CHAPTER IX.

THE CONCLUSIONS AND SUGGESTIONS.

In this final chapter, we propose to discuss the major conclusions of this study, which are mainly based on our survey results. Secondly, on the basis of these conclusions, we have made an attempt to make a few suggestions regarding the programme of rural electrification in Marathwada Region.

PART I

CONCLUSIONS

(A)

1) During the initial period in 1950-51, both the State of Maharashtra and the Marathwada Region were far below the All India averages with respect to energisation of pumpsets as well as in the field of village electrification. But at the end of 1983, the progress made by the State as well as the Marathwada Region has been quite spectacular. In fact, both have surpassed the All-India averages with respect to energisation of pumps and village electrification. In fact, the Marathwada Region, has surpassed even the state average, in 1983, in respect of village electrification programme.
2) **Per Capita Consumption of Electric Energy:**

Per capita consumption of electricity is generally considered as one of the indicators of measuring economic development of a region. As had been concluded earlier, that, the Marathwada Region has achieved 94.5% of village electrification in 1982-83, and has even surpassed the State average, we do not consider this achievement as an indicator of regional progress. Sometimes such indicators prove to be deceptive. In fact, the definition of village electrification as given by the Central Electricity Authority, is as follows: "A village should be classified as electrified if electricity was being used within its revenue area for any purpose, whatsoever". Different States have adopted different definitions of "village electrification". In Maharashtra, the State Government recognised the village as electrified, when an 11 KV transformer is set up and an agricultural connection is given to the village. This definition does not take into account the use of electricity made by the people for various productive as well domestic purposes.

Hence, we feel that indicator of per capita consumption for industry, agriculture and domestic purposes, can only reflect, the true state of affairs.

For example, the per capita consumption of electric energy in Maharashtra in 1981-82, was 238.06 KWh. Out of this, per capita use for industrial sector, was 148.52 KWh (or 62.38%); while the per capita consumption for agriculture was observed to be 30.02 KWH (or 12.62%). The remaining part, 59.52 KWH (or 25%), was used for domestic purposes. Now let us compare these figures with the per capita consumption of
electricity in the Marathwada Region. In 1981-82, the per capita consumption of electric energy in Marathwada Region was 78.0 KWH, which was almost one-third of the State average. This itself indicates a low level of development, secondly, if we compare the per capita consumption of electricity by the industrial sector, it was found that, in Marathwada it was only 21.82 KWH or (27.97% of the total per capita consumption) as against 62.38% consumed by the industrial sector in Maharashtra. This again proves the fact, that the Marathwada Region is far behind the State of Maharashtra with respect to industrial development. Thirdly, if we compare the per capita consumption of electricity by residential and commercial consumers sector, it was found that, in Marathwada it was only 12.29 KWH or (15.75% of total per capita consumption), as against 25% consumed by this sector in Maharashtra.

Low Per Capita Regional Income:

In the preceeding paragraph we have observed that when compared to the State averages, the Marathwada Region has very low per capita consumption of electric energy (even-though the region is said to be 100% electrified), appears to us rather paradoxical. But the reasons are quite obvious. Firstly, the per capita consumption of electricity, in the Marathwada Region is extremely low mainly because, only 2.2% of the total income originates in the industrial sector. Secondly, the per capita level of regional income is also 40% below the State per capita income².

1. State per capita income = Rs. 272.
   Per capita income of Marathwada = Rs. 174

Source: Fact Finding Committee Report, April, 1984, p. 27 and p. 63.
Therefore, the common people cannot afford to spend money on electric energy even for domestic/commercial purposes.

(3) Financial Feasibility of Electric Pump:

(i) Internal Rate of Return:

(i) We have measured the financial feasibility of electric pumpsets as an investment in agricultural sector. For this purpose, we have used the net benefits derived by the mot-users and oil-engine users, as control groups, or as alternative methods of irrigation. We have found that, both, mot users as well as oil-engine users, do not satisfy the test of financial feasibility. In fact, both show a negative rate of IRR, indicating that both the projects are un-remunerative to the cultivators. On the other hand, investments in electric pumps sets give us 48% IRR, which is quite high. This indicates that investment in electric pumps are extremely profitable to the cultivators in Marathwada Region.

Apart from measuring the Internal Rate of Return (IRR) as a method of measuring the financial feasibility of electric pumps/oil engines/motes, we have also made an attempt to measure the impact of these investments by using other alternative methods, like (i) Benefit-Cost ratio and (ii) Net Present Worth (NPW). The results are as follows:

(ii) Benefit-Cost ratio:

We have applied the method of benefit-cost ratio, to measure the financial feasibility of three alternative methods of irrigation. On the basis of our results, we have to conclude that, both investments in motes, as well as in oil-engines, show a Benefit-cost ratio which is less than one (0.23 for
MOT and 0.67 for oil engine). This indicates the fact that, investment in motes and oil-engines are not financially feasible. On the other hand, the Benefit-cost ratio in case of investment in electric pumps, is more than one (1.78) indicating that these investments are quite feasible or profitable.

(iii) Net Present Worth:

Application of the method of net Present Worth, to measure the financial feasibility of the above mentioned 3 types of alternative methods of irrigation, also gave us the same results. The NPW in case of mot users, as well as oil-engine users, was found to be negative, indicating that, both the type of investment are financially not feasible or are extremely un-remunerative. On the other hand, the Net Present Worth of benefits derived by the cultivators, investing in electric pumps, was found to be very high (59470.15).

From these survey results we may conclude that the investment in electric pumps, not only satisfies the test of financial feasibility, but also indicates that, such investments are highly remunerative to the cultivators: (48% IRR).

(4) Net Impact on Agricultural Incomes:

In this study we have made an attempt to measure the net impact of electricity on the levels of agricultural incomes. The net incremental income per pumpset (or cultivator) is considered as the net impact of electricity on farm business incomes. According to our survey data, the net incremental income per pumpset was found to be Rs. 12060.72 when compared to net incomes of mot users, and Rs. 12003.55 when compared to the net incomes of oil-engine users. We feel that, this
net incremental income per pumps sets is quite sizable, indicating a very high impact of rural electrification on agricultural incomes.

(5) **Impact of Rural Electrification on Industrial Sector**

Now let us consider the impact of rural electrification on industrial sector. This study covered 55 sample industrial units using electric power and 7 control industrial units, not using electric power. According to our survey results, it was found that, among the seven type of industries studied by us, the net impact of electrification on flour mills, was highest i.e. 557.49%; following by village work-shops (using electric power) 222.03%. The third position was occupied by electric oil ghanis (i.e. 131.48%), the electric saw mills had an impact of 60.55% on their net incomes.

These figures clearly show that rural electrification has a very high impact on the levels of incomes of rural entrepreneurs.

Apart from these 4 type of industries, we have also studied the net incomes earned by 3 other type of newly started units, viz. ginning and pressing mills, Threshruvand Feeder cutter units and Printing Presses. All these 3 type of units have shown a high rate of return, indicating further investment opportunities in these lines.

It is interesting to note that, out of the total number of 55 sample industrial units using electric power, 35 units (63.64%) were found to be flour mills alone. In fact, in most of the villages the average number of flour mills was found to be five. This resulted into unhealthy competitions between
Employment-Capital Ratio:

Now let us consider the employment-capital ratio for control and sample industries. In our study, we have estimated employment in mandays. That means to create one manday of employment how much capital is required is defined as employment-capital ratio. As regards the control group of industries, the overall employment capital ratio was found to be 1: 10.66. That means to create one manday employment, the traditional mode of production require Rs. 10.66 of capital. Similarly, we have also estimated the employment capital ratio of all the seven sample industries together. It was estimated to be 1: 36.46.

From this discussion we may, conclude that use of electric power in rural industries increases their employment capital ratio. From our survey data discussed above, we may state that use of electric energy increases the employment capital ratio by more than three and half times, then what is required by the traditional mode of production.

Although, the employment capital ratio in case of sample industries using electric power was found to be relatively high, even then the total impact of electricity on the generation of employment opportunities has been quite satisfactory. For example, in case of saw mills(using electric power), impact on employment was found to 100% higher, and in case of work-shops it was 50% higher than the traditional or control industries. Similarly bigger units like ginning and pressing mills or printing presses have positive and large amount of employment impact.
7. **Impact of Electrification on the Degree of Mechanisation and Automation of Rural Industries:**

Another important conclusion of this study relates to the measurement of degree of mechanisation and automation achieved by rural industries in the Marathwada Region, due to introduction of electric energy as motive power. We have estimated the degree of mechanisation and automation in case of selected industries; namely (i) Flour mills (ii) Oil Ghanis (iii) Workshops (In four other cases the control group was not available). Generally, mechanisation and automation leads to higher level of consumption of electric power and it leads to a reduction in the proposition of labour cost to total production cost. But in our study the relative expenditure on electricity was found to be less than that of the expenditure incurred by traditional industrial units using other sources of energy. This happened mainly because the electricity was a cheaper source of energy than the other sources from the point of view of individual enterprises.

On the basis of our survey data we have estimated the following indices of mechanisation and automation. (1) Flour mills using electric power have indicated the lowest degree of mechanisation and automation (i.e. 1.05). (2) Oil Ghanies are also very close to flour mills, (1.06). (3) The highest degree of mechanisation and automation was seen in the case of workshops using electric power (i.e. 1.54). (4) The overall degree of mechanisation and automation for all the three types of industries taken together (using electric power) was estimated to be 1.52.
Therefore, we may conclude from above discussion that, use of electricity in rural industries leads to higher degree of mechanisation and automation.

(8) Contribution of electric energy in the generation of Industrial incomes:

In this study we have made an attempt to measure the correlation between industrial incomes and the consumption of electric energy. Our survey data has indicated that, there is a very close relationship between these two variables, because estimated value of correlation coefficient was found to be 0.92.

Similarly we have also attempted a multiple correlation coefficient as well as regression coefficients. Both have indicated that each of the multiple regression equations as obtained by us (see chapter No. VII) serves as an excellent formula for predicting industrial incomes from given value of other variables, namely fixed capital, value of inputs, value of labour cost and expenditure on electricity.

To measure the contribution of electric energy, to one unit of industrial output, we have used the method of partial correlation analysis. In this method we have eliminated the effect of other variables in the creation of one unit of output. Our results have explained 15% variation in the total output of one unit, or in other words in the total value of one rupee of industrial output the contribution of electricity was found to be 15 paise.
Impact of Rural Electrification on Domestic/Commercial/Social Life:

Let us now discuss the conclusion of this study, regarding, (i) domestic lighting (ii) commercial lighting (iii) street lighting, and (iv) general benefits of rural electrification.

(i) As regards the net benefits obtained by the domestic consumers of the electric energy, our study has reveled that, on an average the domestic consumers have obtained a net benefit of Rs. 356.49 (per annum), due to use of electric bulbs.

(ii) Regarding impact of electrification on commercial enterprises our study has reveled, two measures reasons of their increasing sales (a) these enterprises could attract larger number of rural customers due to electric lighting, (b) they could work for longer hours during night, mainly because of electrification. These two factors have led to increasing sales of their goods. The range of increase in their sales, varied between a minimum of 10% to maximum of 25% of their total sales. This may be considered as net benefit of rural electrification.

(iii) The benefits of street lighting although they are numerous but they are not quantifiable in money terms. We may mention these benefits briefly as follows: (a) due to street lighting the number of thefts in the villages have come down.

(b) convenience of movement in the village during night hours has considerably increased. (c) number of accidents in the village during night hours has declined.
(iv) The benefits of rural electrification according to our study were observed quite immense and varied. Again these benefits also not quantifiable in money terms. We may describe these benefits as follows: (a) Rural electrification has enabled to provide drinking water facility to almost all villages surveyed by us. We considered this facility as a measure of social benefits obtained by the villages (b) rural electrification programme has created numerous recreational facilities for the villages in this region. For example Cinema theater, radio sets, television sets etc. These recreation facilities can be used by the villages to improve their knowledge regarding the methods of cultivation etc. Radio and television programmes have educational value also. This again is an important benefit of rural electrification.

PART-II
SUGGESTIONS

In the light of our findings, we now propose to offer few suggestions, which might prove useful for the policy makers in the Marathwada Region.

1) Assigning highest priority to energisation of pumpsets in the Marathwada Region:

We have already noted in the earlier section of this chapter, that, investment in mot and oil engine are both non-rumnerative as both have indicated negative internal rate of return (IRR) and a benefit-cost ratio less than one. On the other hand, investments in electric pumps has indicated a high IRR (40%) as well as a benefit-cost ratio of 1.78. On the basis of these findings we suggest that, wells fitted with traditional
mots and oil engines should be replaced by electric pumps as early as possible. To do this, the M.S.E.B. should assign top priority to the programme of energisation of wells in the Marathwada Region.

According to the latest available data about 11% of the total wells in Marathwada, are yet to be energised. We feel that if most of the wells, which are today fitted with mot or oil-engine are replaced by electric pumps, the average incomes of the farmers are bound to increase rapidly. This suggestion is based on our survey, which show that, the net benefits flowing from energisation of pumpsets were of the value of Rs. 12000 approximately.

2) **Role of Financial Institutions and Rural Electrification**

Although rural electrification programme is the main responsibility of the M.S.E.B., even then we feel that for the successful implementation of this programme, the co-ordination as well as co-operation between the M.S.E.B. and other financial institutions is extremely necessary. In this connection, the role played by Co-operative Land Development Banks, the National commercial banks, the State Co-operative Banks and Regional Rural Banks is a great significance. All these financial institutions are directly or indirectly connected with the rural electrification programme of the M.S.E.B. For example the Land Development Banks provide long term credit to the cultivators for digging new wells or purchase of oil engine, electricpumps, tractors, etc. The Nationalised commercial banks now a days provide similar type of credit to the cultivators in the region. On the basis of our survey results, we may suggest to these banks to provide joint loans (i.e. for wells
plus electric pumps) to the cultivators, so as to make their investments financially feasible, as well as remunerative. The banks should discourage single loans (for wells only) as well as loans for motor or diesel engines, because these loans prove to be un-remunerative and financially not feasible.

Similarly, to make the productive plans of the cultivators successful, timely support of crop loans is extremely necessary.

(3) **High Consumption of HP per Acre of Irrigated Area**

This study has revealed, another important fact relating to the consumption of horse power per acre of irrigated area by sample cultivators. According to the study made by the Rural Electrification Corporation, the consumption of HP per acre of irrigated land was found to be 0.8 HP. According to our study, the consumption of HP per acre irrigated area was observed to be 1.22 HP, which appears to be quite high. This clearly indicates inefficient performance of the sample cultivators. A closer examination of this problem has revealed three important factors, which are responsible for this inefficient use of these electric pumps. Firstly, there is constraint of land holding itself. In number of villages, surveyed by us, the average land holding found to be very small. Therefore, the cultivators could not irrigate larger area of land, resulting into high consumption of HP per acre of irrigated land.

The second major constraint, according to the sample cultivators is actual availability of water in wells. Due to inadequate water supply, in the wells, they were unable to irrigate larger areas of land, where the land holding was little higher. We feel that, this type of constraint is a
a natural constraint and is beyond the control of individual cultivator. This factor is also responsible for high consumption of HP per acre irrigated area. Thirdly, interruption in the supply of electric power to the pumpsets has also resulted in a high consumption of HP per acre of irrigated area. Many cultivators have complain about the intermittent interruption in the supply of electric power. We feel that, this deficiency can be rectified by officials of the M.S.E.B. If the supply of the power made by the M.S.E.B. is smooth, regular and efficient, we feel that this may partly improve the consumption of HP per acre of irrigated area.

4) Rural Industrialisation:

In a modern economy, electricity as an input played a crucial role. It transforms a traditional backward economy into a modern one. In this connection, the M.S.E.B. has to play an important role. Our survey results have clearly indicated that, if the traditional mode of production is replaced by the modern electric power using method, its impact is extremely benefited to the entreprenuers as well as to the society as a whole. As has been stated earlier, the impact of electrification of rural industries is not only input raising but it is also employment generation.

In this connection, the co-operation and co-ordination between M.S.E.B. on the one hand and other financial institutions and governent department is extremely necessary. Our survey data has shown that, with the introduction of electricity, the industrial units need highest amount of fixed capital. This requirement of entreprenuers has to be met by various financial insititutions like Regional Rural Banks, Nationalised commercial banks, etc. Similarly, the industries department
of Government of Maharashtra should identify various locations in the region for setting up different types of rural industries.

While locating such small scale industries in rural areas, it should be seen that, local resources are fully utilised in the process of production. These industries also should meet the requirement of the common people in rural areas. Broad speaking such units should be agro-based industrial units, using local resources. For example, ginning and pressing, fodder cutter units, saw mills, oil mills, Dal mills, soap factories, Ice-cream factory, Dairy plants etc.

We feel that, rapid industrialisation of rural Maharashtra through the use of electricity can reduce the severe unemployment, which is prevailing to-day in the rural sector. We feel that this is an important social benefit of rural electrification.

5) **Administrative Difficulties of Cultivators:**

In the course of our survey, we have come across, numerous administrative difficulties faced by the sample cultivators of this study.

(a) **Irregular Voltage:**

Many cultivators have complained about the fluctuations in the voltage of electric power supplied by M.S.E.B. This kind of irregular voltage has caused the damage to the electric motors (motors have burnt). The cultivators had to spend Rs. 400 to Rs. 800 for the repairs of their electric motors. This is an extra burden on their economy. Therefore, we suggest that, the M.S.E.B. should make an effort as per as to reduce such wide fluctuations in voltage.
(b) Another important complaint of these cultivators pertains to the problem of meter reading and preparation of electric bills. They have stated that the officials of M.S.E.B. prepare the bills without actual verification of meters, and many times excess bills are prepared for these cultivators. To rectify such bills the cultivators have to unnecessary spend time and money. It was observed that in many cases, the M.S.E.B. has disconnected their power lines, merely because of non-payments of such excess bills. In fact, this has caused damage to their crops, resulting in low output and income. These are all administrative deficiencies and hence should be rectified by M.S.E.B.

(6) We have observed that in the villages Harangul, the facility of street light was available, but it was not in operation since last five years, due to the weak financial position of gram panchayat. Due to non-payment of bills by the Gram Panchayat, M.S.E.B. has disconnected the power to the street lights. Under special circumstances Zilla parishad/Panchyat Samity of concerned area should finance such Gram Panchayat to tide over such difficult financial position only for temporary period.

We feel that, the findings of this study will prove useful for the policymakers to frame their programmes for the economic development of the Marathwada region in particular and similar other regions in the country in general.