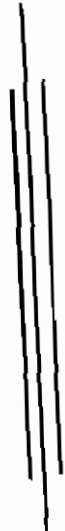


PART

ONE



GENERAL

INTRODUCTION

"All we have in what we produce"; Emile Dupont. And observe Barret and Aiken "Our power to deal with the world of matters has multiplied out of all proportions to our wisdom in coping with the problems of our human and spiritual world."

Goods and services which are not produced cannot be consumed and those produced in limited amount can be consumed also in limited amount; production and consumption are associated. / The goal of productivity is increased production of goods and services. Productivity depends for its functional goal on its power in-take. Most important power input in production operations, now, is the use of sophisticated machines-tools usually called mechanization, which is one of the most important ingredients in the gamut of technology. / Agricultural technology in its semantics is the combined index of the level of knowledge and attitude and the use and management of fertilizers, water, improved seeds pesticides, machine and power in agricultural production process.

Man as a power unit is ineffective and inefficient. His powers are multiplied manifold by the use of various machine devices. In the West scarce and costly labour led to machine use in agriculture.

Machine use in its modern sense is relatively recent phenomenon in Indian agriculture and basically aims at; increased productivity per man-hour, and change in the character of farm work from arduous to attractive. There are different shades of opinion, on what is farm mechanization, functional as well as

structural.

There are variations in the notions of people about farm mechanisation. For a few, it means the use of modern machinery from seed-bed preparation to harvesting and transporting. For others, it means the replacement of manual and animal labour by improved agricultural implements and tractors. (Some have called it tractorisation.)

Singh, R. and Singh, B.B.¹ consider that operationally, mechanization is the use of tractor and tractor operated machinery in farming.

Roy, K.² held that tractor and tractor drawn implements is mechanization.

The above notions of farm mechanization refer to partial mechanization, the focus of the present study: Partial mechanisation involves the handling and utilization of one or more of the mechanized tools, with adequate or little training, at the farm. Partial mechanization is a transitory phase in comprehensive mechanization which Tolpekin³ defines as 'systematic use of machines, in all agricultural operations and at all stages of production process, replacement of human/labour and ensuring continuity of the complex production process.' The concept of complex mechanisation assumes mechanization of all operations in the entire production cycle.

McMillan⁴ found a high degree of relationship between tractor and allied farm machinery and implements and adopted

tractor as the most important index of farm mechanization. In India also the mechanization of farm work assumes significance only in terms of tractor as tractor owner is required to purchase a minimum of tractor operated farm machinery to make effective use of tractor. Further tractor is the main and most costly item in the complex of farm machines.

Tractors are the most important item of farm mechanization and Randhawa⁵ calls it the multi-purpose agricultural machine.

This study is focused on the social implications of the use of tractor and tractor operated farm machinery, as tractor is the most important spearhead of the farm mechanization in India.

For purposes of this study, farm mechanization means the use of tractor and tractor drawn farm machinery in farm operations.

The problem under consideration is a study in the dynamics of social change caused by the application of mechanical devices to the process of production in agriculture.

'It is amazing that matters which vitally affect man's welfare and survival have mostly been ignored in so far as scientific work in the field is concerned'. Although the social theorists have constantly been seeking uniformities and regularities of this process of change in the society, still it is a big challenge for analysts. Sorokin concludes that, 'Each theory of social change of mid-20th century, makes a little contribution

to our knowledge of social change; hardly any of them greatly enriches our understanding of the most essential aspects, forms, principles, relationships, uniformities, causes and consequences of social change of the past as well as of the present. They all are either too abstract or too fragmentary. All are pedestrian and Alexandrian rather than classical, enlightening, and imaginative.' Thus he gives a higher place to classical theories for obvious reasons, for social change analysis.

Two basic groups of theories in sociology try to explain social change; those defining the dominant factors and mechanism of change; and those discussing the nature of social change. Significant in the first category are the economic theories of Marx, Veblen and Ogburn---mechanistic interpretation of social causality. Important contributors in the other category are those explaining ^{CHANGE IN TERMS OF NONECONOMIC} factors like Weber, MacIver, Sumner, Tyler etc. Masil, J.⁷ 1970) says that we are living in an era of parallel and partial theories of change which do not compete but complement each other in adequately modelling the changes in various parts of society. Methodological difficulties in working out complex analytical models of change have so far proved unsurmountable and consequently sociology has to limit itself to partial theories.

William Leiss⁸, another 1970 author has observed: Few aspects of social theory in recent years have elicited as much comments as that of the social consequences of technological

progress. An increasing number of large scale scholarly studies of this theme in the West is matched by the broad public concern. The recognition of the necessity for formulating public policy with regard to technological change has very often prompted the researchers to offer recommendations of a practical nature. Yet the matter remains highly confused. Most of these studies offer common sense dicta. Moreover, the bewildering array of phenomena which has been linked with technological progress threatens to distort the process of social analysis by making social change appear to be largely dependent upon technological change. Finally, too little attention has been paid to the question of the possibilities for breaking the seemingly fatal link between the positives and negatives of modern technology.

Numerous factors have been cited for causation of variation in social organisation. The social theorists have in general, assumed mono-causal explanations, called determinism; important ones being geographic, biological and cultural, each having many off-shoots. Some of the important explanations for social change have been those focusing on factors or on nature of the process.

For Marxism causation began in the application of a technique of production initiating changes in the economic structure which leads to changes in the socio-cultural structure. Veblen related economic institutions to the habits of life and thought, produced through socialisation. Durkheim relates change in society from mechanistic to organic solidarity due to

division of labour. MacIver and Page stress the role of differentiation which is poly-valent. The functionalists explain social change in terms of need gratification. Social action systemists explain social change in terms of values. The psychoanalysts seek forces for social change in the psychological factors. Those championing socio-cultural theory of social change trace these in social and cultural factors. The seekers of laws and direction of change find these in linear, succession stage, and cyclical theories.

For different people the range of the semantics of technology is very wide and this poses many analytic problems to spell out its social meaning.

It is well known that the significance of technology, or anything, lies in what it does, as the function of the entity gets its social significance due to the use of the functional product by men in society. Further, the meaning of technological objects lies in the field of social sciences and social life. This corroborates that the emergence of technology is primarily in response to social demands, and in this way the origin and spread effect of technology is sociological.

The dispersion or spread effects of technology are vast on employment, standard of living, power for work, changes in our habitual patterns of conduct and this shows that the sociological phenomenon is being totally altered by the technological innovations as manipulated by man. Causation theorists assert that there is a cause and there is an effect which is

manifest in variations caused. This cause and effect relationship assumes many forms of significance for social life and organisations.

The production and use of technology leads to a process of change. Once a change in habits is caused, this in turn leads to further changes; one derivative effect leads to other effects becoming further away from the original innovative variation. Hence, it is proper to speak of a cause rather than the cause. Then there are successive derivatives each one becoming an innovation for a cluster of successive consequences. This makes causation a network. However, the effects of innovation are not immune to the cultural constraints and lags which lead to delayed observation of the innovation effects. The implications of different innovations vary in their magnitude. The converged clustering of innovations as well as their spread also determines the diffusion and magnitude of innovation.

It is true that society is an organization of micro units into a functional whole, reinforced by harmonious status-role balancing indicating a 'good-fit' of social forces; Sumner calls it a 'Strain toward consistency.' Any variation anywhere causes dislocation in the social order and patterns.

Naturally, from entities and inventions, some gain while others may lose as one man's meat is another man's poison. This leads to basic contradictions between productive forces and relations, economic base and ideology, and ideological structure itself perpetuating a strain and stress matrix, sometimes, culminating into competitive conflict while at others

into collaborative integration making society, the arena of changing group relationships and struggles.

An important cause is one which accounts for the dominant part of the variation caused. These causes may manifest in sequence, in clusters or convergence, in dispersion effects, and in complex network of feed-back and back-wash, also visible in eliminations, substitutions, and enhancements in the body of the society. It is said that social changes are proportional to the extent of adoption of an innovation. This effect is spiral which, Myrdal⁹, calls - a 'circular cumulative accelerating process.' Many of these social changes are mere variations in the existing practices.

New technology has led to a lot of social organisation problems, changes in work relations, marked shift in our attitudes and outlook, the values, norms, and the institutions - the whole complex of habitual responses and practices. The interstices and conflicts in changing stratification bases, needs for labour and its supply, the roles, status and mobility and communications are the very meat of the relation between technology and social change.

Modern era is appropriately called the age of technology as it promises to be man's hope of future as well as the instrument for his destruction.

Today, a new awareness is rampant that change is dependent not on the adoption of innovation but more on the adjustability of the socio-economic structure. The vast concern

about the complex of problems and controversies generated by the application of technology to the process of production in society indicates the urgent need to throught the issues and formulate the course for future endeavours.

Technology, thus, is a very dominating force in the causation of cycles of social changes. One such technological innovation in agriculture is the use of sophisticated farm machines in production processes, which is called farm mechanization.

Ogburn and Ninkoff¹⁰ have observed, that mechanisation is one of the most striking and pervasive phenomenon of our times. Unfortunately, its study has been neglected by the social scientists, who have not sufficiently recognized that although technology itself belongs to the field of natural sciences, it has far-reaching effects on social life.

Marx¹¹ observed that the laws operating at the economic basis and the production relations ultimately determine the character of all other social and personal relationships. The whole process moves in the form of interaction. The Marxist theory of social change is formidable and has been controverted extensively. At this stage of development of our agricultural technology and the consequent changes, Marxist theory in conjunction with that of Ogburn can be helpful for threshing out the issues of studies in the dynamics of technological change like the present.

Axiematically, it is said that agriculturist is the lynch-pin of the whole social chariot. The recent application

of science and technology to traditional agriculture has brought about a major breakthrough in production widely heralded as 'Green Revolution' and with it have withered the despondence and gloom of conspicuous shortfalls in food-grains. Jain¹² observed that some of the new strains of seed have especially been instrumental for this break-through in agriculture. Agriculture is our biggest industry and it is gradually assuming the character of business. It is being felt that to feed well the growing population constant strides in agricultural production - both in quantity and quality need to be made. To reach the stage of developed economy, it is necessary to arm the producer with adequate power for progress. Greater use of farm machinery and tools by the farmer can significantly contribute in this direction.

Anonymous¹³ reports that India ranks first in the use of farm machinery among 11 countries in Southern Asia (India, Pakistan, Afghanistan, Nepal, Burma, Ceylon, Thailand, Indonesia, Singapore and Malaysia).

However, a recent study¹⁴ has indicated that per capita energy use in India is the lowest in the world.

Another study¹⁵ in America has brought out a comparative statement of power available for 1964-65 for different countries of the world. India has one of the lowest power availability for agricultural production. The same study indicates a definite correlation between power available for crop production and yield. (Appendix I)

Further, much of the energy and power in India is being

used in areas with higher and assured irrigation which leads to unbalance in its distribution and use. At present, animal power by far continues to be the major source of power for agricultural production operations in India. Even in Punjab, the most mechanised State in India, in 1970, it constituted more than 50% of the gross power for agriculture.¹⁶

With regard to the introduction of mechanisation in agricultural production, there are two shades of opinion. The enthusiasts advocate increased mechanisation in agriculture whereas the pessimists disfavour it in view of their apprehensions regarding displacement of labour, consequent upon the adoption of mechanisation in farming. However, an emerging consensual view is that mechanisation in farm work should be restricted, selective and guarded; that comprehensive mechanization of farm operations is full of dangers in a labour-abundant contemporary India and that the gains of recent agricultural break-through need to be furthered and consolidated in which partial mechanization becomes essential. The myth of the pessimist has been dispelled and rightly so in view of our colossal need for power to do farm work; we need to multiply our farm power several times.

Our government's policies indicate the consciousness of the significance and guarded use of machine in our agriculture. It accepts that by 1973-74, the annual demand (modest estimate) for tractors would be around 52000. Since 1961 to 1966, the increase in tractor population has been @ 16% per year. (Appendix I)

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Jain ¹⁸ reports that we require mechanical power to supplement human and animal power, to meet labour requirements at peak season, to carry on operations not possible without machine use, and meet the time sensitiveness of modern agricultural operations within a very short time.

Further, in Haryana, labour for agricultural work is already in short supply and it is gradually assuming an alarming proportion. It is estimated that for 11 farmers only one hired agricultural labour is available (For Hissar 1 for 9 farmers).

Thus hired agricultural labour, a major ingredient of agriculture input is becoming scarce and costly and the demand for agricultural labour is increasing. To meet this challenge, the farmer needs to cut down his cost of production. One important way to attain this is to use more machine rather than man or animal power.

However, the initial cost of machinery is very high for the average farmer and the availability of loans for purchasing machinery is neither easily available nor cheap as is sometimes presumed. Further, tractor alone is not enough. Matching machinery has also to be purchased. The clients form long queues and vested interests squeeze the situation. There is lag in demand and supply of machine, its logistics and infra-structure. Unprecedented and unforeseen situations emerge, giving rise to widespread apprehensions regarding the machine acquisition and operational phases and the reminiscences in terms of changes in land-man relations, interpersonal relations and institutional relations.

Mechanisation in agriculture has implications on rural life such as changes regarding rural population, agricultural labour, land uses and tenural patterns, size of holdings, crops and livestock, motives, values and attitudes of people, their wealth, incomes, expenditures and investment patterns, level of living, off-farm work, custom services, structure of agricultural work organisation, amount of leisure and participation, farmers' inner or outer-directedness, customary work relations, the role of family members and the independence of farmers.

Lincoln once said, "If we could know, where we are now and where we are to go, we could, better judge what to do and how to do." This works as a caution, as in India we are at a crucial stage in our agriculture and a little slip of policy may cause irreparable damage. This calls for clear understanding of our goals and ends and decisive action for their attainment. We want our green revolution to be further greener but not at the cost of equitable distribution of growing rural prosperity and harmonious social life.

Due to divergence of social and personal cost, social intervention in the form of policy decisions based on reliable data is necessary.

Kahlon²⁰ reports that farm mechanization is as much a social problem as an economic or technological issue for it brings about wider changes in social organisation. Which section of the rural population derives most benefit out of mechanisation; which sections lose, how the increased income is being used, which

new indices of socio-economic status and prestige are emerging, what a type of agricultural leadership is emerging, what is happening to tradition and customary work relations are a few of the issues which need to be investigated into.

Swigh²¹ reports that there are many purpose-minded persons in the country who are interested in analysing the contemporary complex and ensuing prospects of farm mechanisation for Indian agriculture, economy and society, the required logistics for it and the constraints surrounding it.

For rational planning of our agricultural development policy those at the helm of affairs need to be fed with knowledge of the applied aspects of agricultural technology including the causal and consequent conditions of mechanisation. The lack of empirical evidence about the social factor as a condition and consequence of agricultural mechanisation, becomes a handicap in drawing out meaningful plans for agricultural prosperity.

Haldipur²² reports that broad generalisations regarding the impact of farm mechanisation as well as detailed studies of its solitary aspects are apt to be misleading. The process of farm mechanisation needs to be studied in totality with preference to the socio-cultural (agro-climatic and techno-economic) dimensions.

The green revolution is gradually spreading in Haryana in recent years. To speed up this process, the government and the farmers are all keen and the process-effects are visible in agricultural work and organization. But hardly any systematic studies into the social implications of machine use in agricultural pro-

duction process have been made in Haryana, especially in Hissar.²³ The present study, therefore, endeavours partially to fill this gap in our knowledge. It attempts to collect empirical evidence about some of the social aspects of farm mechanization ⁱⁿ rural society and thus constitutes the next step in the process of adoption of innovation-continuum. Planning for future has become essential, for if we could know where we are and where we want to go, much good will emerge. Therefore, a diagnostic search into the contemporary standing of farm mechanization and its influences on rural social life would be worth its while. This will provide a benchmark for understanding further planning of agriculture.²⁴ This study seeks to do it for Hissar in Haryana.

Technological change is always accompanied by social change. But what is the nature of this relationship? How far one is a cause or consequence of the other? What are its diffusional dimensions? What is the nature of the whole configuration? What is good in technology and how much it overshadows its ills? How does it affect life and living conditions and meets the expectations? Is it leading to the optimum intensive use of the physical endowment? What sort of a chain of demands for further goods and services does it create? And do the above mechanization effects give rise to unique and new situation? These questions need to be answered as they have significant implications for the society.

The above issues need to be researched if current mechanization hangovers affecting rural life are to be solved and future

ones anticipated. The intellectual stirring and curiosity aroused by the advancing technology has laid open new horizons for scholarly research and inquiry. Need is being felt that the nature, causes and implications of mechanisation of farm on rural social life and institutions, social adaptations effected, work relations of labour and the farmer and service classes; the nature and width of socio-cultural and economic disturbances and distortions consequent upon introduction of machine for farm work, the emerging power figures etc. are required to be explored to seek direction, solutions and remedies.

Objectives of the study:

The overall purpose of this study was to understand the nature of the farm mechanization process and its implications for rural social life and change patterns in terms of the implications of the machinery acquisition and operation phases and as its result, the variations. These were to be seen in land-man relations, inter-personal relations, institutional relations and the emerging trends. The specific coverage objectives of the study were to understand the existing conditions and emerging trends in:

1. the general and personality variables of tractor owners;
2. their motivational matrices;
3. the changes in important dimensions of agricultural work organisation and orientations;
4. the constraints hindering farm mechanization;
5. the interpersonal and work relations and roles;

6. the pattern of participation and leadership;
7. the attitude-values of tractor owners, non-tractor owners and agricultural labour; and,
8. thus to arrive at the emerging issues and implications to reduce the gap between knowledge and action.

These were to be seen in terms of land-size and native ~~land~~ Vs. migrant wherever divisible as the division of farmers in such strata will provide further details of the whole complex. Thus the study objectives were focused to look into the salient aspects of the complex of farm mechanization in terms of agricultural machine acquisition, availability and use, problems, adoption consequences, and the measures to streamline the whole process.

The above objectives are expressed in the changing rural social life and living - directly or derivatively. These are broadly stated in two forms; that mechanization vests the farming groups with resources to improve their conditions - higher productivity, income and leisure. The necessity to mechanise brings the farmer face to face with difficult problems, each attempting to over-power the other. Difficulty in handling these problems may lead him to increased outer-directedness in many farm and home decisions ranging from crops and supplies, to education of family members. And it can thus be hypothesized that this process has serious social implications.

The second derivative problem-form emerges from the first - loss of inner-directedness of farmer. It can be hypothesized that not all farmers would push their desire for further

mechanisation of their farm work. And for this, they will need to be provided with the better alternatives, which necessitates further research. The study has assumed that mechanization of farm constitutes the dominant force in the conduct of agricultural work causing wide social changes in rural life, and living, admitting at the same time that simultaneously many other forces like social and community influences and interests are exerting pressure, but less forceful comparatively, to cause variations in social life and organization.

Underlying Assumptions:

Regarding the machine acquisition phase, the assumption of the study was that demand for machines for farm work was more than their supply and that such a situation had many social implications for agricultural work, machine makers, distributors and the users. For purposes of this study mechanisation of farm was defined as the use of tractor and tractor drawn implements in the agricultural production and transportation process. Mechanised farm means one having a tractor.

The second assumption was that the adoption of farm mechanization was more by larger landholding owner farmers for self-work which will have implications for small farmers, labour and whole web of social relations. This was taken to be the machine operation phase.

The third assumption was that farm mechanisation would result in many changes in the rural life and living, structurally

and functionally, which will in turn condition farm mechanization pattern and will accentuate use-based, regional, socio-economic variations.

The fourth major assumption was that agriculture would need more use of inputs and energy in future to feed the growing population which will necessitate finding indicators through research to make progressive agricultural policy decisions on a continuous basis in view of the advancing mechanization matrix.

Scope of the Study:

This probably is the first study of its kind in the State, exceptions being some census like studies on the economic aspects of mechanization of the farm. By and large the policy of the State is to lay the greatest stress on the development of agriculture and allied industries for the economic development of the State and increased farm mechanization.¹³ This study assesses the present situation and analyses the causal conditions for the affected emerging aspects of socio-cultural changes in rural areas.

The study is a problem oriented adaptive piece of research and hence neither emphasises nor embraces abstract theoretical models so as to be of use to future researches, furnish data for comparison with similar studies conducted elsewhere and thus be of help in ~~for~~ the regional rural social system.

Limitations of the Study:

The study purports to have regional applicability

and adopts the comparative method in so far as it studies only the tractor owners (except for attitude part) as per land and nativity Vs. migrant strata at one point of time. The study focuses on the consequences phase of the process of technological change.

The conclusions reached are hypothetical in view of inadequacy of coverage of area for data to substantiate the arguments. Hence the analysis is confined to outlining a tentative framework indicating conditions for and consequences of farm mechanisation.

Durkheim distinguished 3 applications of the method of covariation; one being the analysis of variations within one society at one point of time. The present study dominantly fits in with it and strives to formulate some propositions to be replicated by further empirical research to specify the limiting conditions and the intervening variables regarding the implications of technological changes.

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