive to find out the middle way in the same spirit of ITDG and other, "to benefit the rural producers and their mainly poor clientele, as well

as to build a self-sustaining base for upgrading, transforming and utilisation of indigenous technical skills." Thus, despite its revolutionary wordings in the formulation, the main theme of CTD fall in line with the second generation of appropriate technologists - tapping the skill of local artisans, voluntary actions, providing them base and meeting local demands - are not consistent with Marxist approach. However, they might resent being called as appropriate technology group, but in theme and action they are.

Specialisation

Among second generation in AT, specialisation of AT group is a unique phenomenon. The extreme of such specialisation could be found in the formation of "Woodburning Stove Group" at the Netherlands. It is a Dutch-sponsored collaboration of four organisations - THE, or the Technical University of Eindhoven; the Catholic University at Leuven, Belgium; TNO, or the Netherlands Organisation for Applied Scientific Research, Apeldoorn; and CDP, Consultants for management of Development Programme, Utrecht, with the help of financial sponsorship by the Netherlands Minister for Development Cooperation, in 1980.[37] Interestingly, the team leader of THE group, the dominant group of

the Collaboration, is K.K. Prasad, who was earlier related with ASTRA programmes of Indian Institute of Science, Bangalore. The Woodburning Stove Group was formed to fight 'The Real Energy Crisis' of the developing countries. "During the first five years of WSG, work mainly focussed on the testing of various stoves "...including the basic 3-stove and other open fires."[38] The WSG is not interested in wood-burning cook stoves only, but also in community cooking needs, range of bio-mass based fuels, and end-uses like space heating, water-boiling, bread-baking etc. - any smallish local activity which involves combustion of bio-mass-based fuels, as well as "more attention is being given to the ways in which food itself is prepared, and on simple improvements in cooking pan and promotion of the use of 'free' devices such as haybox cookers and even pan lids."[39] Such an intensive concern of scientists with a problem which is entirely dealt by women in the household, with no formal training at all, is amazing. All these efforts of WSG are based on the fact that deforestation in the developing countries and smoke-hazards to rural women can be abated by their activities in research. The WSG produces a list of 30 types of stoves prototypes and used in different countries, the

selection among them, for a layman, would be more difficult than choosing chocolate in a provisional store. The WSG also gives a list of more than 80 books exclusively on stoves.

It should be recalled have that over specialisation is often repeated topic in the ideological discourse of AT. Is WSG responding to the demands of people in Third World Countries? Supposedly to be so. But there is growing demand for wood burning cook stove among groups disseminating appropriate technology in the developing countries. The WSG would be meeting the demands of those groups and agencies promoting the use of improved cookstove particularly wood burning in most cases, to study, design and implement such projects in the developing countries. What is the role of rural women in such wood burning cookstoves, nothing more than to purchase it from marketing specialised AT group or receive it on subsidy from the local government. The end result, what was women's own construct, own product, whatever energy inefficient it may be, will become a commodity to be purchased in the market. The conventional scientific approach of such group makes women more alienated and reduces them as an irrational being on energy and health hazard ground. What 'rationality' calls for energy to be prime criteria of efficiency?

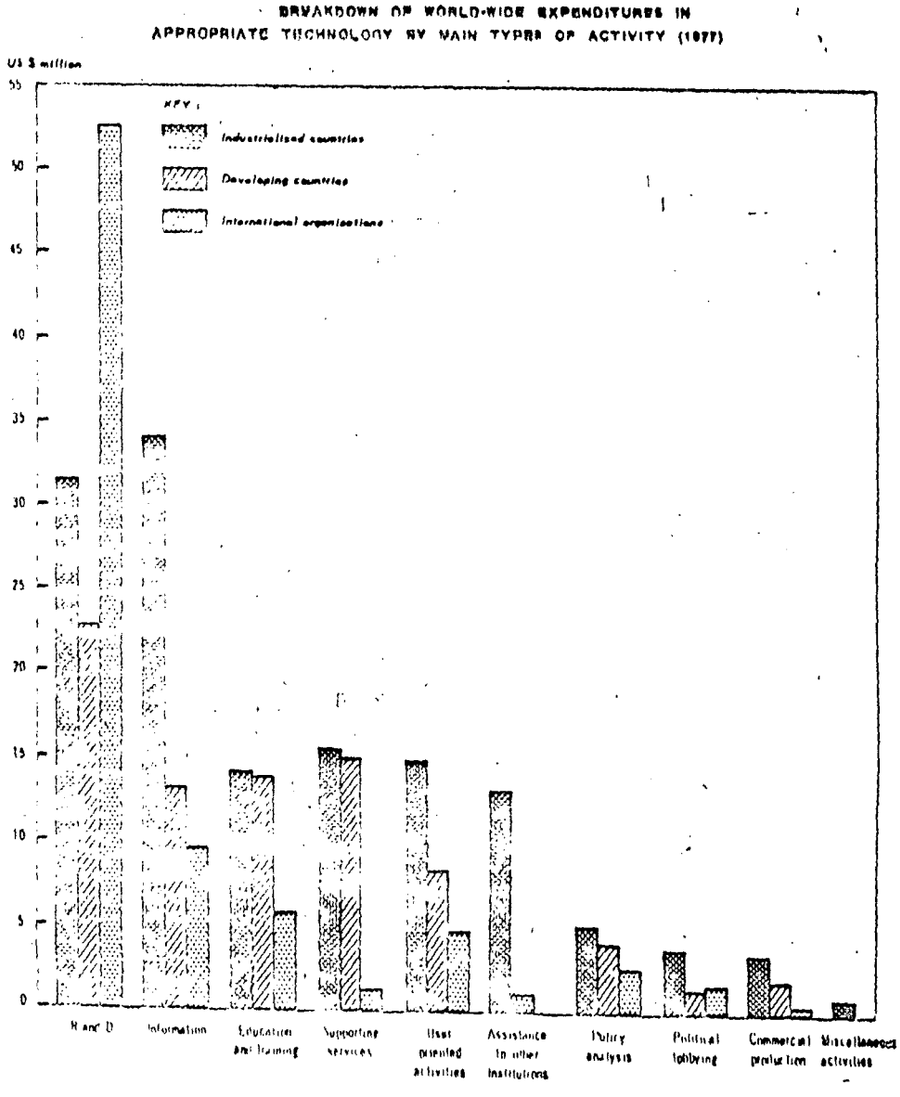
Studies show that villager's needs are quite different from defined by these "energy-mongers"[40]; they need smoke for various purposes depending upon their environment. Even the need of smoke could be seen scientifically justified if all purposes are included - abating mosquito, and other insects from house, cattle yard etc. drying grains and seeds in smoke, protecting the roof made up of bamboo from termites etc. It is not suggested that village women are using traditional Chullah in more rational way or that there is no need of improving the use of such cookstoves. But this can be done, simply by a dialogue with them, let them know hazards and facts which they might not be knowing. They are more sensitive to their health than any body else can be. But such a breath-taking research of five year, on a single item 'cook-stove', devising the whole formula from the way of cooking to the design of pans, is more than concern for rural women and conserving the forest. These specialised groups like WSG is responding to the demands of those organisations, both governmental and N.G.C., who need dissemination of improved cookstove through project, well defined strategies and sufficient input. These are new form of industries corresponding to the 'knowledge-industry' that is very prominent in the AT world.

Perhaps, 'knowledge-industry' is the single largest activity in the second generations of AT groups, more specifically those operating at the international level - because, they have, perhaps, internalised the growth of such industry in the mainstream economic development. This reflects in AT Times - "Information industries are a key to a new world order and more persuasively perhaps knowledge industry. Ethics and Leisure are in the words of Masuda, with Information and Knowledge the four cornerstones of tomorrow's world."[41] There is phenomenal growth in specialised AT groups both at international level and national level, particularly in the late 70's and early 80's. Growing importance of appropriate technology in the circle of international agencies and national governments of Third World countries, led various international and national NGO's to make stake in the 'knowledge industry' in other field of appropriate technology. The specialised groups like WSG are the producers of such knowledge and the buyers are aid providing agencies and institutions, as well as several national governments in Third World countries. For disseminating hardware s produced through such knowledge, many specialised AT groups have emerged at national level who advocate and practice the latest marketing

management in order to disseminate such technologies for alleviation of rural poverty. For example, in India, 'Development Alternatives' led by Dr. Ashok Khosla has emerged with such specific purpose - "Our product range meets the present needs of people and the same time open new paths to more food, water, energy, jobs. Our modern marketing system ensures wide-spread availability of our products and after-sales services."[42]

The growth of 'knowledge industry' in the field of appropriate technology is evident from the data of the expenditure on the information and R&D at world scale. (Table 1) Though Jequier's presentation of such analysis is based on faulty data and wrong definition of AT movement as pointed out earlier, but it tells a lot about the expenditure at a world scale particularly by international agencies and national governments which is seen here as supportive to AT movement. The figure on expenditure clearly shows that expenditures on main types of activity in AT, have been dominated by exceptional shares of R&D and information. And that too dominated by the AT groups in industrialised countries and international agencies. And flow of information on geographical scale at world

TABLE - I.



(Source - Jequier, N, & Blanc, G. ' The World of Appropriate Technology' OECD 1983 p.66)

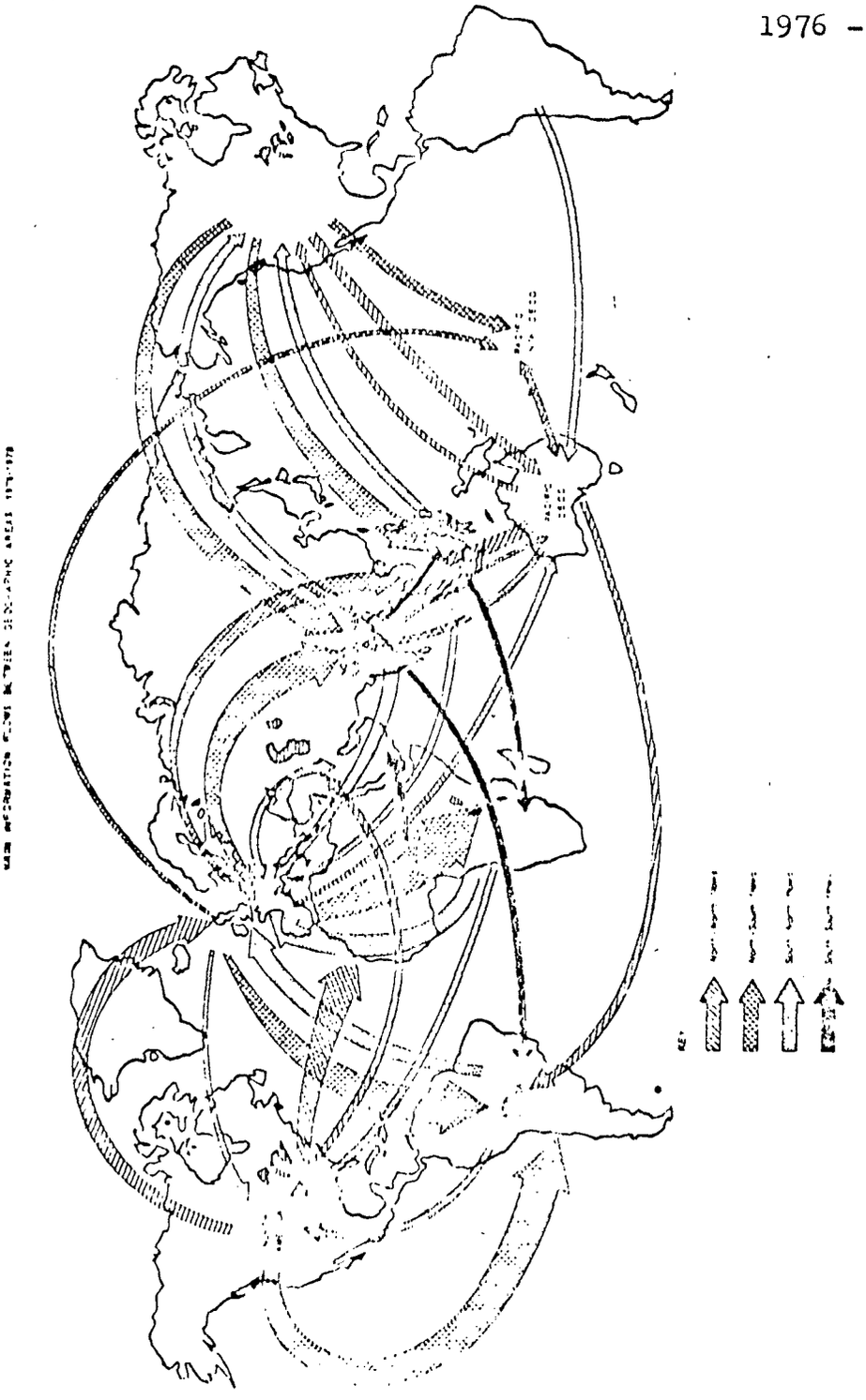
level is concommitant with the expenditure being made on R&D and Information, it is flowing from the USA and Europe to Third World countries with little co-operation among the Third World countries. (Table 2) Just a replica of mainstream technological development!!

There are many AT groups in the industrialised countries which deal primarily in the information business - studies, documentation, catalogueing, publication, exchange of information, training etc. Apart from earliest example of VITA, in the USA, many such groups have emerged in European countries as well. For example, ATOL, the Dutch abbreviation for 'Appropriate Technology for Developing Countries' started functioning in 1976, as a study and documentation Centre, now deals in technical advice, studies, exchange and collaboration in information, documentation and publication. Its pamphlet reads - "ATOL is an independent non-profit organisation, recognised as an NGO by the Beligian government that gives us a small subsidy. Other sources of income are the donations of the members, grants from a number of charities, research and studies that are paid for... our financial situation in improving very slowly. This implies that although their number has been increasing over the years, the number of permanent staff is still a minority among the 13 people currently

TABLE -II

Main Information Flows Between Geographic Areas

1976 -1978



(Source - Jequier & Blanc ' The World of Appropriate Technology ' OECD 1983 p.13)

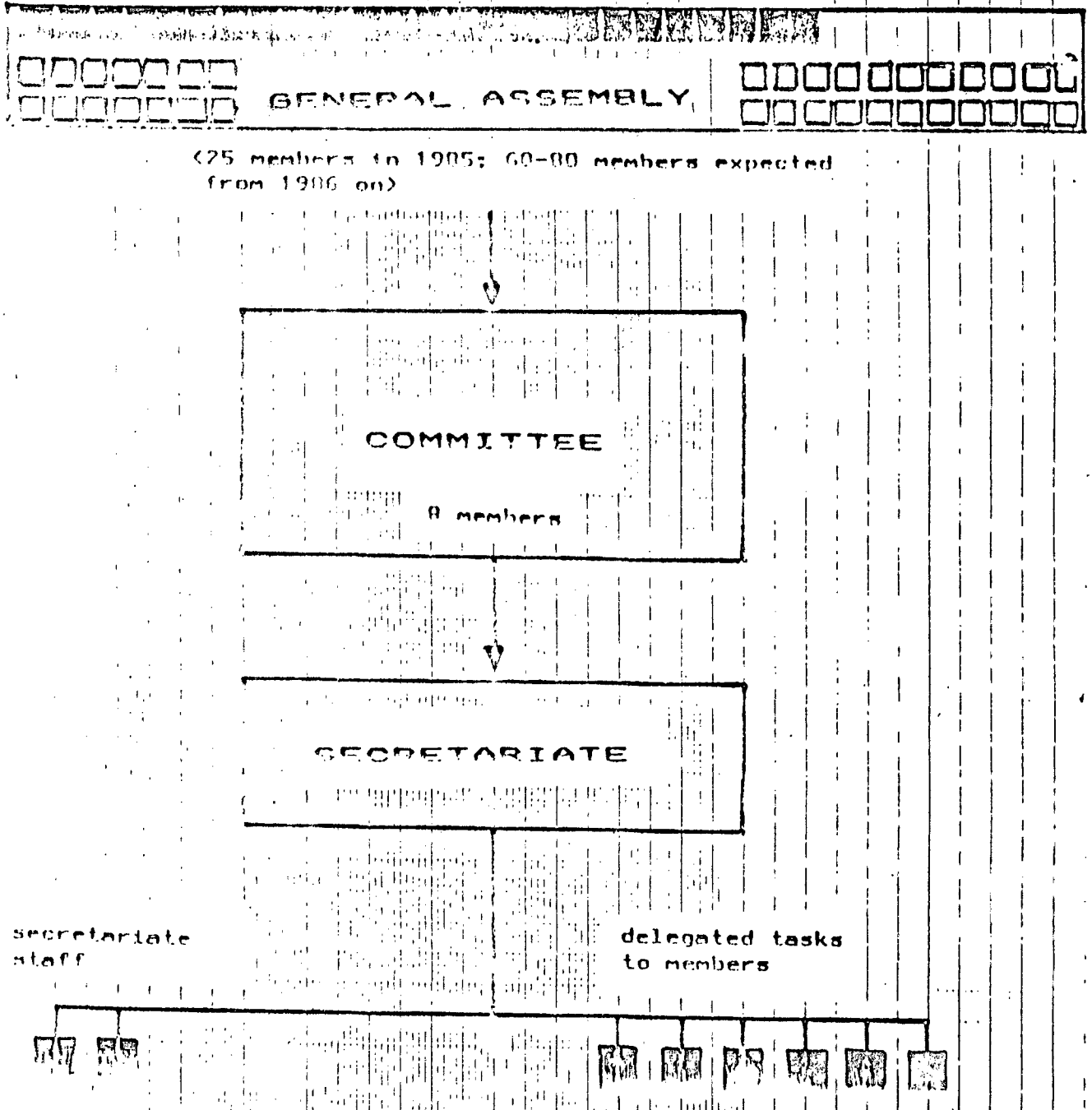
working at ATOL."[43] Many of their organisations in the line of ATOL, like GATE (German Appropriate Technology Exchange) Germany, ATI, USA, etc., along with their counterparts in Third World countries, viz. ATDA, CSV, and CORT in India, came together under the banner of SATIS (Socially Appropriate Technology International Information Service), with its headquarter at Amsterdam, Netherlands, to have their share in such valuable informations on appropriate technology.[44]

The working and organisation of SATIS may provide much light on the international networking in the 'second generation' of AT groups. SATIS started its functioning after first General Assembly at Dakar, Senegal, in 1982 to undertake activities mainly into three areas - (a) access and exchange of information, (b) resource development, (c) resource guides. Apart from publishing a 'SATIS Publication List' and developing a SATIS classification for documentation, which is being used by about 300 organisations, nothing much could be said of its success.[45] The main reason of failures was found in the structure of SATIS organisation and they set to discuss the issue at Delhi in 1983 - how to abate apathy of members, how to prevent a closed-circle phenomena, in organisation

and how can SATIS take democratic decisions without having regular plenary session? For these problems they went to propose change in the entire structure of SATIS from an 'inappropriate organisation structure where the desire for democratic participation in activities and management was translated to an economically unrealistic committee structure and prohibitive rules against the desired membership growth' (Table 3) to 'a networking foundation'. (Table 4) Whatever be its implication it was a shift to a small, powerful, central authority in the organisation around which various networking exists. The accounts of expenditure and incomes tells more about SATIS working pattern. In the year 1982 and 1983, the major source of income was grants, which accounted more than 50% of other sources of income. And in grant facilitating agencies, the Netherland Government alone provided more than 40% of total gransts, other agencies are Swiss Federal Govt., UNESCO, WHO, ATI, GATE etc. The total income, however, was 401,943.95 Dfl. and 273,469.43 Dfl., respectively in 1982 and 1983. The expenditure on personnel charges and salaries, travelling charges, auditing etc., office costs and equipment, rent etc. was just double than the expenditure on newsletter, training programme, classification, card production etc.[46]

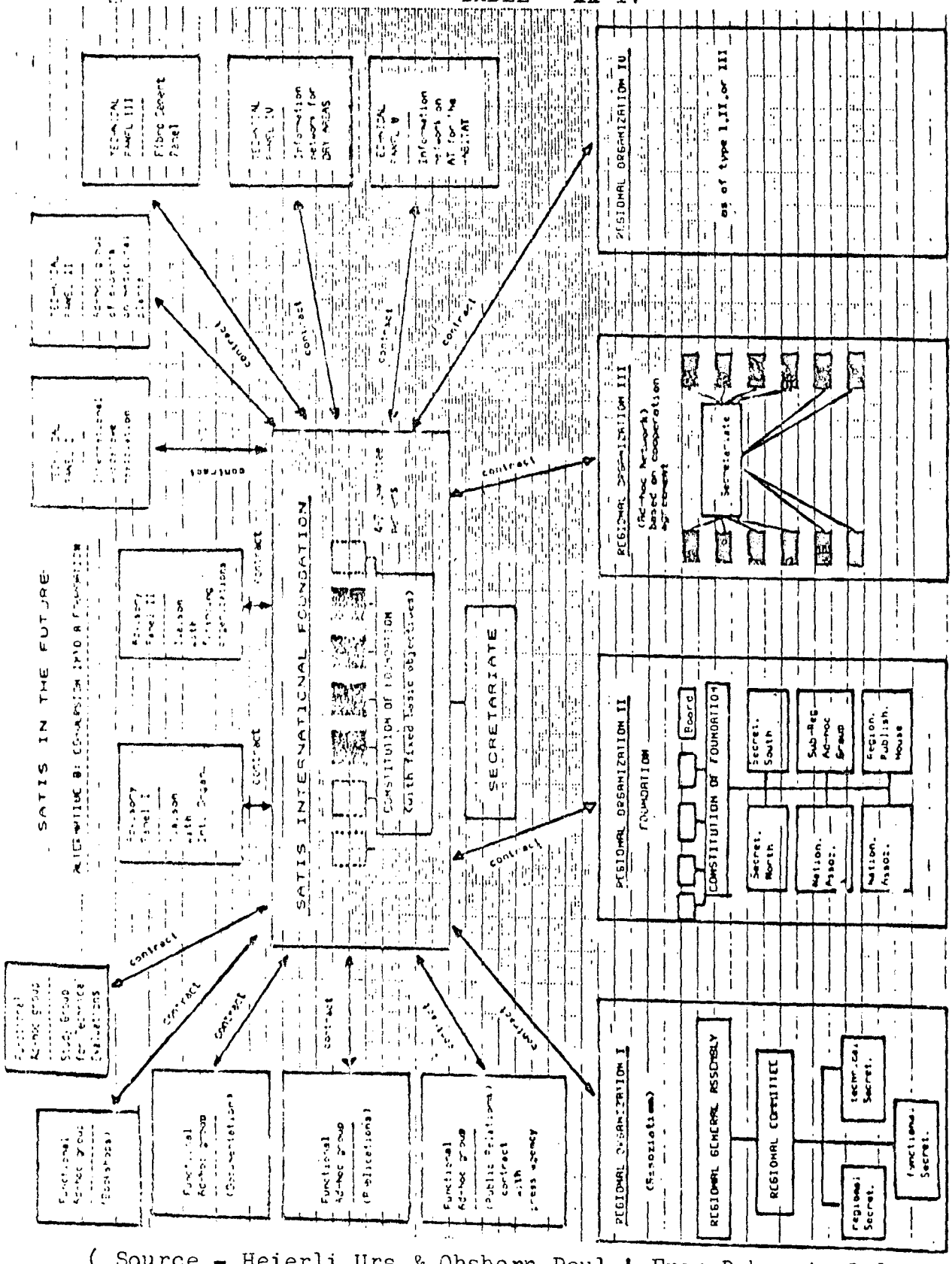
TABLE - III

SATIS 1985



(SOURCE - Heierli, Urs and Ousborn, Paul ' From Dakar to Delhi, From Delhi to 1990', A Policy Document on the work and structure of SATIS General Assembly, 2 to 7 Dec. 1985)

TABLE - XX IV



(Source - Heierli, Urs & Obsborn, Paul ' From Dakar to Delhi, From Delhi to 1990', A policy document on the work and structure of SATIS General Assembly " 2 to 7 Dec. 1985.)

It is clear that such international networkings are highly dependent on rather highly financed by certain industrialised countries and international agencies, rather than standing on their own. Implying thereby the theory of self-reliance is for others or they are following a methodology of dependency to bring about self reliance. Apart from it, the manner in which the resources are spent does not show any genuine effort in their pursuit of appropriate technology, the personnels and office establishment consumes more than double money, than what is spent on the tasks they are supposed to do. Let aside the interest or intention of a government to finance such endeavour.

The specialisation has also taken place in the sectoral form. While most of the AT group emerged in the area production technology, the subsequent effort was to introduce the 'idea' of appropriate technology into health sector as well. Many specialised groups also exist in appropriate health technology. WHO is also interested in such efforts. It is not possible to look into those groups, but it will suffice the general argument developed in this chapter, through the observation made on such movement by Oscar Gish, who reflecting upon'the second generation' of AT in health sector concluded - "it is not particularly the

lack of appropriate technology that stands in the way of the creation of, for example, national primary health care systems, but rather the application of inappropriate technologies in keeping with the play of market forces."[48] He identified problems with the movement as follows - (1) the movement, in the health area anyway, has been too dependent for its development upon concepts and experts drawn from a relative handful of industrialised countries, primarily the USA and UK; (ii) the movement has concentrated too much on the development of new 'gadgets'; (iii) the movement has focused too narrowly on technocratic solutions to problems that require wider consideration and additionally - " The AT movement has become isolated from the major issues involved in technological development and technological choice, and especially as they appear in the countries of the third world."[49] Thus, it becomes clear that there is identical development in the health sector as it is in general. What Gish identifies as problems are the characteristics of the 'second generation' in AT of which AT health movement is a offshoot.

Co-ordinations/Linkages

As AT is a movement of small, independent and non-governmental organisations located in different

parts of the world, there must be some linkages among them based on certain sharing. In the second generation of AT group there is a strong tendency to co-ordinate and collaborate with others both at international and continental level. The example of SATIS described above is not a lone example. There are several others, in the international field, like TRANET (Transnational Network for Appropriate Technology). The policy document of SATIS General Assembly notes about TRANET - "The best (or the worst) example of a formally democratic, but in fact not very participatory structure is the TRANET network, even of it is praised in some American books about networking as an outstanding example of a "new age-organisation". The TRANET board has 25 members from 5 regions, which rotate completely within 5 years. They have met once, in 1980, just to learn about the organisation which they should lead. As the board is thus an extremely weak and impo tent body, the Secretariat is absolutely autonomous in its decisions and consequently, apathy is predominant, together with a very strong position of the secretariate."[50] Other AT organisations dealing with third world countries, like ITDG, VITA, GRET, TOOL, GATE, ATI and others do networkings in the movement in their own ways. At the continental level, the effort of Approtech Asia (The Asian Alliance of

Appropriate Technology Practitioners) can be cited. It is a regional 'service mechanism that promotes co-operation and sharing among its members and with other relevant organisations'.[51] It has 18 full members and 17 associate members from Bangladesh, India, Indonesia, Malaysia, Singapore, Sri Lanka, Thailand and the Philippines, with a headquarter at Manila. A.T. Ariyavante Sri Lanka, is the Chairman of Approtech Asia, who is also a leader of well known Sarvodaya Shramdana Movement in Sri Lanka, which perhaps is the largest organisation in the world engaged in rural development. From India, Centre for Science and Environment (CSE), New Delhi, and Kerala Gandhi Smarak Nidhi are full members and CORT, New Delhi, Asian Institute for Rural Development, Bangalore, and Tata Research Development and Design Centre, Pune are associate members.

On the other hand, co-ordination among the first generation of AT group, which are not identified as AT group in most of the cases in India, can be seen only at national level. The two subsequent convention on People's Science Movement is evident of the fact that such diverse groups in their objectives, organisational structure, operating styles will have nothing in common to form a national body for co-ordination. But they

all stressed the need of sharing of experiences with each other at certain intervals.[52] Friends Rural Centre, Rasulia do participate on organic farming with other organisations including Gandhian, but it has hardly any organisational linkages with such organisations or other. Many social samitis and groups are doing things in their own often in the form of protest to the application of modern technology like nuclear plant, scientific forestry, big dams and chemical fertilisers and pesticides etc. There are some efforts, here and there, to unite themselves but not at very significant level. Recently, traditional health healers, about 30 rural organisations from six states have jointly launched a programme to strengthen the traditional health culture rooted in the Science of Ayurveda, under the banner of 'Lok Swasthya Parampara Samvardhan Samiti' (Lospass) at Kashele village in Maharashtra.[53] But there is no effort on the part of the AT groups of the second to link themselves with such grass root movements. Similar trends can be seen in the groups of industrialised countries who are engaged in their own countries. Very few are directly identified with the "promotion and diffusion" of appropriate technology as such, as described by McRobie in his book "Small is Possible". The application of

appropriate technology becomes a part of other programmes there, co-operative communes, neighbourhood living, back to the land movement etc. In this context, it should be seen what they are doing there is a reaction expressing obsession with modern technology and life, here is the reaction to the intrusion of modern technology and way of life. In this, they share same concern, but qualitatively different in form. Thus, this section of AT movement remains fragmented, locally engaged groups, both in industrialised countries as well as third world countries. But recently their concern and interests are being identical with 'enlightened' individuals and groups, and they are not fighting their battle alone. However, organisational linkages still lacks badly even in this aspect.

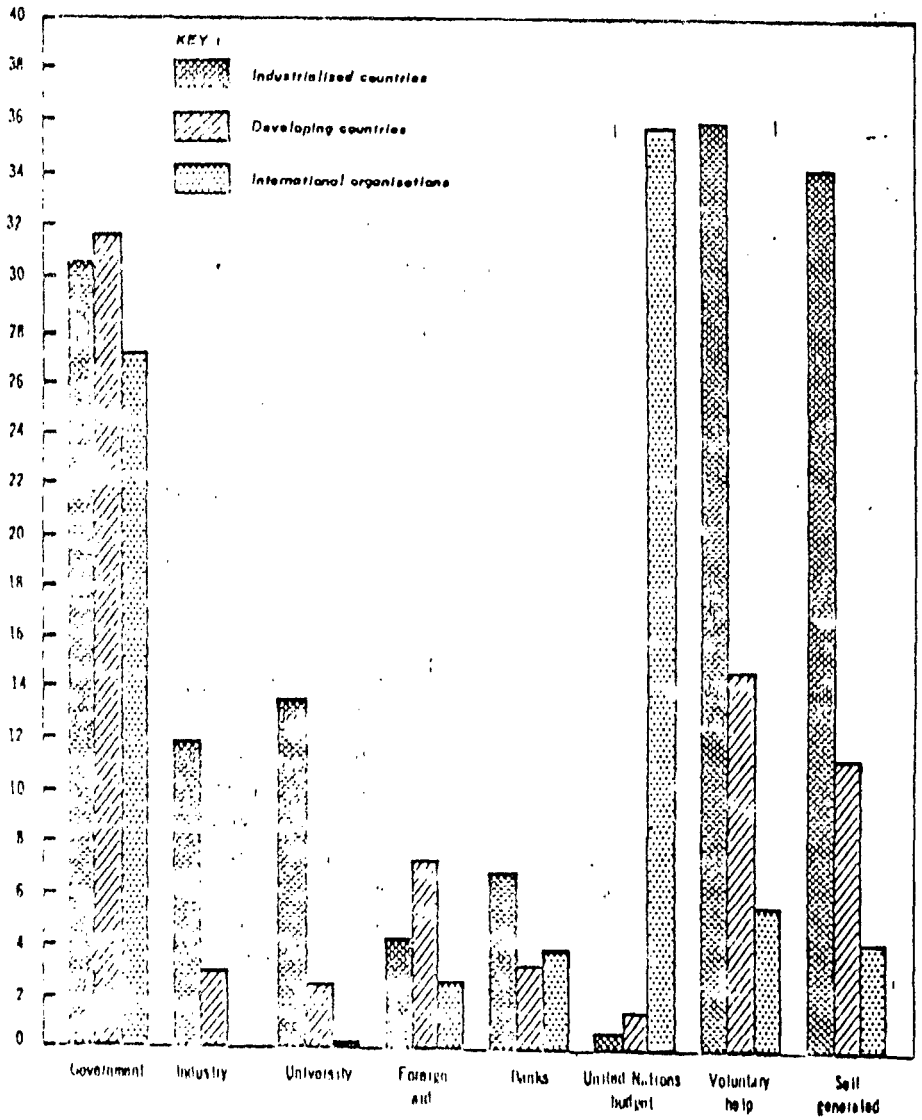
Funding

There is little data or references about how these organisations are being funded in their produced literatures. Still many refer to their sources - charitable trusts, foundations, government agencies, foreign aid agencies and international organisations as well as sale of their own products. What is the amount of grant from outside and what they produce themselves. Jequiere's presentation of data provides

a revealing trend in the context of the second generation of AT groups. (Table 5) However, there are many complexity in categorising the sources on exclusive level, but the trend is very clear. The governments of both industrialised and third world countries are biggest financer of appropriate technology. Secondly, UN Budget spends fairly large amount of money in the pursuit of appropriate technology through their own agencies. And thirdly, the amount of voluntary help and self generated funds are quite high in the AT organisations of industrialised countries. The last point is to be seen bit carefully, as there is large number of AT organisations which are working in close connection with the government of their respective countries for development activity in Third world countries as pointed out in the case of SATIS. Jequiere admits this problem - "Some AT organisations in the industrialised countries, for instance, work as consultants and advisors for a national aid agency; this income is, therefore, included in the category of self generated funds."[54] And, also foreign aid does not all go directly to local AT organisations in the third world countries, it goes only after a transit through international organisations or AT organisations in the industrialised countries working on third world countries' problem. Jequiere

TABLE - V

SOURCES OF FUNDING OF APPROPRIATE TECHNOLOGY ACTIVITIES IN INDUSTRIALIZED AND DEVELOPING COUNTRIES AND IN INTERNATIONAL ORGANISATIONS IN 1977
(US $ millions)



(Source - Jequier & Blanc ' The World of Appropriate Technology ', OECD 1983 p.80)

notes - "Around 30 per cent of it goes directly to AT organisations in the industrialised countries which are working on developing country problems, and close to 20 per cent goes to international organisations."[55] There should be no illusion about the sudden spurt of a number of AT organisations working for the problems of the poor located in the third world countries. The new entrants of the second generation in AT are largely creations of such funds available for their disposal. Many entrepreneurs located in different fields changed their houseboards in the wake of huge funds available, and put the new tag, "APPROPRIATE TECHNOLOGY" and did "what they have always been doing."[56] It is not to suggest that all new entrants are inevitable phonies, but many AT practitioners can also be seen in this endeavour. There are many who seriously believe that in this manner they are helping poor in the third world countries.

Very little can be said about the groups of the first generation, how they mobilise resources. Perhaps, this is one of the main reasons of many grass root movements and groups becoming perennate. Many Gandhian groups have turned to generate their own resources.[57] Many still relying on government's aid and voluntary helps. KSSP raises its fund largely through sale of

their publication and paid money from government's different projects.[58] Institutional reformers are paid for their services in the institution or work on the government's projects. Still many grass root movements can be seen utilising lagely their own resources.

No Organisation at all

Still, there may be many examples in which appropriate technologies are being generated, and get diffused without any effort of any organisation for that purpose. Perhaps this is typical anarchist way of propagating appropriate technology. One example can be cited that of "the bamboo tube well."[59] An average educated person and middle-sized farmer, Ram Prasad of North Bihar in 1968, invented the idea of using bamboo tube well due to his failure to obtain iron pipe. He succeeded in his experiment and a viable low cost (almost 10 per cent of iron pipe) and simple technology was born. No group was needed to popularise it slowly but in a confident way, this technology propagated village by village. The local artisans quickly learned and adopted this technology for their local clientele. All materials for its construction were almost local-bamboo,iron strips, nails, and jute-sacks. This was fulfilling the

requirements of even small land-holders. Thus, within five year 'more than 33,000 bamboo tube wells were sunk in ten districts of Bihar'. Why not other technologies got evolved and propagated in this manner? Answer lies in the fact, perhaps, it is not technology which is a felt need but something else, and the way in which mainstream technological development eroding this channel of spontaneous propagation.

References:

1. Rahnema, Majid, "N.G.Os: Shifting the Wheat from the Chaff" in Development: Seeds of Change, no.3, 1985.

2. Jequier, Nicolas, Directory of Appropriate Technology, OECD, 1979.

3. Reddy, A.K.N., "National and Regional Technology Groups and Institutions: An Assessment" in A.S. Bhalla (ed.), Towards Global Action for Appropriate Technology, 1979.

4. "ASTRA" in Science as Social Activism, KSSP, 1984.

5. McRobie, George, Small is Possible, Abacus, 1982.

6. Ibid. (p.24)

7. Ibid. (p.32)

8. Ibid. (p.37)

9. Ibid. (p.38)

10. Ibid. (p.38)

11. Franda Marcus, Voluntary Associations and Local Development in India, Young Asia Publications, 1983.

12. Ibid. (p.97)

13. Ibid. (p.107)

14. Jequir, Nicolas & Blanc, G., The World of Appropriate Technology, OECD, 1983 (p.166).

15. Bhatt, Chandi Prasad, "An Interview" in Lokayan Bulletin (Hindi), vol.3, no.5/6, 1986.

16. Agrawal, Anil, "Spreading the World Around" in Technology in the Hands of the People, Approtech Asia, 1984.

17. "Science As Social Activism", Reports and Papers on The People's Science Movement in India, KSSP, 1984.

18. Diwan, Romesh, "Total Revolution and Appropriate Technology" in Romesh Diwan & Mark Leiti, Essays in Gandhian Economics, Gandhi Peace Foundation, 1985.

19. Sethi, Harsh, "Undesired Allens: Elements from a Collective Autobiography", Lokayan Bulletin, no.2/1, 1984.

20. A brochure of KSSP (undated distributed in 1985).

21. "Science As Social Activism", op. cit.

22. Ibid. (p.171)

23. Ibid. (p.86)

24. Bang Abhay & Patel, A.J. (eds.), "Medico-Friend Circle: which way to Go: A debate" in Health Care: Which Way to go, MFC, 1982.

25. 'Centre of Science for Villages' in "Science as Social Activism", op. cit.

26. Ibid. (p.278)

27. Ibid.

28. Narayan, Sriman, One Week with Vinoba, New Delhi, 1955 (p.30)

29. Franda, Marcus, op. cit. (p.106)

30. Tandon, Vishwanath, "Vinoba's Approach to Science and Technology" in Khadi Gramodyog, vol.29, no.1, Oct. 1982.

31. Kumar, Devendra, "Strategy for Rural Development through Technological Input" in Khadi Gramodyog, vol.24, no.1, 1977.

32. McRobie, op. cit. (p.199)

33. A brochure of ATDA, Lucknow, (undated, distributed at SATIS General Assembly, New Delhi, Dec. 1985.

34. Ibid.

35. Ibid.

36. A brochure of 'Centre for Technology & Development, New Delhi.

37. "Wood burning Store Group", paper presented at SATIS General Assembly, New Delhi, Dec. 1985.

38. Ibid. (p.2).

39. Ibid. (p.3)

40. Soedjarwo, Anton, "Diffusion of Rural Technology: Obstackle or Resource?" in Technology in the Hands of the People: Asian Experiences," APPROTECH ASIA, 1984.

41. Christian de Laet, Soul Searching - A critique of the functioning of Institutions, AT Times publishes at SATIS General Assembly, New Delhi, 1985.

42. A brochure of "Development Alternatives", New Delhi, 1985.

43. A brochure of "ATOL" Belgium (distributed at SATIS General Assembly, New Delhi, Dec. 1985.

44. Heierli, Urs and Obsborn, Paul, "From Dakar to Delhi, From Delhi to 1990", A Policy Document on the work and structure of SATIS General Assembly 2 to 7 Dec. 1985.

45. Ibid.

46. Ibid. (Appendix-2.2)

48. Gish, Oscar, "Appropriate Choice in Health Technology" in Tropical Doctor, Oct. 1982.

49. Ibid. (p.227)

50. Heierli, Urs and Osborn, Paul, op. cit. (p.28)

51. A brochure of "Approtech Asia" distributed at SATIS General Assembly, New Delhi, Dec. 1985.

52. "Science as Social Activism", op. cit.

53. "Traditional Doctors are up in Arms" in The Statesman, 9th April, 1986.

54. Jequiere & Blanc, op. cit. (p.81)

55. Ibid. (p.82)

56. Winner, Langdon, "Building the Better Mousetrap" in Franklin, A. Long & Alexander Oleson (eds.), Appropriate Technology and Social Values: A critical appraisal, Ballinger Publishing Company, 1980 (p.37).

57. Dharshan, Shankar, "Increasing Difficulties of Voluntary Organisations" in Lokayan Bulletin, no.3/1, 1984.

58. "Science as Social Activism", op. cit.

59. Dommen, Arthur J., "The Bamboo Tube Well: A note on an example of indigenous Technology" in Economic Development and Cultural Change, vol.23, no.3, 1975.

CHAPTER V

STRATEGIES

In the earlier pages, much have been said about different kinds of strategies in the AT movement, in various contexts, but in haphazard ways. The ways of pursuing stated goals into action, the art of campaigning for its objectives and aims and the use of existing or distant resources including ideas, symbols as well as human resources for those purposes - all come under the notion "strategy" of the social movement. Strategies change in the course of life-cycle of a movement either by the leadership or by the emergence of new leadership. Even if the basis of strategies does not change in the course of time, it may take different forms. As the original prophets and visionaries of AT movement have been or being replaced by a new kind of leadership, the strategic discourse has taken different forms among different sections of the movement.

The strategic discourse of the early prophets and visionaries, and still continuing groups of the first generation of AT movement, is radically different from the newly emerged leadership. Gandhi is the earliest prophet in setting out strategies for appropriate technology which got correspondence in the practice

of the first generation of AT groups. The essential method of Gandhi was that if one finds something true and just, he should follow it himself first, only after being convinced by it, he should ask others to follow him. If his way is right, others will follow him. Gandhi found 'charakha' to be a just technology for the society he thought desirable. He practiced it himself, convinced by it, asked others to follow him. By setting one's own example, it was expected that if it is a right path others will follow it. At least one gets moral right to persuade others. It can be called as a demonstrative value of action and programmes. But for Gandhi, it was more than that, a qualitative change in and a perpetual effort on the part of individual as well. Thus, non-violence is not a principle for strategy but a moral obligation of individual in a just society. Gandhi's strategy and starting point was 'do yourself', 'others will follow you', if you are right. Apparently, this strategy is a direct appeal to the consciences of people. One sort of 'conversion' is present in this strategy - conversion to a path to follow your own conscience.

Thus in Gandhian Scheme appropriate technology is to be practiced and followed by those persons who is advocating it. Thus many satyagrahis made a

mandatory to observe those rules which they asked others to do. The other important point was that appropriate technology to be a part of struggle for liberation not only from foreign political domination, but from any centralised authority like state, to bring about a society that can be a minimum concern to individual freedom. Thus, unnecessary interferences from outside was to be avoided. In short 'development' was to be brought about by appropriate technology from within. Any outside help in this regard was sought to be catalytic only, not as a 'white man's' responsibility to liberate the 'primitives'. Thus any outside help, whether at individual, community, regional or national level, has to have a token presence only, in the process of change.

This strategy got some resemblance in the efforts of tinkers and crackpot investors of USA in 60's and 70's and radicals, new left and other movements however with a significant variation having an imprint of its own tradition. Their strategy is rooted in the American traditional notion about how inventions change the world. If you can build a better thing others would follow you. The utopian and communitarians moved in their pursuit with great conviction that their technical and social inventions would have a strong appeal to the

world undergoing rapid change. They became 'patent office models of the good life', for other to follow it. Their belief is that people will show their willingness to a future society through technical choice. Many books that catalogue various appropriate technologies, indicate the same strategy as that of communitarians and utopians. The amazing emphasis on cataologues, information, sharing, networking, demonstration sites, do it yourself, manuals and working models of solar energy, wind mills and others, indicate their strategy for social change. Victor Papanek, who is a strong advocate of AT in USA reflects this notion of social change - "There is the capitalist approach (make it bigger), the technocratic one (make it better), the 'revolutionary' solution (portray the problem as an example of an exploitative system) and the pre-industrial romantic fallacy (don't use it: may be it will go away by itself): We propose a fifth alternative response. Let's invent a different answer."[1] Papanek is of great conviction that if tools were designed for sharing, rather than individual use, they would change technology structurally, mechanically and in material composition. And that will be proper for community living. And "once people discover what is available to them, they will send away for the blue-prints and

build the better mousetraps themselves. As successful grassroot experiment proliferates, those involved in the similar projects will get in touch with one another and begin to form little communities, slowly reshaping society through a growing aggregation of small-scale social and political innovations. Radical social change will catch on like Smoke detecters."[2] Winner traces the root of this strategy of American appropriate technologists in the traditional American notion of change that is best expressed in the apothegm attributed to Ralph Waldo Emerson - "If a man can write a better book, preach a better sermon, or make a better mouse-trap than his neighbour, though he builds his house in the woods the world will make a beaten path to his door."[3] Better use of energy, resources, relaxations from pressures and strain coming from alienating structure of modern life, quest for sharing with others, insecurity and fear of money dreadful things including nuclear holocaust - all besets heavily around the weak nerves of Western mind. The radical movements of 60's and early 70's played well on those nerves, but having showdown in the tussle with the 'system', they went to follow the traditional tinkers and crackpit investers. "Rather than attempt to change the structures that vex them, young American growing older have settled on the quest for exquisite palliatives.

If the 1960s announced, "Let's see if we can change this society", the 1970s proclaimed, "Let's get out of this skyscraper and go jogging!"[4]

Thus, the interest of first generation of AT in western countries, in appropriate technology is a mechanism to escape from the hard reality of huge, complex and all powerful system, or an inability to face it directly. Gandhian interest in appropriate technology, was as tool to be the firm foundation of his desired society, not through social and technical innovations, but by mobilising the masses, taking the immediate problems to be solved in order to achieve desired form of society. His effort was to take the cause of most deprived sections and mobilise them. Although it remained similar in both tradition that experiment will catch on in the wider society, but Gandhi's emphasis on the change within the experimenters is unique, as well as addressing the problem of deprived masses, by mobilising all sections of population, makes it missionary in character. However problems with both traditions are identical more or less. Despite their lovely plans, and projections, their efforts fall short to solve the immediate problems. The practical immediacy of many problems

expose their inherent weakness, inspite of their strong desire to translate their future society, here and now.

The recent trends of radicals - Gandhian, New Left, Communitarians, and others are varied in their strategies and decisively divided. Some of them joined the second generation of AT movement. Some of them refined their strategies to reform the 'system' by joining it. They may be called revolutionary in disguise, as their objectives remained the same but changed their discourse of struggle to fight the corrupt system from within. The institutional reformers can well be placed in this category. Some are still engaged in bringing about social transformation by mobilising people at micro-level. Others narrowed downed their objective to do social service and welfare of weaker sections of society. Still, some sat down to challenge the modern world view with conviction that in the early stage of fundamental change in the society, building of better mousetrap must succeed as conceptual invention. There are, on the both sides of the world, many intellectuals, scientists and thinkers came up in recent times to broaden the meaning of or replace the categories viz., efficiency, rationality, productivity,

labour, cost, man and nature relationship and a host of other concepts. It is not an entirely new pursuit, these problems of categories and the conditions of human sufferings have been long lamented by philosophers and poets. What is new is that now, these arguments are arranged in scientific vocabularies, by extending or modifying them.

On the other, the other section of AT movement having 'absorbed' the criticism made by the origin prophets, turned to the world going as usual, with a fresh look at it, how to run it more efficiently. Their strategy is strikingly different from the first generation of AT. The meaning of appropriate technology is synonymous with rural technology which is meant for the welfare of poor and toiling masses located in rural areas of the Third World countries. It is not applicable to their own conditions. They transcend the applicability of appropriate technology on themselves by tuning the definitions of 'self-sufficiency', 'development', participation etc. with the official definition. Some of them even come up with new objectives in the field. Some keep the objectives intact as they inherited from first generation, and transform them into action in such manner that the end product remains identical with the products of mainstream development. Old convictions

and beliefs are turned into the rituals to be performed as a matter of custom. These are groups coming mostly from the first generation, often are leaders among the second generation groups.

The need for appropriate technology generation as a precondition of social change was deeply rooted in the first generation of AT in the Western countries. As they found themselves surrounded by all sort of appliances contrary to their desired goals. The necessity of the generation of new technology and social structure was more visible in their efforts. Their idea was well received in the official echelons except their radicalism. Now there is explicit invitation for them to join the system - "Sociologically speaking, the AT movement has many features in common with the intellectual elites that brought about political revolutions in other places and other times. Not only because of the educational levels of its members, the urban location of its activities or the intensity of its communications networks, but because of a much more subtle phenomenon of termite like penetration into the decision-making circles of governments, industry, banks, political parties and trade unions."[5] Many joined them in their sincere effort to alleviate the condition of poverty and make them prosperous in image of their own prosperity. Many phonies also

turned up to rewrite their revolutionary history to have their pie in the wave of funds to AT activities. Many relinquished their revolutionary action programmes and joined the rising forces while keeping earlier masks intact.

Resource Mobilisation or Co-optation

As pointed out earlier, in resource mobilisation theory of social movement, different groups are seen as mobilising the institutional resources available for the causes of deprived masses. The role of state is seen as almost neutral - facilitating, collaborating and often opposing and suppressing those groups depending upon their strength and capacity of mobilisation. The question whether mobilised resources are used to support the cause of deprived masses or support the activities contrary to their stated objectives. Thus, the actual work of any particular group should be the criteria of determining the difference between resource mobilisation and co-optation.

It is amply clear that governments are one of the major funding agencies for AT activities. Varieties of groups are working in close collaboration with those resources. Are they alike? This question could be answered only by judging their actual work

whether it goes in the interest of the stated objectives of those groups facilitating and fulfilling objectives contrary to it, in the end results. Here the work of ATDA, Lucknow, Sarvodaya Gramdan Movement, Shri Lanka, and Eklavya, M.P. could be referred. The most cherished work of ATDA, in decentralised production is the white-ware pottery at Khurja near Delhi.[6] ATDA scaled down the earlier plant structure by providing the prepared 'body' of mixture (of China clay, quartz and felspar, which requires complete mechanised processing) through its service centre at Khurja to various potters called on from different localities - The potters collect the prepared 'body' from the centre and shape it in their cottage workshops. The centre also supplies them with improved equipment, mechanised potter's wheel, and jigs and moulds now in common use... After the wares are shaped they are fired. Here again a central facility was provided (minimum of 1,100°C firing capacity kiln)... The Khurja centre also stocked glaze, and set up product design and marketing facilities. Starting with only a few potters, Khurja has since grown to more than 400 cottage workshops employing 20,000 people."[7] It does not need elaboration to say that village potters have been transformed through the help of mechanised facility to serve the

needs of urban population; thus, facilitating the integration of traditional potters in the process of industrialisation, instead of restituting them in their own village. One can hail such endeavours as providing jobs to traditional potters who were supposedly 'starving' in their own village, as Schumacher sees it - 'I was there (Khurja) and found thirty thousand people that are now earning a living from pottery and hospital porcelain and electrical porcelain. It is magic. I was fascinated. Three hundred firms. I moved around and I got hold of a chap who was employing a couple of hundred people... Well, yes, Dr. Sharma brought you the implements and so on, and trained you, from a technical point of view, but where did you learn management? He said, learn what? ... We assume that all of this is so extremely difficult because we have created this extremely complex technology. But when it is back to reality, to real simplicity, then management ceased to be a great problem."[9] Obviously, the notion of cottage industries, simplicity are attuned with the official definitions and job and earning become paramount, over the meaningful job, self sufficiency, and other considerations. Similar thing can be said about ATDA's other successful scaling down of sugar plant - mini sugar plant. They

never went to examine the nutritive value differences between sugar and Gur as Gandhi bothered to do nearly fifty years ago. The job is prime consideration for them, the end product is left to be discussed in the seminars by the International Organisation of Consumers' Union.

Schumacher and ATDA are not only magacians in the field, who through their spells transform the ideology of oppositions into an agreement of actions. The other example is of Dr. A.T. Ariyarante, the unquestioned leader of Sarvodaya Sramadana Movement in Sri Lanka, and also the chairman of Aprotech Asia. The Shramdana movement is active in 'over 6,000 villages in Sri Lanka alone... Nearly 5,000 nurseries for pre-school children, over 300 village "re-awakening" and co-ordinating centres, 24 district development education institutes, several agricultural and rural technical service centres, and over 3,000 shramadana camps have been organised every year... It involves some 27,000 full time workers."[10] Such a huge manpower and wide area of activity is perhaps lone example among AT groups, but its leader is afraid of its centralisation - "We are now endeavouring to decentralise the movement by incorporating every village as separate entities

under government law."[11] A fellow from Shri Jayawardenapura University, Susanta Goonatilake, was invited to undertake the study of Sarvodaya Shramdana Movement in 1978. He did it, but was forbidden to travel outside the country until the inquiry was concluded, which was set by the Government of Sri Lanka, on the complained made by Ariyarante about the 'negative' tenor of the report prepared by him. His report describes revealing facts of the Sarvodaya Shramadan Movement led by a Magsaysay Awardee.[12] The report says that even according to the documents of the organisation the annual budget is of Rs.60 million, while the Ministry of Rural Development, Sri Lanka has a budget of Rs.15.8 million. Susanta Goonatilake quotes two earlier studies to confirm that out of Rs.60 million, more than 90% is from foreign donors. Batik amounts largest commodity produced by the 'movement', which is largely exported. The second is wood craft like masks, wood image, animal shapes etc., which also goes to export or tourism industry. In agricultural production activity, the main product orchids is carried under the system of contract farming for the Ceylon Tobacco Company. In the distribution of food, what is called 'community kitchen' - "Sarvodaya acts largely as an agency of

distribution for imported milk and other products from outside the village... The village generated nutritional supplies in the form of leaf conjee amounts to less than 9 per cent."[13] While milk powder alone amounts more than 33 per cent. In the Shramadana camps which are classified under environment, water, clothes, food, housing, health, communication, fuel, education, spiritual and cultural - but no activity was resumed under the heading fuel and clothe in the programme. The estimate value of work was approximately Rs. 3.3 million, which comes only 5 per cent of total foreign donation. Such is the example of a group who claim unquestioned faith in Buddhism and the ideology of Sarvodaya. The report, if it is true, make it clear for whom these mobilised resources are used, what is being promoted, under the guise of community programme. This is one sort of resource mobilisation in the AT movement.

The groups like Eklavya, Kishore Bharati, KSSP also works often on the government projects, in education, science promotion etc., but hardly any foreign donation. In one sense they are mobilising institutional resources, also. But this mobilisation becomes part of their larger objective - popularising science for social change. They collaborate with government department

in their chosen field which they think will serve their objective. However, it is very difficult to access their work in objective terms. But certainly they were able to mobilise a larger section of population through their efforts and obviously some awakening among them. These groups can't be put together with other groups explained above, in the resource mobilisation theory. They must be separated, in examination of the resource mobilisation through looking into the end results of their actions. In the earlier instances, it is the case of co-optation, as they are serving the interests of mainstream ideology of development the resources are provided for them. Under the impression that these organisations could be better link with 'the target population'. The work of Eklavya, KSSP are tolerated, because they don't go against State's ideology directly. One member of KSSP puts it aptly - "It is very difficult for any body to go against science". The funds are mobilised in this case through keeping their objectives quite intact not through co-optation.

Symbols and Signs

There are always some positive and some negative symbols in the case of a social movement. It would be difficult to find out a single or a set of symbols to characterise such a diverse movement, as 'Charaka'

become the symbol of Gandhian movement. No body would deny that technologies of solar energy, biomass energy, wind and other renewable sources of energy, are areas of agreement among all sections of AT participants. But favour for such technologies, whether is complacency or a matter of conviction could be judged only when the corresponding 'negative' symbol is compared with it. It is largely neglected by the analysts, when they present these technologies as a wider areas of agreement. Morrison identifies that "Nuclear Energy" is a negative symbol among AT participants, at a wider level.[14] This is nothing more than reflecting on the 'false consensus' in the movement. It would be difficult to find out the word 'Nuclear' in the brochures of the groups of the 'second generation' in AT, and almost absence of any programme related with the opposition of nuclear energy. Many ideologues of these groups might be seen decrying about use of nuclear energy but in action programme, seminar, conferences of these group nuclear energy does not appear as a 'negative' symbol should appear. For them, 'the apathy, superstition, ignorance, immobility and inability to take risk' of the 'target population' appear as a negative force in the way of diffusion of appropriate technology. However,

many groups in western countries might be participating in anti-nuclear programme. But it does not appear on the agenda of those AF organisation who are dealing with the problems of poor located in third world countries. Their negative symbols appear quite opposite than nuclear energy.

At the ideological level there are many stances when traditional symbols are reinvented and used to justify what they want to say. The case of Greek Goddess Pallas Athen and God Hephaistos was discussed in the earlier pages. Schumacher also makes use of Middle way of Buddhism in order to justify what he calls "intermediate technology". Many intellectuals are taking recourse in traditional philosophies to counter the modern symbols. But in the actual discourse of the second generation of AT they do not operate. In the 'first generation' these symbols are varied and cultural specific. In India, the symbol of appropriate technology was 'charakha', the opposition of which was modern textile mills. Now, there is no uniform symbol for AT movement.

However, some groups in India do use of cultural symbols for their purpose. For example, Eklavya uses the old, mythology of Mahabharata in which a tribal

youth Eklavya learned archery by taking a log as his guru Dronacharya in absentia. Eklavya had to sacrifice his thumb of right hand in gurudakshina as Dronacharya did not want him to be a competitor of his favourite disciple Arjuna. The present education system is seen as a continuation of this phenomenon and the group now challenges the sacrifice to be made by youths of the present day. KSSP also uses native language, art, drama and song in the popularisation of science. ASTRA means 'weapon' in Hindi the case of poor people. However, there is lack of extensive use of tradition as it was reflected in Gandhian schema.

Dilemmas

Inconsistency between stated objective and actual discourse gives rise to many dilemmas, in the all sections of AT movement. This phenomenon is least observable in the second generation of AT groups because they hardly bother about stated objective or their dilemma emerges not from the inconsistency between objectives and actions, but from other sources. Still there are occasions when such dilemmas become manifest. The example of conference on wood stove dissemination at the Netherlands can be cited.[15] There were two distinct groups of people on the problem of dissemination

of wood-stove. One group holds that appropriateness of improved wood stoves appears to be location, consumer specific and that a high degree of flexibility is needed since successful dissemination will require adaptation of the technology to meet specific local condition. While other group advocated that a stove can be designed and mass-produced in accordance with consumer needs and distributed through commercial channels. In the same conference, the participants formulated a hypothetical situation of the way in which wood store is designed and disseminated to show that a typical stove programme produces a national fuelwood saving of only about 0.3 per cent, that the cost of saving even that amount is only marginally its retail price, and that 10 litres of petrol may be used up by project personnel for every stove installed. Therefore, "there is no point in exchanging a fuelwood crisis for a petrol crisis".[16] Such dilemmas are profound in many areas as pointed out in the course of description of their activities. But things are presented in the way as if 'it is all right."

The dilemmas of the first generation groups are obvious, as they find themselves engaged in those activities, of which they are opposed. The use of modern media, and other technologies, as well as

institutions and other agencies - all make their situation inherently contradictory in one way or other. The overall situation makes their criticism a look of naive thinking, but they are not unaware of it or do not make it appear as if all is well. Their dilemmas reflects in their discourse, as it was discussed in the case of Medico Friend Circle in detail. But there is active desire to transcend those dilemmas when they make criticism about the whole system. It is not that they are unaware of powerful structure of multinational and state, but their complete contempt is informed by a sense of powerlessness.

References:

1. Papanek, Victor & Henhessey James, How Things Don't Work, Pantheon Books, 1977 P.xiii).

2. Winner, Langdon, "Building the Better Mousetrap" in Franklin A. Long & A. Oleson (eds.), Appropriate Technology and Social Values: A critical Appraisal, Ballinger Publishing Company, 1980.

3. Ibid. (p.45)

4. Ibid. (p.43)

5. Jequier, N. & Blanc, G., The World of Appropriate Technology, OECD, 1983 (p.164).

6. McRobie, George, Small is Possible, Abacus, 1982 (pp.199-202).

7. Ibid.

8. Schumacher, E.F., Good Work, Abacus, 1980 (p.137).

10. Ariyarante, A.T., "Towards a 'No-Poverty' Society" in Technology in the Hands of the People: Asian Experiences, Approtech Asia, 1984 (pp.85-89).

11. Ibid.

12. Goonalilake Susanta, "The Sarvodaya Movement in Sri Lanka" in Lokayan Bulletin, no.8, Nov. 1982.

13. Ibid. (p.138).

14. Morrison, Denton E., "Soft Tech/Hard Tech, Hi Tech/Lo Tech: A Social Movement Analysis of Appropriate Technology" in Sociological Inquiry, vol.53, no.2&3, 1983.

15. Clarke, Robin (ed.), "Wood-Store Dissemination", Proceedings of the Conference held at Wolfheze, The Netherlands, 1985.

16. Ibid.

CHAPTER VI

CONCLUSION

The representation of AT movement in this paper remained sketchy and scattered, partly because of the vastness of the subject matter and partly because of the absence of any systematic study done in this area. However, the effort was to trace the trend of this global phenomenon in the light of social movement perspective, it is pointed out that the literature presenting AT as a social movement, has serious flaws; the very definition of social movement is so loosely constructed that it allowed even incompatible forces, agencies and organisations to be included in the single, non-contradictory and generally consensual phenomenon what they called AT movement. Thus, a tentative definition had been checked out to examine AT phenomenon on the basis of ideology, organisation and strategy.

Even this tentative definition was found to be highly limited, when the ideological origins of the AT movement was examined; technology was never the starting point or the only thing that signified their ideas of social change. Even by broadening the meaning of the term technology to include science, education etc., this definition of AT movement did not work, because

the original ideological prophets were for a fundamental change in society that included a host of other phenomena in their agenda of activities. However, change in technology of an entirely different technological choice was one of the most important aspects of their activities. Perhaps, their all activities could be apprehended in technological terms, if it is defined in its broadest sense, as Marx did - "Technology discloses man's mode of dealing with Nature, the process of production by which he sustains his life, and thereby also lays bare the mode of formation of his social relations, and of the mental conceptions that flow from them."[1] But it would not serve the purpose here, as it is to find out the trends and dimensions of the phenomenon called 'Appropriate Technology' which has its specific significance in the emergence of the term and in the certain historical events of 70's of this century.

The ideology of AT movement is directly related to Gandhian movement in India, and Communitarian, New Left, and the radical movements of the Western countries. Among them the dominant theme came from anarchism. Even anarchism was not identical in every parts of the world. The significant variation is present in Gandhi itself -

the significance of ahimsa, integrity of means and ends, non-contradictory combination of religion, politics, and other practices of life - all placed Gandhi quite apart from other anarchists. However, need for a different set of technology for a new form of society remained characteristic in all of them.

The transition from this ideology of fundamental change to a principle of 'tension management', was found in E.F. Schumacher and his works in the field. He can be taken as representing all those who followed the same process of transition. The end result of this transition was the sacrifice of those social and political values which the early prophets held very near to their hearts. The era in which the term 'Appropriate Technology' was born, marked also a shift in the emphasis - 'promotion and diffusion' of appropriate technology became the first and foremost consideration. While in the West these appropriate technologies including Yoga, herbal medicines, Acupuncture, pyramidal power and a wide range of small hardwares and consumer goods, indicate tendencies towards escapist consumerism and spiritual self-indulgence to mark the arrival of New Age, in the Third World countries appropriate

technologies were meant to create 'millions of work places' through scaling down modern technology or upgrading traditional one. In both cases, the creation of new set of technologies became a pre-requisite, either to provide an escape route from the maladies of industrialism or to fight poverty in the Third World countries. In the context or Third World countries, promotion and diffusion of appropriate technology consolidated the growth of industrialism through the efforts of 'new appropriate technologists' or 'experts of rural technology', in many ways. Thus, their efforts are more nearer to the recent move of international capitalism in which NGOs are considered to be more efficient vehicle to move in hitherto unexploited area of Third World countries. The organisational linkages, funding, the working pattern and symbols - all confirm this shift in the 'second generation' in AT.

The sudden spurt in the fund available for the promotion and diffusion of appropriate technologies by governmental and international agencies, the phenomenal growth of AT groups, regional and international networks, and the popularisation of the concept in development thinking, do not signify the

conversion to the social values voiced the early prophets. Rather it indicates the process of institutionalisation through an active support from the 'establishment' - in which a radical ideology turns to be a sophisticated method of technology diffusion. Although many ideologues of this generation kept their criticism in tune with the early prophets, but the implicit ideological shift is apparent, which comes by redefining the problem - bureaucratic inefficiency, mismatch between scientific-technological development and social progress, separate and isolated growth of different specialities on the one hand and on the other, ignorance, immobility, illiteracy, inability to take risk, and an apathetic attitude towards progress among poor located in the Third World countries. Thus the move of the second generation in AT is a 'stop-gap' arrangement in the process of development. The sacrifice of earlier social and political values is recognised which comes due to the entry of new comers, but it is seen usually as a 'mixed blessing' to the movement by the A^T participants.[2]

Yet, there is another development in the AT movement - the emergence of technologues - a new type of ideologue coming directly from the scientific community, who give their voices and supports to varied

kind of localised, and isolated grass root movements protesting against industrialism in one way or other. The unique characteristic of these technologues is their formulation of social problems in precise and scientific terms for the arguments. What are social necessities, become scientific and technological necessities as well, in the hands of these technologues. There are important variations among them too; while some want to introduce change in the society through democratisation and popularisation of appropriate technology, others seek fundamental change even in the concept and categories of scientific thinking as a prelude to social change. However, this development signifies a greater awareness among the members of the scientific community towards their social responsibilities - which might be a meeting ground for the emergence of a new ideology rather a new paradigm. Those technologues who are placed in certain institutions or they have placed themselves there exert immediate repercussions as their acts are direct challenge to the long established professional ethics and norms as well as their examples are path makers for how these institutions could or should run in the larger interests of society.

The emergence of the second generation in AT did not marked the death of the first generation,

although many groups 'jumped' to join the second generation. In terms of number and resources the second generation is outweighing the former one. The first generation continues in its own way. Many technologues are heavily influenced by the thinking of the early prophets of AT. Many grass root movements and groups are there in this tradition which are not concerned with the 'promotion and diffusion' of appropriate technology as such but have a resonance of the ideologies and methodologies of the early prophets of AT. This can be seen in the capacity of self-production in the dominant ideologues of the AT movement. Alain Touraine has identified three main criteria for the successful self-production of a social movement - totality, opposition, and identity.[3] Anarchist tradition and Gandhian tradition provide a relatively complete theoretical and ideological pre-requisites for political and social intervention along with a new vision of future society. However, opposition and identity are to be determined in historically specific conditions.

In the west anarchism reproduced itself in the 60's despite Woodcock's earlier pronouncement that it is dead.[4] Gandhian movement failed in the form of Sarvodaya Gramdan Movement,[5] but it resurrected itself

somewhere else, Chipko movement, JP movement of 1974 etc. The totality of Gandhian ideas can be seen at much wider level, in its growing importance at world level particularly in ecology movement - the acceptance of non-violence, the sit-in methods etc. Perhaps Gandhian ideas are fulfilling the wish of a modern Indian luminary Anand K. Coomaraswamy - "All that India can offer to the World proceeds from her philosophy. This philosophy is not, indeed, unknown to others - it is equally the gospel of Jesus, and of Blake, Lao Tze, and Rumi - but nowhere else has it been made the essential basis of sociology and education."[6]

While the ideology held by the first generation groups is sound and relatively complete in its formulation, the organisational aspect is their Achilles' heel. The communitarian movement and radical groups in developed countries are drilled in the tyranny of structurelessness i.e. their opposition to any kind of authority is subdued by the very group structure they form; they are either faced by authoritarian leadership or strong religious strictures in order to survive as a group. Even then they remain highly localised and dispersed small groups. The Gandhian tradition is fraught with this problem as organisations are highly dependent on the charismatic leadership. The opposition of the dominant ideology

also makes their condition miserable resourcewise. The dilemmas are also very profound in this context.

The strategic aspect of the AT movement makes it clear that the second generation in AT has not only co-opted with the mainstream process of development but also applied the notion of change through technological inputs. This concern is also evident in the first generation in AT of developed countries where it is a great conviction that technological change will lead a social change. Gandhian approach is quite distinct in this aspect, which emphasises the change in the 'agents of change' as well.

Among the critics of appropriate technology, a deadly blow came from Arghiri Emmanuel to those who justify appropriate technology on the same criteria as that of mainstream technological development which is characteristic of the second generation of AT.[7] By giving various examples of the applications of appropriate technologies he goes to prove that it leads to both economic and technological backwardness. However, Arghiri does not take AT as a social movement, and misses to address himself to those, whose advocacy of appropriate technology is informed by the denial of the very criteria of mainstream economic and technological development. He

concludes, since multinational companies are the repositories of advanced technology, they become the favoured means by which the Third World technological development path may be cut short. (He is perhaps unaware of the fact that many multinationals are party to develop appropriate technology. Thus his meaning of appropriate technology is highly misleading.

The other line of criticism is familiar one that until and unless the social and political structure of society changes radically, the talk of appropriate technology would be irrelevant and meaningless. This sort of criticism comes mainly from Marxist quarters for whom the political change becomes a pre-requisite for any other changes. Echoing the same argument, Arjun Makhijani asserts that AT movement is relevant only in the industrialised countries because there is an organic growth of capitalism which generates a severe kind of alienation among workers among whom AT movement operates, and if channelled properly "it could be one potent method for organising a revolt..."[8] For him, here in India, "it is plain hunger" and "the state of affairs can change only if class-based mass organisations of the poor come to control the economic and political life in the country. The people will then decide which technologies are useful and which

are not... what is appropriate and what is not". Mr. Makhijani even denies to admit that appropriate technology has any link with Gandhi's ideas because of reactionary aspect of his ideology i.e. the theory of trusteeship and his puritanical and anti-scientific propensities. Thus, it becomes clear that neither AT advocates nor its critics have undertook the subject matter of appropriate technology beyond their own point of views i.e. they failed to see the different shades of the AT movement.

Finally, the world of AT is not a homgeneous collection of different families. As it is the state of affairs today, appropriate technology finds its way in the two inconsistent, incompatible and even opposing ideologies, organisations and strategies. Many groups and individuals could be found vacillating between the process of coptation and the radical change. The dominance in terms of resources, number is certainly of those groups who copted with the mainstream, conception of AT. The opposing section in the AT movement far from being dead, find its way in other contemporary social movements as well.

References:

1. Marx, Karl, Capital, Progress Publishers, vol.I, 1954 (p.352).

2. Whitecombe, R. & Carr, Marilyn, "Appropriate Technology Institutions: A Review", Occasional Papers 7, ITDG Publications, 1982 (p.3).

3. Touraine, Alain, The Voice and The Eye: An Analysis of Social Movement, Cambridge University Press, 1981.

4. Woodcock, George, "Anarchism Revisited" in Terry M. Perlin (ed.), Contemporary Anarchism, Transaction Books, 1979.

5. Oommen, T.K., Charisma, Stability and Change, Thomson Press (India) Ltd., 1972.

6. Coomaraswamy, Anand K., The Dances of Shiva, Sagar Publication, 1968 P.4).

7. Emmanuel, Arghiri, Appropriate or Underdeveloped Technology, Trans. Timpthy E.A. Benjamin, John Wiley, 1982.

8. Makhajani, Arjun, "Energy Policy for India" in EPW Special Number, 1977.

SELECT BIBLIOGRAPHY

Approtech Asia 1984 Technology in the Hands of the People, Approtech Asia Publication.

Batalov, Edward 1985 The American Utopia, Progress Publishers, Moscow.

Bang, Abhay & Patel, A.J. 1982 Health Care which Way to Go? Examination of Issues and Alternatives, MFC.

Bhalla, A.S.(ed.) 1979 Towards Global Action for Appropriate Technology, Pergomon Press.

Bose, N.K. 1957 Selections from Gandhi, Navjivan Publishing House.

Clarke, Robin (ed.) 1985 "Wood-Stove Dissemination", Proceedings of the Conference held at Wolfheze, The Netherlands: Intermediate Technology Publication.

Dharmapal 1971 Indian Science and Technology in the Eighteenth Century, Academy of Gandhian Studies, Hyderabad.

Darrow, Ken & Pam, Rick (eds.) 1981 Appropriate Technology Sourcebook, vol.I&II, A Volunteers in Asia Publications.

David E. Apter & James Joll (eds.) 1971 Anarchism Today, Doubleday & Company Inc. NY.

Dickson, David 1975 Alternative Technology and the Politics of Change, Universe Books, NY.

————	1983	"Forestry in British and Post British India: A Historical Analysis" in EPW, Oct. 29.
Guha, Ranjit(ed.)	1985	Subaltern Studies, vol.IV, Oxford University Press.
Hess, Karl	1975	Dear America, Morrow N.Y.
Illich, Ivan	1971	Celebration of Awareness, London.
Jenkins, J.Craig	1983	"Resource Mobilisation Theory and the study of Social Movements" in Annual Review of Sociology, vol.9.
Jequier, Nicolas	1976	Appropriate Technology: Problems and Promises, OECD.
————	1977	Directory of Appropriate Technology, OECD.
Jequier, Nicolas & Blanc, G.	1983	The World of Appropriate Technology: A quantitative Analysis, OECD.
KSSP	1984	Science as a Social Activism, Reports and Papers on The People's Science Movement in India, held at Kerala.
Ladd, A. et. al.	1983	"Ideological Themes in the Anti-nuclear Movement Consensus and Diversity" in Sociological Inquiry, 53.
Lovins, Amory B.	1977	Soft Energy Paths: Towards a Durable Peace, Ballinger Publishing Company.
Marcuse, Herbert	1964	One Dimensional Man: Studies in the Ideology of Advanced Industrial Society, Beacon Press.
————	1969	An Essay on Liberation, Beaon Press.

Reddy, A.K.N. & Prasad, K.K. 1977 "Technological Alternatives and the Indian Energy Crisis", in EPW, Special Number.

Robertson, James 1978 The Sane Alternative: A choice of Futures, RiverBasin Publishing Company.

Roszak, Theodon 1969 The Making of a Counter Culture: Reflection on a Technocratic Society and its Youthful opposition, Doubleday.

———— 1973 Where the Wasteland Ends: Politics and Transcendence in Post-industrial Society, Anchor Books, Doubleday.

Schumacher, E.F. 1974 Small is Beautiful, Abacus.

———— 1980 Good Work, Abacus.

Singh, Y. 1986 Indian Sociology: Social Conditioning and Emerging Concerns, Vistar Publications.

Steward, Brand et. al. 1968 The Whole Earth Catalog, Nowels, California.

Touraine, Alain 1981 The Voice and the Eye: An Analysis of Social Movements, Cambridge University Press.

Whitecombe, R. & Carr, Marilyn 1982 Appropriate Technology Institutions: A Review, Occasional Paper 7, ITDG Publication.