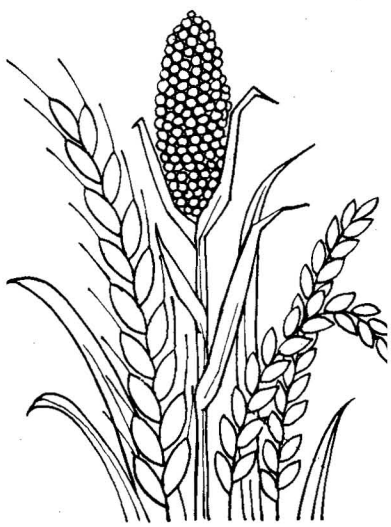
Vol XXIV
No. 4

ISSN 0019-5014

CONFERENCE
NUMBER

OCTOBER-
DECEMBER
1969

INDIAN JOURNAL OF AGRICULTURAL ECONOMICS



INDIAN SOCIETY OF
AGRICULTURAL ECONOMICS,
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ECONOMICS OF RURAL ELECTRIFICATION IN BIHAR

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SUMMARY

Till 1967-68, no uniform concept of rural area was followed even by the various Directorates of the C.W.P.C. No doubt, the standard prescribed in the 1961 Census has settled the difficulties arising out of conceptual variations once for all, but with the change in the size of rural area because of urbanisation, this concept of rural area does not help in reviewing the progress between inter-censal years. It is observed that till the middle of the Third Plan, no uniform concept of rural electrification was adopted by the States. The uniform concept is not being strictly followed even today. It is high time that the standard concept of rural electrification, already spelt out by the C.W.P.C., is strictly adhered to by all the States.

The analysis of variation in the cost of village electrification ranging from Rs. 30,000 in Bihar to Rs. 1,97,500 in Assam, reveals that such variation, which vitiates inter-State comparison of cost, is mainly due to the adoption of different practices in including the cost components for rural electrification. It is, therefore, essential that such discrepancy is removed sooner the better. Till 1963-64, more stress was given on the electrification of village in order to add comforts to the rural population. For attaining higher agricultural productivity, the emphasis was, however, changed in 1964-65 to energization of irrigation pump set. It is in this context the problem of rural electrification has really assumed urgency today.

The overall reduction in operational cost in extending supply to irrigation pump sets can be achieved by improving the combined load factor of a sizable group of consumers in the area. This can be attained by improving the inter-group diversity and also by rostering the load within the group. But before going for diversification of irrigation load, its feasibility may be judged, and preferential tariff for resuming supply in odd hours be introduced. Besides, the diversity of irrigation load can also be attained by removing the consciousness barrier of the people for working in night instead of day, by planned and systematic staggering of crop plantation and by encouraging community installation of irrigation pump sets. The preference of the farmer for electricity over diesel or manual power will be obvious so long as the cost of irrigation by electricity is cheaper. Even the cost being less, the input-output coefficient may be imbalanced, and if it is because of irrigation input, the price of electricity will be uneconomical. Thus, the economic price of electricity for the farmers can be fixed on or below the level Pc where input-output ratio in agriculture computed after allowing variation in irrigation input and injecting other inputs to an optimum level, remains less than one. The remunerative price for suppliers should be fixed at Ps after considering interest, depreciation and general reserve on capital invested, operation and maintenance charges, cost of energy at distribution point and reasonable return.

RURAL ELECTRIFICATION IN CHANGING INDIAN AGRICULTURE

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SUMMARY

Farm electrification is a means of change over in agricultural pursuit. So rural electrification assumes a greater importance in making the existing Green Revolution a success. The impact of availability of rural electricity is felt very much on agricultural operations. Because of its cheapness and the effect of it on the irrigated area and its effect on enhancing the farm output, it gets a greater demand from agriculturists. Many surveys reveal that the cheapness and profitability of electrically operated irrigation pump sets are inducing the farmers to take the full advantages of it. Accordingly, the demand for these purposes in rural areas is increasing, and the electricity consumed

for agricultural purposes also shows an increasing trend. In addition, there are possibilities of emergence of agro-industries in rural areas following rural electrification. All these aspects show that the load factor in rural areas for extension of electricity would increase. But the financial position of State Electricity Boards is not permitting the extension of transmission lines in rural areas, as electricity industry is a capital intensive one. So some device should be followed to make it profitable to extend these lines. Lastly, the financial position of small farmers is also not conducive to get their farms electrified, even if electricity is supplied to rural areas, because the fixed cost of having pump set is very high. So the need arises to help these farmers for the electrification of their farms. Here banks and other financial agencies can take the opportunity to help them.

RURAL ELECTRIFICATION—A COST ANALYSIS

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SUMMARY

The study relates to the cost associated with the transmission and distribution of electric power to rural areas for agricultural purposes. On the basis of the findings, suggestions have been made to reduce these costs. Cost functions have been derived both for high and low tension lines. These costs largely depend on the voltage, distance from the main line to the consumption point, number of consumers and their demand for electrical energy, supervision, material, breakdowns and repairs, thefts, wastage, etc. Once a decision has been taken to supply the power to a consumption point, some initial investment has to be made irrespective of the quantum of energy demanded. It is suggested that the whole programme of power development and use should be executed in three phases: (1) The first or the *Initial phase* is the one when the people have to be given a taste of the comforts and uses of electricity. Heavily subsidized (or even free up to certain number of kilowatt hours) supply of power should be provided and agricultural operations integrated with electrical power. (2) The second phase of *Felt-need phase* of the power development would be the one when the common man has started using this facility for agricultural as well as domestic purposes and realized its place in his daily life. The energy consumed for domestic and other purposes would be enough to cover its cost and the State would break-even. (3) In the third phase or the *Utilization phase* of power development, electricity would become an integral part of the life of the rural population. The rates for domestic consumption could be enhanced. The subsidy for agricultural purposes could also be reduced to increase the revenue. In fact, it is more than likely that improvement in the agricultural technology and the standard of living of the farmer would push up the demand for and, therefore, revenue from electrical energy. This may enable the State to have more staff and reduce the losses due to breakdowns and thefts. Moreover, with the introduction of more efficient methods of production and transmission of power, the production, transmission and distribution costs would decrease and, therefore, even without enhancing the rates, the State could earn huge profits.

HOW TO ENHANCE REVENUE RETURNS TO THE ELECTRICITY BOARD FROM AGRICULTURAL CONNECTIONS

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SUMMARY

The need for rational allocation, efficient management and optimum utilization of scarce resources like electricity in the State like Gujarat which is deficient in electric power and funds for its distribution network, is self-explanatory. Under such circumstances it is very necessary for the Electricity Board to so administer these inputs as to ensure optimum utilization of installed capacity and to maximize the revenue for further development. The model for revenue returns to the Electri-

city Board from agricultural connections suggests that ultimate determinants of revenue returns is the period for which the pump set can be operated per year (*i.e.*, load factor). An analysis of the factors determining this factor indicates that the yield of well and the consumptive use of lifted water are the major determinants governing the load factor and ultimately the revenue to the Electricity Board. The yield of well can be ensured only when it is tested properly. In the absence of any finer method of testing the well for its yield, an indirect method can be adopted before electrification of the well. The wells on which dieselised pumps worked successfully can be considered "proven wells" for electrified pumps of similar performance. The wells in which no power operated pump was operated prior to electrification can be considered as "untested well." Based on these assumptions the following hypothesis was advanced:

"The electrification of proven wells will yield more revenue to the Electricity Board than that of untested wells."

The hypothesis was tested by collecting field data from 113 sample farmers in eight villages electrified by the Gujarat Electricity Board (GEB). It was observed that out of 113 electrified wells, 80 were 'proven wells' and 33 were 'untested wells.' The data on electricity bills paid by the sample connection holders for particular periods were obtained from GEB records. The revenue returns per HP connected were calculated for two periods, *viz.*, (*a*) during the first 12 months after electrification (this period was not uniform for all the consumers) and (*b*) during identical period of 12 months (from November, 1967 to October, 1968). During the first period, on an average, the electrified pumps installed on proven wells yielded about Rs. 91/HP/year more revenue to the GEB than those on untested wells. The corresponding figure for the identical period was about Rs. 74/HP/year. To test the degree of association between the two attributes, *viz.*, revenue and type of well, chi-square (X^2) test was applied which indicated that the association was significant and the variations were not to due chance. Thus, the hypothesis of higher revenue (per HP per year) from the proven wells was found valid. This finding is very significant from the GEB's point of view for its policy of granting agricultural connections. To maximize the revenue per kW of connected load, the GEB should encourage electrification of proven wells and induce indirectly the farmers to test their wells before they get electricity for their wells. This can be achieved by increasing the minimum charges from Rs. 35 to Rs. 80 per HP per year and by offering slab rate system—lower rate for higher slab of consumption. This will not only ensure fuller utilization of pumps and yield higher revenue to GEB but at the same time it would achieve the other objectives of broad-based distribution of electricity, reduction of theft of electricity and ultimately raising the agricultural production.

A CASE STUDY OF THE ECONOMICS OF RURAL ELECTRIFICATION

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SUMMARY

The study is based on the data obtained from 100 cultivators in ten villages, out of which 50 cultivators were selected from five electrified villages in Chandauli tehsil of Varanasi district, Uttar Pradesh. The main objectives of the study were (*i*) to determine the per hectare running cost of irrigation by electric power and diesel power; (*ii*) to assess the changes in the financial aspects of the farms and marketable surplus in the electrified villages as against those in the unelectrified villages. A comparative study of the running costs of electric and diesel pumping sets shows that the per hectare running cost of irrigation by electric motor is 40 to 45 per cent less than that generated by the diesel engine. The impact of electrification on the farm economy indicates that the intensity of cropping and net income per hectare have risen by 17.75 per cent and 98.85 per cent respectively in the electrified villages as against those in the unelectrified villages. The input-output ratio shows that the increase in productivity has resulted in a gain of Re. 0.38 per rupee spent in electrified villages. The investment in fixed capital has also increased to Rs. 2,602.74 per hectare more in electrified villages than that in unelectrified villages. The irrigation development caused by electrification resulted in greater availability of marketable surplus to the consumers. It is 47.71 quintals more with farms under electrified villages in the study area. The regression results suggest that

the marginal productivity for irrigation input is very high in both the categories of villages. So far as fixed cost is concerned, an increase in its units gives greater returns in the electrified villages, while it depresses the yield in the unelectrified villages. The broad generalisation that can be deduced from the investigation is that electrification brings about an interaction between farm and non-farm sectors in the development of farm productivity and expansion of industries related to agricultural production. This leads to the expansion of producer's as well as consumer's market for the balanced development of rural economy.

RURAL ELECTRIFICATION AND AGRICULTURAL DEVELOPMENT IN DEVELOPMENT BLOCK, KALYANPUR, KANPUR

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SUMMARY

Rural electrification, which means the use of electrical power on the farm, holds the key to agricultural development. In this study, in order to examine the impact of electrification on agricultural development, Sachendi V. L. W. Circle of Kalyanpur, Kanpur, was selected. Two villages, *viz.*, Sachendi electrified in the year 1964 and Binour, a neighbouring village having no electricity were selected for comparative study. The study showed that electrification has brought a rapid development in the electrified village in respect of extension of irrigated area, use of fertilizers, high-yielding seed, and cropping pattern and intensity of land use. The percentage of irrigated area to the total cultivated area in the electrified village increased from 42.6 in 1964 to 76.07 in 1969 against 18.87 and 25.39 in the non-electrified village during the same period. The greater increase in the irrigated area in electrified village was due to an increasing number of tube-wells which rose from 4 in 1965 to 93 in 1969. The mean irrigated area of electrified village was found significantly higher than the non-electrified village. The use of chemical fertilizer in terms of nitrogen has increased from 1kg. per hectare in 1964-65 to 23.18 kgs. per hectare in 1968-69. The high-yielding varieties were introduced in the electrified village in 1965-66 while in the non-electrified village these were introduced in 1967-68 and 55.4 quintals of seed of high-yielding varieties were distributed in the electrified village against only 2.36 quintals in the non-electrified village in 1968-69. The total cropped area of the electrified village has steadily been increasing. The cultivators have thus resorted to intensive cultivation in the electrified village which is due to increased supply of water by tube-wells. The mean cropping intensity of the electrified village was significantly higher than that of the non-electrified village and it was 140 per cent and 111.5 per cent during 1968-69 in the electrified and non-electrified villages respectively. The area under the high-yielding varieties in the electrified village has increased from 1.90 hectares to 362 hectares in 1968-69 covering 25.03 per cent of the total cropped area against 4.72 per cent in the non-electrified village.

ECONOMICS OF RURAL ELECTRIFICATION

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SUMMARY

Electricity in rural areas is being used for a variety of purposes. Of the different uses of electricity, its use in lifting available water for irrigation is the prime one. For its employment, electricity has to be taken all over village areas for lifting water to reach it to every well and thus requires huge expenses for laying high and low tension cables over vast areas. By and large, the small cultivators

are unable to take the opportunity of utilizing electricity due to their small, scattered and fragmented holdings. In the Sangli area of Maharashtra State, huge network of lift irrigation schemes has been installed by the co-operatives organized under the patronage of the co-operative sugar industry. This enabled in pooling up of individual cultivator's resources together and enabled them to achieve all the benefits of the rural electrification collectively. The impact of this activity has brought about complete economic development in the area. This marked economic change has prompted us to undertake a study of the impact of rural electrification through lift irrigation in Sangli area. The use of electricity substantially increased the area under irrigation which eventually brought more acreage under the sugarcane crop. As a result, adequate supply of cane of good quality is ensured to the sugar industry. Besides, the area under other irrigated crops like paddy, wheat and high-yielding varieties of foodgrains was also found to have increased considerably. It brought about significant change in the cropping pattern, intensive cultivation and adoption of technical know-how. The sugar industry has organized special machinery to render advisory service to the cultivators. Due to definite assured income to the cultivators the sugar industry has been supplying inputs like fertilizers, provided credit for meeting crop expenses and for purchasing machinery for farm mechanization. Fifty-eight lift irrigation schemes thus installed have brought about nearly 22,500 acres of additional area under irrigation. It enabled better utilization of labour and created new employment opportunities. There was considerable increase in the input costs due to irrigation, application of increased quantities of manures and fertilizers and capital investment. Gross and net income showed very significant increase. With the electric power, the lift irrigation schemes facilitated the cultivators to grow sugarcane on a large area and necessitated expansion of sugar industry from its daily capacity of 1,000 tons per day to 3,500 tons. Irrigation schemes have thus transformed subsistence farming into highly commercial one. With increase in the use of capital investment in commercial farming higher farm incomes were gained by the cultivators. The outlook of the cultivators became progressive towards farm business and their ways of life—bringing about improvement in their socio-economic conditions. This significant impact on the rural economy was mainly due to the provision of electric power and a competent and able leadership in the co-operative field which organized the lift irrigation schemes. This achievement has given an inspiration for the development of agriculture in general and rapid rate of economic growth in the region in particular.

RURAL ELECTRIFICATION AND THE DEVELOPMENT OF PRIVATE MINOR IRRIGATION—AN ANALYSIS OF COSTS OF IRRIGATION BY ELECTRIC AND DIESEL TUBE-WELLS IN NORTH-WESTERN U.P.

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SUMMARY

There has been a rapid development of private owned means of irrigation particularly electric and diesel tube-well in the last two to three years in north-western Uttar Pradesh. The farmers prefer electric tube-wells and would instal a diesel tube-well only when electric connections are not available. It is hypothesized that the fixed and variable costs of irrigation water for electric tube-wells are significantly lower than that for diesel tube-wells. A study was undertaken in north-western Uttar Pradesh where a purposive sample of 16 farmers, 8 in each type with a 5 HP electric or diesel tube-well was selected. An analysis of their costs shows that even with under-utilization, the costs of an acre-inch of water for electric tube-well are 48 per cent less than that for a diesel tube-well. A synthetic model of crop land for irrigation norms for an average operated holding of 15 acres was worked out and it showed that the costs per acre-inch for an electric tube-well are about 33 per cent of that of a diesel tube-well. If full utilization of electric tube-well is made, the cost may be only 25 per cent. It is concluded that the development of electricity would help to a large extent in the development of private minor irrigation.

ECONOMIC BENEFITS OF RURAL ELECTRIFICATION TO BANANA GROWERS

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SUMMARY

The main purpose of supply of electric power to the rural areas has been to encourage its use in agricultural production and to open up possibilities of development of agro-based industries in rural areas. Banana crop utilizes irrigation resources heavily. In all, about 60 to 70 irrigations are required to be given to the crop. Irrigation is a major item of cost to the banana growers. Electrical power as compared to mechanical power is considered to be economical. If use of electric pumps in the place of oil engine pumps could effect substantial reduction in the cost of production, the project of rural electrification can be said to have imparted direct economic benefits to the cultivating class residing in the rural areas. The purpose of the study is to evaluate the extent of economic benefits accrued to the banana growers by use of electric pumps in place of oil engine pumps for irrigating banana crop. The study has been based on a sample of 27 growers using electric pumps and 27 using oil engine pumps from six villages situated in Raver taluka where banana area is concentrated. The study in the first instance reveals that per acre maintenance and running charges for electric pumps work out to Rs. 285.83 while those for oil engine pumps work out to Rs. 929.22, *i.e.*, 225 per cent higher. Thus there is a reduction in per acre expenditure of Rs. 643 on banana production with the use of electric pumps. Secondly, the increase in the expenses on hired labour in the case of oil engine users which is about 28 per cent over users of electric pumps has been mainly on account of the requirement of extra labour to assure constant attendance in the case of working of oil engines. Thirdly, as a result of the use of electric pumps, there is a significant saving in family labour which can very well be diverted to other operations. The growers using electric pumps almost wholly manage irrigation operation with the help of family labour, hired labour constituting only about 25 per cent of the utilization ; while in the case of growers using oil engines for pumps family labour employment is not only 30 per cent more for irrigation operation but also it has to be supplemented equally by hired labour. The increased requirement of hired labour for irrigation by oil engine users is more than 200 per cent over those utilized by electric pump users.

The per acre yield of banana is observed to be the same in both the cases, *i.e.*, 209 quintals per acre, with almost the same gross income received by banana growers (Rs. 4,874.59 in the case of growers using electric pumps and Rs. 4,866.41 in the case of those using oil engines). With substantial reduction in the per acre cost of production (Rs. 2,343.83 in the case of electric pump users and Rs. 3,080.35 in the case of oil engine pump users), there are increased net earnings to the extent of Rs. 744.70 per acre to the electric pump users. The input-output relationship works out to 2.1 in the case of electric pump users and 1.6 in the case of oil engine pump users. Thus there is a net extra gain of Re. 0.5 for every rupee invested by banana growers who use electric power for lifting water over those using oil engine pumps. It may, therefore, be concluded that the programme of rural electrification has enabled the banana growers to install electrically operated pumps for irrigation in place of oil engines and that this substitution of mechanical power by electrical one has caused substantial reduction in the cost and consequently added about Rs. 745 per acre to the profits received by the growers.

ECONOMICS OF RURAL ELECTRIFICATION

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SUMMARY

The prosperity of a predominantly agricultural country like India depends upon the maximum utilization of potential resources by using modern scientific technique and know-how which is the surest way of increasing agricultural and industrial production. This will raise the standard of living of the rural masses whose main way of life is farming which requires cheap electricity. Electricity in rural areas for lift irrigation from wells, *nalas*, *bandharas*, tanks, rivers, etc., serves the greatest need for successful farming. Small scale the cottage agro-industries can be very well established with a view to improving the rural economy, which will ultimately promote agrarian improvements. Thus there are multiple activities for the use of electricity even though there are difficulties in the way of rural electrification. Surveys so far conducted for assessing and evaluating the economic benefits from electrification indicate changes in income, reduction in cost as compared with other modes of production. Rural India exist in the scattered villages, prosperity of which depends upon industrialization for which cheap electricity is badly needed.

THE ECONOMICS OF ELECTRIC PUMP SETS AND OTHER MEANS OF LIFTING WATER FROM WELLS

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SUMMARY

The objectives of this paper are to study the economics of different types of lifting water from wells for irrigation and to examine the problem of acquisition, operation and maintenance of these machineries. A sample of farmers selected randomly using mainly *mohte*, oil engines and electric pump sets was taken in a village near Visakhapatnam. The data relate to the agricultural year 1968-69. It has been found that modern means of irrigation like oil engines and electric pump sets are more efficient than the traditional *mohte*. Not only these irrigate a larger area per well but also the ratio of gross values of output to irrigation costs is substantially higher for these two types as high value crops like sugarcane and vegetables can be grown and the intensity of cropping can also be increased under this type of irrigation. The switching on to these modern methods by farmers is not difficult as credit is made freely available to modernize agriculture. Operational and maintenance problems are found in respect of oil engines and pump sets as most of the farmers do not have sufficient knowledge and experience of working with these modern machineries and lack of proper servicing facilities in the countryside.

ECONOMICS OF RURAL ELECTRIFICATION WITH SPECIAL REFERENCE TO IRRIGATION

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SUMMARY

Irrigation is the most important single consumptive use of rural electric power supply in India. As compared to the bullock operated devices like *mohte* and *Rahat*, an electric pump set is more efficient in terms of (*a*) the time taken to lift an acre-inch of water and, (*b*) the depth of water table

at which it can operate. The study was conducted to seek an answer to the following questions : (*a*) Is electrical power more economical than the bullock power (used in *mohte* and *Rahat*) for lifting water, and (*b*) what is the effect of electrification of irrigation on the human labour utilization? Linear cost functions for cost of irrigating a crop by different modes of lifting water were fitted. The costs were treated as functions of the area irrigated. The study reveals that (*i*) electric pumps are more economical and efficient mode of lifting water as compared to *mohte* and *Rahat*, and (*ii*) the use of electric pumps, for irrigation, in place of *mohte* or *Rahat*, does not necessarily result in lesser employment of human labour. Our findings reveal that the use of human labour for all crop operations, other than irrigation, is more in the case of farmers using electric pumps than those using *mohte* or *Rahat*.

IMPACT OF RURAL ELECTRIFICATION ON AGRICULTURAL DEVELOPMENT IN JAIPUR DISTRICT, RAJASTHAN

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SUMMARY

India is passing through a Green Revolution. The recent break-through in Indian agriculture has created input consciousness among an increasing proportion of our farmers. There is evidence of an increasing tendency among the farmers to borrow the funds even at a much higher rate from the rural moneylenders for the purchase of inputs like fertilizers, seeds and to invest large sums for tractors, electric pump sets, etc. It is primarily due to favourable cost-benefit ratio of these inputs in farming. Additional and timely irrigation is the essential pre-condition for the use of high-yielding varieties and fertilizers in most of the regions of the country. For the assured and timely irrigation of the crops, availability of electricity is a very important factor. Electric power plays a vital role in the development of the rural sector. The present study was undertaken to examine the impact of rural electrification on the agricultural development in Jobner *Panchayat Samiti* of Jaipur district of Rajasthan. The main objectives of the study were to assess the impact of rural electrification and to compare the cost of irrigation per acre by different sources of power. The progress of rural electrification indicates that since the introduction of rural electricity in this *Panchayat Samiti* in 1964-65, 23 villages, *i.e.*, 18.17 per cent of the total villages in this *Panchayat Samiti* have been covered up to 1968-69. The number of electric pump sets energized also increased sharply and its progress will increase further as the many prospective users are awaiting their turn for connection on their wells. In addition to the utilization of electric power in pumping sets, few farmers have also utilized it for the chaffing of fodder, saw mills and flour mills. The study further reveals that about 73.33 per cent of the electric pump set owners in the village had holdings more than 10 acres and 26.67 per cent had holdings between 5—10 acres.

The cost of irrigation per acre for wheat crop on an average depth in this locality was worked out by *charsa*, persian wheel, pumping set diesel and electric motor. It was found that the cost of irrigation by electric motor was Rs. 8.44 per acre which is about one-sixth of *charsa*, one-fifth of persian wheel and half of the diesel oil engines. The high cost of irrigation by *charsa* and persian wheel is primarily due to the high cost of manual and bullock labour used in lifting water. During the course of this study, it was found that the medium class farmers having electric motors on their farms sold water to other farmers. The normal rate for custom hire is Rs. 20 to 25 per acre per irrigation or one-fourth of the produce of the crop irrigated. In addition to reducing the cost of irrigation per unit of land and possibilities of additional incomes by custom hire, rural electrification has provided many other benefits to the farmers in particular and the rural population in general. It has resulted in the reduction of the requirements of human and bullock labour thus utilizing them for rural transportation and getting extra incomes. It has also increased the intensity of irrigation of the existing crops. The introduction of electric pumping sets has also induced the farmers to increase the area under *rabi* crops by 25—30 per cent during the last five years. The acreage under hybrid bajra, fodder crops and cash crops like *jeera*, chillies, onions and garlic, etc., has also increased. Rural electrification has also provided many other indirect and intangible benefits to the people of the locality. The village life has become more attractive and secured by street lighting. Recreation and cultural activities have increased and qualified doctors, a few teachers and enterprising small businessmen have been induced to come to the village.

BENEFIT-COST EVALUATION OF A POWER-DRIVEN DEEP TUBE-WELL PROJECT—A CASE STUDY OF BHALUKA MOUZA (24 PARGANAS), WEST BENGAL

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SUMMARY

This paper stresses the need for benefit-cost evaluation before the execution of any investment programme. Benefit-cost analysis can be applied with equal rigour in the case of rural electrification scheme. A sound policy requires that a scheme of rural electrification should not be restricted to serve merely the purpose of illuminating the rural areas, it should also be designed in such a way as to contribute to the process of accelerating agricutural production. Electricity can serve as a source of power supply to alternative means of irrigation. Besides electricity, there are also other devices by which a particular irrigation plant can be operated. It is, therefore, essential to make inter-project as well as inter-device comparisons before launching any programme of rural electrification on a wider scale. This paper also includes a case study. An attempt has been made to find out the benefit-cost ratio of an electricity-driven deep tube-well project located at Bhaluka (24 Parganas district), West Bengal. A comparison has been made between the estimated benefit-cost ratio of the particular project and the necessary minimum ratio prescribed by the Nijalingappa Committee. It has been found that the estimated ratio is well above the prescribed minimum. This proves the worthwhileness of the particular project. Emergence of irrigation facility in the locality after the installation of the tube-well has been followed by significant changes in the cropping pattern, cropping intensity, input use, etc. In conclusion, several suggestions have been made keeping in view the objective of extracting the maximum possible out of the changed situation.

FINANCING OF RURAL ELECTRIFICATION PROGRAMME IN POONA DISTRICT

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SUMMARY

Rural electrification is considered one of the most effective steps for transforming the rural economy from the 'primitive' to the 'modern.' It is important not only because it gives them more light in their houses but also it widens their economic horizon. It will promote rural industrialization and help modernization of agricultural operations. Professor Lewis says introduction of electric light in rural houses would also help reducing birth rate among the rural population. Rural electrification is a costly venture. It involves investment of a huge capital for generation of electricity and further investment of funds at the rural household level. It is said that a farmer is able to increase his output three fold by making use of electricity in his agricultural operations such as electric motor for irrigating his land. This calls for institutional agencies advancing necessary amount of funds to the farmers for installing electricity in his farm business, processing of agricultural products and demostic uses.

Presently the Maharashtra State Electricity Board is charging each farmer a sum of Rs. 3,000 as deposit for giving him electric connection. The farmers have to get this money from some source

to get the benefit of electricity. Presently rural electrification programmes are financed directly by the Government or the Agricultural Refinance Corporation (ARC) or the Land Development Banks, The experience of Government financing and extension of rural electrification schemes in Poona district has not been happy. The Maharashtra Government prepared a scheme for lift irrigation covering 282 schemes in 1965-66 but 92 of them are still incomplete. Some of the schemes are held up because of inadequate finance, some because of lack of proper technical guidance and supervision, etc. As in other areas of agricultural finance, direct financing by Government is not considered suitable for this purpose. Wherever co-operative institutions are developed they have promoted rural electrification programme quite successfully as in Sangli district. So far primary land mortgage banks have financed 1,061 lift irrigation schemes in Poona district as against 2,257 schemes financed by the co-operatives in Sangli district. The main factor for greater success of the co-operative lift irrigation schemes in Sangli is said to be the organizational efficiency and leadership of the co-operative movement in that district.

Rural electrification programme must fit into the strategy for rural development. It is pretty costly to take electricity to the farms and fields in rural areas. So that scarce capital resources are most fruitfully utilized every care must be taken to plan and execute the programme efficiently. It is not enough for financing agencies to provide merely finance but also guide the farmer in its operation and uses. The co-operative institutions, the ARC and the Government have to maintain a technical cell in their organization to give technical guidance to the farmer. On the basis of a study of the rural electrification programme in Poona district, the following suggestions are made for more effective implementation of the programme : (1) Liberal subsidization policy by the Government as in Belgium, France, Italy, Switzerland and Canada. (2) A central organization for strengthening State Electric authorities. (3) The financing agencies should directly finance the State Electricity Boards instead of each farmer depositing Rs. 3,000 as deposit for obtaining electric connection. (4) There must be a plan for rural electrification rather than *ad hoc* schemes. (5) Financing agencies must conduct feasibility studies before financing the scheme. (6) Financing agencies may provide not only finance but also leadership. (7) Processing units like sugar factories could also lend their hands in augmenting rural electrification programme. (8) The State Bank of India, nationalised commercial banks and other commercial banks could also promote rural electrification. (9) It should also be treated as an educational device for modernization of the rural economy.

SOME BOTTLENECKS IN RURAL ELECTRIFICATION

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SUMMARY

The recent technological developments in the field of Indian agriculture have brought in their traina variety of problems which need to be looked into on the eve of the Fourth Five-Year Plan. A Rural Electrification Corporation is proposed to be set up with an outlay of Rs. 150 crores and a target of energizing five lakh wells. It is further proposed to energize 12.5 lakh dug wells and 3 lakh tube-wells during the Fourth Plan period. This paper examines the several bottlenecks that exist and are likely to multiply unless taken care of as a result of these targets. The first problem is regarding the mobilization of loan applications for digging and energization of wells. The reluctance to avail of institutional credit facilities arises from a variety of time and energy consuming hurdles in the preparation of a loan application. The application form in Madhya Pradesh runs into about 50 foolscap pages. The formalities include the obtaining of land records, sale deeds, no dues certificates from revenue and co-operatives, record of rights, etc. The valuation of land is depreciated to save stamp duty but this also reduces the borrowing capacity of the farmer. The procedure for fixing standard multiples (value of land) is also circumbendibus, one agency coolly awaits for another to take the initiative in the matter. Though wells may be dug their energization does not follow primarily bcecause of several types of deposits and guarantees required by the Electricity Boards. The farmer does not always have ready money and time to complete these formalities. Policy is not also always clear as to who should pay these amounts, *i.e.*, the borrower or the Electricity Board. The short supply of drilling equipment including direct and reverse rotaries is another major problem. The Government of Madhya Pradesh has only four rigs and has availed of the services of contractors and voluntary agencies. Together the equipment is quite inadequate to achieve the programme of Rs. 9.29 crores. Sometimes there are difficulties

even in obtaining Indian made components. Delays also occur in the disbursement of sanctioned loan amounts to borrowers. Thus the digging operations may be in an advanced stage but subsequent instalments are delayed. Hence the work already done may become infructuous due to rains. Even though elaborate water table contour maps and hydro-geological tables are prepared these are net always followed in locating sites for wells. The village priest or pandit is the consultant in this matter and geological rationale are glossed over by the cultivator. The required spacing between wells to prevent mutual interference is also not adhered to because of the lack of departmental supervision. The problem of the small farmer is serious because he cannot avail of the facilities due to lack of borrowing capacity, *i.e.*, he does not have the required extent of mortgageable land which can provide the security for loans. The Draft Fourth Plan recommends the setting up of a small farmer development agency to provide comprehensive ameliorative measures with a provision of Rs. 30 crores. However, the problems of farmers are to be identified by the agency. We suggest that a number of small farmers in a contiguous area should be allowed to provide joint mortgage, if they cannot individually have the necessary mortgageable land. The agency or other organizations could commission their own energized wells and sell the water to small farmers. This could be a sound way of helping the small farmer to improve his production and income. It is also suggested that one single agency should be set up to meet the full range of economic problems of the small farmer so that the problems of co-ordination in which our deficiencies are many, do not arise. Finally, the programmes for rural electrification should be an action-oriented programme for planners and administrators.