CHAPTER III

3. Impact of Electrification on Cropping Pattern, Production and Productivity

3.1. Introduction

Rural electrification is one of the most basic factors for transformation of rural life and agricultural production. The overall expenditure of farmers can be controlled by bringing electricity to the villages for domestic purposes and for pumping water from wells. Rural electrification has helped in modernizing the rural and agricultural sector of the economy. Rural electrification is a positive input in agricultural development. It is helpful in the growth of irrigation facilities and increases the area under irrigation and also helpful in several other farm activities such as threshing, drill machine, cutter, etc.

On the eve of the First Plan, agriculture was in a hopeless and deplorable condition. Our farmers were in heavy debt and most of them were dependent on village moneylenders. They were having small and scattered holding. They had neither money nor the knowledge to use proper equipment, seeds and chemical manures. Productivity of land as well as labour had been declining and was generally the lowest in the world. To bring about increase in agricultural production and also increase in employment, the Five Year Plans were drafted considering the various programmes and agricultural extension services throughout the country, expansion of irrigation facilities, fertilizers, pesticides, agricultural machinery, high-yielding varieties of seeds, expansion of transportation, power, marketing and institutional credit. With the adoption of new agriculture strategy in 1965-66, the traditional method of agricultural production was replaced by modern package of inputs in India.

After the adoption of new technology there was an increase in per hector productivity of agricultural production. The overall production has increased and this has helped in increasing income levels of the farmers. Adoption of modern techniques has changed the cropping pattern in Erode district. The subsistence farming was replaced by commercial farming. The productivity of the farms has increased considerably. In this chapter impact of electrification has been studied by using the following different criteria;

1. Ownership of electric pump sets.
2. Change in irrigated and non-irrigated area.
3. Change in the number of farmers cultivating food and non-food crops.

4. Change in area under food and non-food crops.
5. Production and productivity of crops.

3.2. Ownership of Electric Pump Sets

Government of Tamil Nadu has provided 18,21,432 energized agricultural pump sets for the state on 31st March 2014. For Erode district, 1,116 energized agricultural pump sets were available. A comparison with the western Tamil Nadu shows that Erode district is lagging behind in terms of energized agricultural pump sets. All statistical information about energized agricultural pump sets has been collected from Erode district profile. As mentioned earlier the sample of 120 farmers was selected for the purpose of this study to see the impact of rural electrification on agricultural development. For that, farmers having electric pump sets were only selected. Generally, the large farmers have posses of 10HP electric pump sets and marginal and small farmers have posses of 5HP electric pump sets. Out of the total sample farmers, 13 farmers have posses community electric pump sets i.e., 10.83% and remaining 107 farmers have posses own electric pump sets i.e., 89.17%. In this section the village wise possession of electric pump sets along with possession of electric pump sets by selected farmers have been examined. The village wise possession of electric pump sets of all sample farmers of Erode district is presented in the following Table 3.1.

Table 3.1: Village Wise Number of Farmers Owned Electric Pump Sets

Village	**Own Possession**	**Community Possession**	**Total**
Mylambadi	13(81.25)	03(18.75)	16(100)
Thottipalayam	11(91.67)	01(08.33)	12(100)
Gettisamudram	26(81.25)	06(18.75)	32(100)
Sankarapalayam	16(88.89)	02(11.11)	18(100)
Savandappur	21(95.45)	01(04.55)	22(100)
Vellalapalayam	20(100)	00(00.00)	20(100)
Total	107(89.17)	13(10.83)	120(100)

Note: 1. Figures in brackets show the percentage of sample farmers they possessed electric pump sets.

2. Figures outside brackets show total number of sample farmers they possessed electric pump sets.

From the above Table 3.1 it can be seen that, in villages of Erode district, farmers from Mylambadi, Thottipalayam, Gettisamudram, Sankarapalayam and Savandappur have their own electric pump sets and also community pump sets. In Vellalapalayam, all farmers possess own

electric pump sets. The source of water for the farmers of this village is, therefore, common. Some farmers in this village are having their pump sets. In certain cases, it has been observed that farmers are using community pump sets as well as of their own. In modern times, the use of electricity for irrigation has been increasing substantially.

3.3. Number of Electric Pump Sets Possessed by Farmers

From the above Table 3.1 it can be also seen that the number of farmers are the highest they possessed own pumps whereas number of farmers are lower they possessed community pumps i.e., 89.17% and 10.83% respectively. Village wise possession of electric pump sets according to horse power of sample farmers in Erode district has been explained. The information regarding village wise possession of own pumps by farmers is presented in the following Table 3.2.

Table 3.2: Village Wise Number of Electric Pump Sets Possessed by Farmers

Village	**5 HP Pumps**	**10 HP Pumps**	**Total Pumps**	**Average Possession of Pumps**
Mylambadi	12(85.71)	02(14.29)	14(100)	1.08
Thottipalayam	11(91.67)	01(08.33)	12(100)	1.09
Gettisamudram	26(70.27)	11(29.73)	37(100)	1.42
Sankarapalayam	18(81.82)	04(18.18)	22(100)	1.38
Savandappur	23(88.46)	03(11.54)	26(100)	1.24
Vellalapalayam	19(79.17)	05(20.83)	24(100)	1.02
Total	109(80.74)	26(19.26)	135(100)	1.26

Note: 1. Figures in brackets show the percentage of the total pump sets.

2. Figures outside brackets show total number of electric pump sets.

3. All farmers possessed own pump sets.

Community electric pumps are not considered for the analysis of the study, only those pump sets considered, farmers possessed own. In the village Gettisamudram, total sample farmers are 26, and they have 37 electric pump sets. The average possession of pump sets of these farmers is 1.42 per head. It is the highest as compared to the sample farmers of other villages. In the village Gettisamudram, large number of farmers are cultivating food and non-food crops and it is permanent source of income. The irrigated area of this village is at the highest level as compared to the other villages. Therefore, farmers are using large number of electric pumps for production activities.

The farmers of Mylambadi and Vellalapalayam villages have the lowest average electric pumps. In the village Mylambadi, 13 out of 16 farmers possess own electric pumps and remaining 03 farmers have community pump sets. The average possession of 14 pump sets of these farmers is 1.08 per head. In the village of Vellalapalayam, total sample farmers are 20, and they have 24 electric pump sets. The average possession of pump sets of these farmers is 1.02 per head.

Out of 120 sample farmers, 107 sample farmers possessed own electric pump sets (remaining 13 farmers possessed community electric pump sets) and the number of pump sets possessed by them are 135. Out of the total pump sets (135), 109 pumps are of 5HP and 26 pumps are of 10HP i.e., 80.74% and 19.26% respectively. The average possession of the electric pump sets worked out to be 1.26 per head for all sample farmers. From the above Table 3.2 it can be also seen that the number of 5HP electric pump sets is the highest (80.74%) whereas the number of 10HP electric pump sets is the lower (19.26%). In general, it has been observed that, the purchasing cost is less for 5HP pump sets in comparison with pump sets of 10HP. Therefore, farmers gives more preference for the pump sets of 5HP for their irrigating own area of land.

It would be relevant to find out ownership of electric pump sets along with size of landholding. The Table 3.3 shows the number of sample farmers having electric pump sets as per size of landholding.

Table 3.3: Ownership of Pump Sets as per Size of Landholding

Sample Farmers	**No. of Sample Farmers**	**5HP**	**10HP**	**Total**	**Average Possession of Pumps**
Marginal	17(15.89)	17(15.60)	00(00.00)	17(12.59)	1.00
Small	20(18.69)	20(18.35)	00(00.00)	20(14.81)	1.00
Semi-medium	21(19.63)	19(17.43)	02(07.69)	21(15.56)	1.00
Medium	34(31.78)	39(35.78)	20(76.92)	59(43.70)	1.74
Large	15(14.02)	14(12.84)	04(15.38)	18(13.33)	1.02
Total	107(100)	109(100)	26(100)	135(100)	1.26

Note: 1. Figures in brackets show the percentage with respect to total numbers.

2. Figures outside brackets represent total numbers.

3. Number of sample farmers having own electric pump sets.

The Table 3.3 shows categories of farmers along with number of pump sets possessed by them. The total numbers of farmers having pump sets are 107 and they are having 135 pump

sets. Out of the total pumps, 109 pumps are of 5HP i.e., 80.74% and 26 pumps are of 10HP i.e., 19.26%. The average possession of electric pump set is worked out to be 1.26 per head. By and large, it has been observed that mostly semi-medium, medium and large sample farmers possess pump sets of 10HP. Semi-medium sample farmers in the sample of this study possess 02 pump sets of 10HP (07.69%), whereas medium sample farmers in the sample of this study possess 20 pump sets of 10HP (76.92%) and large farmers are having 04 pump sets of 10HP (15.38%) of the total 10HP pump sets.

The average possession of electric pump sets of all sample farmers is calculated as 1.26 per head. The average possession of electric pumps for the marginal, small and semi-medium farmers is worked out to be one per head. The average possession of electric pump sets of the medium and large farmers worked out to be 1.74 and 1.02 per head respectively.

From the above data it can be said that:

1. In case of marginal, small and semi-medium sample farmers are having less number of pump sets on an average.
2. Size of landholding and number of pump sets are interrelated with each other. Higher the size of landholding, higher the number of pump sets on an average.
3. It has been observed that medium and large farmers possess higher proportion of pump sets in comparison with other categories of farmers. However, the number of pump sets possessed by them is not significantly on the higher side.

3.4. Change in Irrigated and Non-irrigated Area

Irrigation plays an important role in agricultural development as well as in rural economy. In Erode district about 70% of cropped area depends on irregular monsoon. This has affected the productivity of crop adversely in the district of Erode. Irrigation can help to increase production and productivity of this region. Irrigation would also be useful for adopting multiple crop system. In recent times, land under irrigation is rising in this part of district though the process is slow. Lifting of water now takes place with the help of modern tools and techniques. Pump sets are the part of this technique; the availability of pump sets has helped in bringing more and more amount of land under irrigation. Now-a-days traditional pattern of irrigation has come to an end. In the old days even animals were used for lifting water but now the animals are no used to take water from wells.

The modernization of irrigation has helped the farmers in cultivating various types of crops. Today, farmers are more inclined towards crops, which have more yields in less time duration. This has brought a change in cropping pattern, which has shifted from food grains to

non-food grains. The process of electrification has also made farmers more aware of profit, which can be derived from cultivation. Farmers are more careful of how they can make more profit from optimum use of water, which largely depends on drip and sprinkler irrigation methods. This process is applied more for the production of Rabbi, as during summer the fast process of evaporation reduces the level of water drastically.

Though irrigation now completely depends on electricity the load shedding by government has resulted in heavy loss of crops. The insufficient supply of electricity also resulted in the loss of production of non-food crops and it has resulted in the collapse of budgetary aspiration of farmers. Non-availability of regular electric power is one of the hindrances in the growth of agriculture in the area of Erode district. The rural electrification has helped in improving the irrigation process but now-a-days irregular supply of electricity particularly in rural area creating lot of problems for the farmers. Inspite of this difficulty of irregular supply of electricity there is defiantly structural change in the rural area of Erode district due to availability of various sources of irrigation. In this area farmers are using mainly wells, government canals, rivers, tanks etc. The distribution of sample farmers according to the various sources of irrigation is presented in the following Table 3.4.

Table 3.4: Types of Sample Farmers and their Sources of Irrigation

Sample Farmers	**Wells**	**Government Canals**	**Rivers**	**Tanks**	**Total**
Marginal Farmers	16(76.19)	03(14.29)	01(04.76)	01(04.76)	21(100)
Small Farmers	17(80.95)	02(09.52)	01(04.76)	01(04.76)	21(100)
Semi-medium Farmers	19(65.52)	05(17.24)	03(10.34)	02(06.90)	29(100)
Medium Farmers	22(64.71)	06(17.65)	04(11.76)	02(05.88)	34(100)
Large Farmers	11(73.33)	02(13.13)	01(06.67)	01(06.67)	15(100)
Total	85(70.83)	18(15.00)	10(08.33)	07(05.83)	120(100)

Note: 1. Figures in brackets show the percentage of sample farmers.

2. Figures outside brackets show total number of sample farmers.

From the above Table 3.4 it can be seen that mainly there are four sources of irrigation i.e., wells, government canals, rivers and tanks. The total sample farmers are 120, out of which 70.83% of farmers are using wells for irrigation, 15% of farmers are depending on government canals, 08.33% of farmers are using rivers as a major sources of irrigation, 05.83% of farmers are irrigating their land area with the help of tanks.

Domestic wells seem to be the most popular source of irrigation in the area selected for this study. Out of the total selected sample farmers majority of them are depending on wells for source of irrigation. All types of farmers are using wells for the purpose of irrigation. Water from canals is also another source of irrigation, which is quite popular. The selected sample farmers are not extensively using tanks, rivers etc. for the purpose of irrigation. This may be due to the fact that well irrigation doesn't required any price for lifting water except in terms of electricity charges use for pumping water but no charges are involved in terms of water rates. This aspect needs to be considered for management of water. Government can seriously think about bringing some degree of regulation on private wells in order to manage scarce water resources. In certain cases establishment of canal helps to increase the water level of domestic wells but this aspect is neglected while developing the scheme of water management. The sample farmers for lifting water from wells mostly use electric pump sets.

In order to know how farmers from the selected village use the various sources of irrigation, information relating to availability of irrigation sources in different villages is collected. Information regarding this is presented in the following Table 3.5.

Table 3.5: Village Wise Irrigation Sources Used by Sample Farmers

Village	**Wells**	**Government Canals**	**Rivers**	**Tanks**	**Total**
Mylambadi	14(87.05)	00(00.00)	00(00.00)	02(12.05)	16(100)
Thottipalayam	09(75.00)	00(00.00)	02(16.67)	01(08.33)	12(100)
Gettisamudram	26(81.25)	00(00.00)	04(12.05)	02(06.25)	32(100)
Sankarapalayam	16(88.89)	00(00.00)	00(00.00)	02(11.11)	18(100)
Savandappur	05(22.73)	13(59.10)	04(18.18)	00(00.00)	22(100)
Vellalapalayam	15(75.00)	05(25.00)	00(00.00)	00(00.00)	20(100)
Total	85(75.83)	18(15.00)	10(08.33)	07(05.83)	120(100)

Note: 1. Figures in brackets indicate percentage of total farmers.

2. Figures outside brackets show total number of sample farmers.

The village wise classification shows that in the village of Sankarapalayam and Mylambadi where 88.89% and 87.05% of farmers dependent on it respectively. The easily available source of irrigation is wells. Therefore, overall dependency on wells for irrigating land has increased considerably. In the village of Savandappur, 13 farmers are irrigating their land area with the help of canals. In the village role of government canal is important for the purpose of irrigation. Therefore, there is no need for the farmers to depend on other sources of irrigation.

Majority of the farmers from all selected villages are depending on their own private sources for the purpose of irrigation. Out of 6 villages 4 villages do not have source of irrigation

from any canals constructed by the government only 3 villages are depending on river for the source of irrigation. Tanks are also significant source of irrigation in the villages selected for this study. This clearly shows that farmers are depending mostly on their own sources of irrigation and are using electric pump sets on wells and others. Obviously this increases the additional burden of cost for irrigating their land. If government acts as mediator in the system of providing irrigation for farmers, cost of production can be brought under control and proper management of water can be made possible.

In the above paragraph, the sources of irrigation used by sample farmers have been explained. In this part, the change in irrigated and non-irrigated area of the all sample farmers has been explained. Information relating to this is presented in the following Table 3.6.

Table 3.6: Change in Irrigated and Non-irrigated Area of Sample Farmers (Figures in Acre)

Sample Farmers	**Before Electrification**			**After Electrification**		
	Irrigated Area	**Non-irrigated Area**	**Total Cultivated Area**	**Irrigated Area**	**Non-irrigated Area**	**Total Cultivated Area**
Marginal Farmers	04 (10.13)	35.50 (89.87)	39.50 (100)	06 (12.90)	40.05 (87.10)	46.50 (100)
Small Farmers	07 (09.21)	69 (90.79)	76 (100)	15 (17.05)	73 (82.95)	88 (100)
Semi-medium Farmers	14 (05.67)	233 (94.33)	247 (100)	35 (13.67)	221 (86.33)	256 (100)
Medium Farmers	115 (19.90)	463 (80.10)	578 (100)	121 (20.65)	465 (79.35)	586 (100)
Large Farmers	98 (17.31)	468 (82.69)	566 (100)	110 (19.06)	467 (80.94)	577 (100)
Total	238 (15.80)	1268.05 (84.20)	1506.05 (100)	287 (18.47)	1266.05 (81.53)	1553.05 (100)

Note: 1. Figures in brackets indicate percentage of cultivated area of farmers.

2. Figures outside brackets indicate cultivated area of farmers.

The total cultivated area of sample farmers prior to electrification was 1506.05 acres after electrification; it is increased up to 1553.05 acre. There is a change in the area under irrigation also. The average time lag involved in non-electrification to electrification is calculated as of 15 years for all types of sample farmers. Out of the total cultivated area (1506.05 acre), before electrification 15.80% area was irrigated and 84.20% area was non-irrigated but after electrification irrigated area has increased up to 18.47% and non-irrigated area has gone down to 81.53%. The percentage of irrigated area has increased because of the use of electricity for the various agricultural activities like water lifting from wells, sprinkling etc. Therefore,

electricity plays an important role in bringing more and more land area under irrigation as well as indirectly it helps in overall agricultural development in rural sector in selected area of this study.

Due to electrification, irrigated area of all sample farmers has increased. In case of semi-medium, medium and large sample farmers the irrigated area has increased almost double except marginal and small farmers. Semi-medium, medium and large farmers have invested maximum capital in their land and they made the use of sources of irrigation up to the maximum available capacities for increasing their own irrigated land. Therefore, the irrigated area has increased substantially in the selected area of this study. Due to increase in irrigated land these farmers have derived maximum benefits from irrigated area. Therefore, the level of income has increased after electrification for all sample farmers in selected area of this study.

In the above part the change in irrigated and non-irrigated area of all sample farmers have been discussed. In the following part the village wise change occurred due to electrification in irrigated and non-irrigated area of the sample farmers of Erode district is presented in the following Table 3.7.

Table 3.7: Village Wise Change in Irrigated and Non-irrigated Area (Area in Acre)

Sample Farmers	**Before Electrification**			**After Electrification**		
	Irrigated Area	**Non-irrigated Area**	**Total Cultivated Area**	**Irrigated Area**	**Non-irrigated Area**	**Total Cultivated Area**
Mylambadi	37 (14.86)	212 (85.14)	249 (100)	40 (15.81)	213 (84.19)	253 (100)
Thottipalayam	41 (16.14)	213 (83.86)	254 (100)	45 (17.65)	210 (82.35)	255 (100)
Gettisamudram	47 (17.09)	228 (82.91)	275 (100)	57 (20.50)	221 (79.50)	278 (100)
Sankarapalayam	28 (11.91)	207 (88.09)	235 (100)	39 (15.23)	217 (84.77)	256 (100)
Savandappur	42 (15.85)	223 (84.15)	265 (100)	49 (18.08)	222 (81.92)	271 (100)
Vellalapalayam	43 (18.82)	185.05 (81.18)	228.05 (100)	57 (23.70)	183.05 (76.30)	240.05 (100)
Total	238 (15.80)	1268.05 (84.20)	1506.05 (100)	287 (18.47)	1266.05 (81.53)	1553.05 (100)

Note: 1. Figures in brackets indicate percentage of cultivated area of farmers.

2. Figures outside brackets indicate cultivated area of farmers.

After electrification total cultivated area has increased from 1506.05 acre to 1553.05 acre for all sample villages. There is a change in the composition of area under irrigation and non-irrigation also. The irrigated area has increased after electrification. The village wise break up shows the village of Vellalapalayam has the highest irrigated area of sample farmers i.e., 23.70% as compared to the irrigated area of other villages. Vellalapalayam along with wells plays vital role in the irrigation of farming of this village. Therefore, after electrification area under irrigation has increased from 18.82% to 23.70%. In case of Gettisamudram, Gettisamudram Lake along with wells plays an important role for irrigating land area of this village. The village of Gettisamudram, irrigated area has increased from 17.09% to 20.50% after electrification. The irrigated area of sample farmers of Mylambadi and Sankarapalayam is lower in comparison with other villages. The farmers of these villages are using government canals along with wells. The large number of sample farmers mostly depends on government canals. The government canals cannot provide sufficient water for farming. Therefore, the irrigated area in these villages is less.

In the earlier days farmers were using traditional equipments for irrigating their land. To take water out of wells, farmers used to employ various types of animals for carrying water up to field. As there was no proper pipeline to carry water to the field a large quantity of water used to go waste and maximum amount of water used to get absorbed in soil, resulting in drastic reduction in the availability of water for the purpose of farming. As a result of this the irrigated area was limited. Later on diesel engines were used for irrigation. The preparation of pipeline also reduced the waste of water and almost whole water was utilized for irrigation.

This facility turned out to be more useful than the earlier one. Mainly the farmers possessing large size of landholding installed these diesel pumps. This has not only increased the area of irrigation but also brought the increase in the level of income. After electrification, there was gradual increase in the area under irrigation. Initially, the rich farmers have derived the maximum benefits from it. They were under the possession of large area of land with the availability of ample water along with small size of land. To analyze impact of electrification on agricultural development in the study area of Erode district, the time lag between non-electrification and electrification has been calculated by classifying sample farmers into marginal, small, semi-medium, medium and large.

The time lag for process of electrification for marginal sample farmers is 7 years, for small farmers 11 years, for semi-medium farmers 14 years, medium farmers 20 and for large farmers 23 years. The process of electrification did not result in the immediate increase of the area under irrigation. The increase in the area under irrigation took place because of several

actions such as the introduction of pump sets, but for the purchase of pump sets the loan facility was made available by banks and by other informal sources. Government has also provided assistant by erecting electric polls in the field near to wells and other sources of irrigation. The cropping pattern from food to non-food crops, was possible because of electrification. Electrification has helped in transforming the traditional agriculture. Farmers started using modern equipments of farming, high yielding of varieties of seeds, pesticides etc. it is explained in detailed in the next part of this chapter. The availability of electrification resulted in an increase in the area under irrigation.

Electrification though has helped in increasing overall production still the other cost needs to be considered for example for irrigating land, pump sets are to be installed by the farmers. This requires borrowing of money from the various financial institutions. The information regarding number of sample farmers utilizing loan facility from various sources for installing pump sets is presented in the following Table 3.8.

Table 3.8: The Number of Sample Farmers Utilizing Loan Facility from Various Sources for Installing Pumps Sets

Source	**Marginal Farmers**	**Small Farmers**	**Semi-medium Farmers**	**Medium Farmers**	**Large Farmers**	**Total**
1.Co-operative Banks	02	01	02	01	00	06
2.Nationalized Banks	00	00	01	00	00	01
3.Institutional Sources(1+2)	02 (09.52)	01 (04.76)	03 (10.34)	01 (02.94)	00 (00.00)	07 (05.83)
4.Moneylenders	04	03	02	01	01	11
5.Others	00	04	05	01	00	10
6.Non-institutional Sources(4+5)	04 (19.05)	07 (33.33)	07 (24.14)	02 (05.88)	01 (06.67)	21 (17.05)
7.Total(3+6)	06 (28.57)	08 (38.10)	10 (34.48)	03 (08.82)	01 (06.67)	28 (23.33)
Total Sample Farmers	21 (100)	21 (100)	29 (100)	34 (100)	15 (100)	120 (100)

Note: 1. Figures in brackets indicate percentage of total sample farmers.

2. Figures outside brackets indicate total sample farmers.

From the above Table 3.8 it can be seen that, out of 120 sample farmers, 28(23.33%) sample farmers had utilized the loan facility for the installation of pump sets of these 28 farmers only 07 farmers borrowed it from the institutional sources like co-operatives and nationalized commercial banks, whereas the remaining 21 sample farmers had no option but to seek the monetary help from non-institutional sources like moneylenders, traders, relatives, friends etc. The above Table 3.8 has also brought forth the fact that, in taking loan, the number of small and semi-medium farmers is more than that of marginal, medium and large farmers. It has been also observed that there is inverse relationship between the size of land and the number of farmers obtained loan. The larger the size of landholding less is the loan obtained. The availability of loan facility resulted in the increase in the number of farmers setting in pump sets, which in turn increases the land under irrigation. The small landholders are relying more on loans for installing pump sets. It changed the cropping pattern from food to non-food crops improving the financial conditions of the farmers.

Out of 21 marginal sample farmers, 06 sample farmers utilizing loan facility, out of 21 small sample farmers, 08 sample farmers utilizing loan facility, out of 29 semi-medium sample farmers, 10 sample farmers utilizing loan facility, out of 34 medium sample farmers, 03 sample farmers utilizing loan facility, out of 15 large sample farmers, 01 sample farmers utilizing loan facility, from various sources for installing pumps sets. Generally it has been observed that the amount of loan borrowed is inversely proportional to the size of landholding. It decreases with the increase in land area.

3.5. Changes in the Number of Farmers Cultivating Food and Non-food Crops

As per expectation, use of electricity leads to expansion of irrigated area and ultimately it leads to more output and more employment opportunities in agricultural sector. Electricity brings a shift in cropping pattern. Farmers shift crops from low value to high value, which in turn raises the level of output. Electrification can help in increasing the production of commercial crops. It can widen the area of irrigated lands. It changes the traditional pattern of agriculture and helps in improving the living standard of sample farmers. Though the importance of electrification is largely recognized, in some parts of the country still the use of electricity for farm use is far from satisfactory, in some of the backward areas. Erode district is also not an exception to this. In this section the impact of electrification on cropping pattern of all groups of sample farmers has been explained. “Cropping pattern means the proportion of area under different crops at a particular period of time. A Change in cropping pattern means a

change in the proportion under different crops. Cropping pattern in agriculture among other things is ultimately governed by farmers choice of crops in individual farms". The choice for growing a particular crop in a particular part in Erode district depends on the following factors; size of landholding, techniques of cultivation, changes in the market price, irregular monsoon, the government policy and new technology. Sample farmers have used electricity for various methods of cultivation such as water lifting, sprinkling, drip irrigation etc. This has resulted in increase of irrigated area in the sample villages. Due to electrification change has taken place in cropping pattern in sample villages of Erode district. With the use of electricity for agricultural activities, traditional cropping pattern has changed into commercial one. All sample farmers asserted that they have adopted the new cropping pattern. The Table 3.9 shows the cropping pattern in the Erode district.

Table 3.9: Number of Sample Farmers Cultivating Food and Non-food Crops

S. No.	Crops	Marginal Farmers		Small Farmers		Semi-medium Farmers	
		BE	AE	BE	AE	BE	AE
1	Rice	04(19.05)	11(52.38)	06(28.57)	13(61.90)	07(24.14)	16(55.17)
2	Maize	09(42.86)	16(76.19)	10(47.62)	18(85.71)	16(55.17)	21(72.41)
3	Plantain tree	00(00.00)	02(09.52)	01(04.76)	05(23.81)	03(10.34)	08(27.59)
4	Mango tree	00(00.00)	00(00.00)	00(00.00)	00(00.00)	01(03.45)	01(03.45)
5	Vegetables	01(04.76)	03(14.29)	02(09.52)	06(28.57)	05(17.24)	12(41.38)
6	Coconut tree	02(09.52)	03(14.29)	03(14.29)	05(23.81)	03(10.34)	05(17.24)
7	Turmeric	02(09.52)	10(47.62)	03(14.29)	10(47.62)	05(17.24)	12(41.38)
8	Sugarcane	01(04.76)	06(28.57)	05(23.81)	14(66.67)	09(31.03)	18(62.07)
9	Cotton	03(14.29)	16(76.19)	06(28.57)	19(90.48)	10(34.48)	22(75.86)
10	Flowers	00(00.00)	00(00.00)	00(00.00)	00(00.00)	00(00.00)	01(03.45)

S. No.	Crops	Medium Farmers		Large Farmers		Total Farmers	
		BE	AE	BE	AE	BE	AE
1	Rice	13(38.24)	17(50.00)	06(40.00)	12(80.00)	36(30.00)	69(57.50)
2	Maize	21(61.76)	29(85.29)	08(53.33)	11(73.33)	64(53.33)	95(79.17)
3	Plantain tree	05(14.71)	14(41.18)	03(20.00)	10(66.67)	12(10.00)	39(32.50)
4	Mango tree	01(02.94)	01(02.94)	02(13.33)	01(06.67)	04(03.33)	03(02.50)
5	Vegetables	06(17.65)	12(35.29)	04(26.67)	05(33.33)	18(15.00)	38(31.67)
6	Coconut tree	09(26.47)	05(14.71)	05(33.33)	03(20.00)	22(18.33)	21(17.50)
7	Turmeric	09(26.47)	20(58.82)	03(20.00)	12(80.00)	22(18.33)	64(53.33)
8	Sugarcane	14(41.18)	29(85.29)	05(33.33)	12(80.00)	34(28.33)	79(65.83)
9	Cotton	12(35.29)	28(82.35)	04(26.67)	11(73.33)	35(29.17)	96(80.00)
10	Flowers	01(02.94)	02(05.88)	01(06.67)	02(13.33)	02(01.67)	05(04.17)

Note: 1. Figures in brackets indicate percentage of total farmers.

2. Figures outside brackets indicate number of sample farmers.

3. BE means before electrification and AE means after electrification.

Prior to electrification about 30% of farmers had cultivated Rice but after electrification this percentage has increased up to 58%. Prior to electrification about 53% of farmers had cultivated Maize but after electrification this percentage has increased up to 79%. Prior to electrification about 10% of farmers had cultivated Plantain tree but after electrification this percentage has increased up to 33%. Prior to electrification about 15% of farmers had cultivated Vegetables but after electrification this percentage has increased up to 32%. Prior to electrification about 18% of farmers had cultivated Turmeric but after electrification this percentage has increased up to 53%. Prior to electrification about 28% of farmers had cultivated Sugarcane but after electrification this percentage has increased up to 66%. Prior to electrification about 29% of farmers had cultivated Cotton but after electrification this percentage has increased up to 80%. Prior to electrification about 02% of farmers had cultivated Flowers but after electrification this percentage has increased up to 04%.

Prior to electrification about 03% of farmers had cultivated Mango tree but after electrification this percentage has gone down to 02%. Prior to electrification about 18% of farmers had cultivated Coconut tree but after electrification this percentage has gone down to 17%.

Change in cropping pattern has been taking place in the area selected for the study after electrification. There is a need to find out whether this electrification is disturbing the balance of food and non- food crops in agriculture sector. The change in cropping pattern according to the number of farmers is shown at a glance in the Table 3.10.

Table 3.10: Change in Cropping Pattern According to the Number of Farmers at a Glance

S. No.	Crops	Marginal Farmers	Small Farmers	Semi-medium Farmers	Medium Farmers	Large Farmers	Total Farmers
1	Rice	↑	↑	↑	↑	↑	↑
2	Maize	↑	↑	↑	↑	↑	↑
3	Plantain tree	↑	↑	↑	↑	↑	↑
4	Mango tree	-	-	Same	Same	↓	↓
5	Vegetables	↑	↑	↑	↑	↑	↑
6	Coconut tree	↑	↑	↑	↓	↓	↓
7	Turmeric	↑	↑	↑	↑	↑	↑
8	Sugarcane	↑	↑	↑	↑	↑	↑
9	Cotton	↑	↑	↑	↑	↑	↑
10	Flowers	-	-	↑	↑	↑	↑

Note: 1. ↑ Indicates upward shift in number of farmers.

2. ↓ Indicates downward shift in number of farmers.

In general, it has been observed from the above information that the use of electrification changed the attitude of farmers. Sample farmers started focusing their attention on commercialization of crops in order to increase their earnings. The use of electrification for the purpose of agriculture has changed the farmers life style, cropping pattern, production and productivity that have brought an overall change in the agricultural scenario in the district of Erode.

3.6. Changes in Area under Food and Non- food Crops

In the preceding section the changing cropping pattern has been presented according to classification of farmers based on size of land holding. This pattern was analyzed in the context of electrification. In this section the change in area under food and non-food crops have been explained. Total cultivated area of all sample framers prior to electrification was 1,506.05 acre it has gone up to 1,553.05 acre after electrification. Due to electrification change in the cultivated area under the different crops is presented in the following Table 3.11.

Table 3.11: Change in Area under Food and Non-food Crops (Area in Acre)

S. No.	Crops	Marginal Farmers		Small Farmers		Semi-medium Farmers	
		BE	AE	BE	AE	BE	AE
1	Rice	03.50 (08.86)	05.50 (11.83)	12 (15.79)	17 (19.32)	40 (16.19)	42 (16.41)
2	Maize	21 (53.16)	23 (49.46)	30 (39.47)	29 (32.95)	73 (29.55)	65 (25.39)
3	Plantain tree	00 (00.00)	01 (02.15)	01 (01.32)	02 (02.27)	12 (04.86)	11 (04.30)
4	Mango tree	00 (00.00)	00 (00.00)	00 (00.00)	00 (00.00)	03 (01.21)	05 (01.95)
5	Vegetables	01 (02.53)	02 (04.30)	01 (01.32)	02 (02.27)	22 (08.91)	30 (11.72)
6	Total Food (1 to 5)	25.50 (64.56)	31.50 (67.74)	44 (57.89)	50 (56.82)	150 (60.73)	153 (59.77)
7	Coconut tree	01 (02.53)	02 (04.30)	08 (10.53)	10 (11.36)	12 (04.86)	16 (06.25)
8	Turmeric	04 (10.13)	05 (10.75)	09 (11.84)	14 (15.91)	15 (06.07)	10 (03.91)
9	Sugarcane	02 (05.06)	03 (06.45)	10 (13.16)	09 (10.23)	25 (10.12)	23 (08.98)
10	Cotton	07 (17.72)	05 (10.75)	05 (06.58)	05 (05.68)	45 (18.22)	52 (20.31)
11	Flowers	00 (00.00)	00 (00.00)	00 (00.00)	00 (00.00)	00 (00.00)	02 (00.78)
12	Total Non-food (7 to 11)	14 (35.44)	15 (32.26)	32 (42.11)	38 (43.18)	97 (39.27)	103 (40.23)
13	Total (6 & 12)	39.50 (100)	46.50 (100)	76 (100)	88 (100)	247 (100)	256 (100)

(Area in Acre)

S. No.	Crops	Medium Farmers		Large Farmers		Total Farmers	
		BE	AE	BE	AE	BE	AE
1	Rice	105 (18.17)	110 (18.77)	106 (18.73)	105 (18.20)	266.50 (17.69)	279.50 (17.99)
2	Maize	290 (50.17)	276 (47.10)	290 (51.24)	292 (50.61)	704 (46.73)	685 (44.09)
3	Plantain tree	18 (03.11)	23 (03.92)	15 (02.65)	13 (02.25)	46 (03.05)	50 (03.22)
4	Mango tree	04 (00.69)	05 (00.85)	07 (01.24)	06 (01.04)	14 (00.93)	16 (01.03)
5	Vegetables	28 (04.84)	22 (03.75)	22 (03.89)	25 (04.33)	74 (04.91)	81 (05.21)
6	Total Food (1 to 5)	445 (76.99)	436 (74.40)	440 (77.74)	441 (76.43)	1104.50 (73.32)	1111.50 (71.50)
7	Coconut tree	50 (08.65)	58 (09.90)	40 (07.07)	34 (05.89)	111 (07.37)	120 (07.72)
8	Turmeric	62 (10.73)	70 (11.95)	55 (09.72)	50 (08.67)	145 (09.62)	149 (09.59)
9	Sugarcane	10 (01.73)	11 (01.88)	08 (01.41)	30 (05.20)	55 (03.65)	76 (04.89)
10	Cotton	10 (01.73)	09 (01.54)	20 (03.53)	18 (03.12)	87 (05.77)	89 (05.73)
11	Flowers	01 (00.17)	02 (00.34)	03 (00.53)	04 (00.69)	04 (00.27)	08 (00.51)
12	Total Non-food (7 to 11)	133 (23.01)	150 (25.60)	126 (22.26)	136 (23.57)	402 (26.68)	442 (28.45)
13	Total (6 & 12)	578 (100)	586 (100)	566 (100)	577 (100)	1506.05 (100)	1553.05 (100)

Note: 1. Figures in brackets indicate percentage of total area of sample farmers.

2. Figures outside brackets indicate total area of sample farmers.

3. BE means before electrification and AE means after electrification.

Prior to electrification out of total cultivated area (1,506.05 acre), 73.32% area was under food crops and 26.68% area was under non-food crops. After electrification area (1,553.05

acre), under food crops has gone down to 71.55% and area under non-food crops has gone up to 28.45% of total. The change in cropping pattern due to electrification according to cultivated area of sample farmers has been studied in the section. This change mainly food crops to non-food crops. The classification of total cultivated area between food and non-food crops possessed by the sample farmers is presented in the above Table 3.11. The change in cropping pattern has been studied in the context of electrification.

In general, it has been observed that the use of electricity shows that the area under food crops has decreased and area under categories of non-food crops has increased. The change in cropping pattern from food to non-food crops for marginal farmers in span of 7 years, for small farmers 11 years, for semi-medium farmers 14 years, for medium farmers 20 years and for large farmers 23 years. Change in cropping pattern has been taking place in the area selected for the study after electrification. There is a need to find out whether this electrification is disturbing the balance of food and non-food crops in agriculture sector.

The change in cropping pattern according to the area at a glance is shows in the Table 3.12.

Table 3.12: Change in Cropping Pattern According to the Area at a Glance

S. No.	Crops	Marginal Farmers	Small Farmers	Semi-medium Farmers	Medium Farmers	Large Farmers	Total Farmers
1	Rice	↑	↑	↑	↑	↓	↑
2	Maize	↑	↓	↓	↓	↑	↓
3	Plantain tree	↑	↑	↓	↑	↓	↑
4	Mango tree	-	-	↑	↑	↓	↑
5	Vegetables	↑	↑	↑	↓	↑	↑
6	Total Food	↑	↑	↑	↓	↑	↑
7	Coconut tree	↑	↑	↑	↑	↓	↑
8	Turmeric	↑	↑	↓	↑	↓	↑
9	Sugarcane	↑	↓	↓	↑	↑	↑
10	Cotton	↓	Same	↑	↓	↓	↑
11	Flowers	-	-	↑	↑	↑	↑
12	Total Non-food	↑	↑	↑	↑	↑	↑
13	Total	↑	↑	↑	↑	↑	↑

Note: 1. ↑ Indicates upwards trend in area under different crops.

2. ↓ Indicates downward movement in area under different crops.

3.7. Production and Productivity of Crops

In the preceding section it has been shown how electrification has brought changes in the cropping pattern in selected area of this study in Erode district. In this section an attempt has been made to show how electrification has affected the production and productivity of crops.

The change in the cropping pattern has affected the structure of production also. Many factors are affecting agricultural production and productivity. These factors are size of landholdings, fertility of land, irrigation facilities, machinery, lack of capital, storage facilities, transportations, fertilizers, electrification, marketing facilities, new tools and techniques, irregular monsoon, natural calamite etc. All these factors have made an impact on production and productivity of crops. Availability of electricity on a regular basis also contributes in bringing change in irrigation facilities. As per expectation irrigation has helped in increasing the production and productivity.

Electrification can also help in bringing favorable changes in production and productivity of farms. It can also contribute significantly in increasing the level of income of farmers. Hence, the role of electricity is very important in overall development of agriculture as well as rural economy. Sample farmers have used electricity for various methods of cultivation, such as water lifting, sprinkling, drip irrigation etc. This resulted in the increase of irrigated area in sample villages in selected Taluk of Erode district. Obviously, due to increase in irrigated land area, the production and productivity of farms has increased. In this section, an attempt has been made to measure an impact of rural electrification on agricultural production and productivity. The change in agricultural production of all crops of sample farmers is presented in the following Table 3.13.

Table 3.13: Agricultural Production (Production in Quintals)

S. No.	**Crops**	**Marginal Farmers**		**Small Farmers**		**Semi-medium Farmers**	
		BE	**AE**	**BE**	**AE**	**BE**	**AE**
1	Rice	19	44	71	148	288	382
2	Maize	336	437	510	609	1146	1359
3	Plantain tree	00	45	43	97	516	563
4	Mango tree	00	00	00	00	273	513
5	Vegetables	03	10	04	11	84	183
6	Total Food (1 to 5)	358 (52.72)	536 (47.64)	628 (26.86)	865 (27.73)	2307 (34.58)	3000 (34.77)
7	Coconut tree	117	270	850	1322	1344	2162
8	Turmeric	29	42	59	105	108	87
9	Sugarcane	150	256	782	805	2755	3119
10	Cotton	25	21	19	22	158	250
11	Flowers	00	00	00	00	00	11
12	Total Non-food (7 to 11)	321 (47.28)	589 (52.36)	1710 (73.14)	2254 (72.27)	4365 (65.42)	5629 (65.23)
13	Total (6 & 12)	679 (100)	1125 (100)	2338 (100)	3119 (100)	6672 (100)	8629 (100)

(Production in Quintals)

S. No.	Crops	Medium Farmers		Large Farmers		Total Farmers	
		BE	AE	BE	AE	BE	AE
1	Rice	924	1122	943	1155	2245	2851
2	Maize	5307	5879	5365	6920	12664	15204
3	Plantain tree	887	1304	728	913	2174	2922
4	Mango tree	369	529	676	661	1318	1703
5	Vegetables	126	187	136	283	353	674
6	Total Food (1 to 5)	7613 (47.74)	9021 (43.16)	7848 (51.27)	9932 (38.83)	18754 (45.80)	23354 (39.35)
7	Coconut tree	6075	8596	5404	5797	13790	18147
8	Turmeric	508	735	418	665	1122	1634
9	Sugarcane	1703	2482	1524	9021	6914	15683
10	Cotton	45	55	96	135	343	483
11	Flowers	03	12	18	29	21	52
12	Total Non-food (7 to 11)	8334 (52.26)	11880 (56.84)	7460 (48.73)	15647 (61.17)	22190 (54.20)	35999 (60.65)
13	Total (6 & 12)	15947 (100)	20901 (100)	15308 (100)	25579 (100)	40944 (100)	59353 (100)

Note: 1. Figures in brackets indicate the percentage of total production.

2. Figures outside brackets indicate the total production.

3. BE means before electrification and AE means after electrification.

Prior to electrification total production of all crops was 40,944 quintals, out of which 45.80% production was under food crops and 54.20% production was under non-food crops. After electrification total production has increased up to 59,353 quintals. Out of these 39.35% production of all crops is under food crops and 60.65% production is under categories of non-food crops. As per expectation, it can be seen that production of food crops has decreased whereas non-food crops has increased before electrification and after electrification. This may be due to the fact that area under non-food crops has gone up before electrification and after electrification.

In this section, an attempt has been made to find out how the factors have increased the productivity of the crops in the selected area of this study. The productivity of all crops has been calculated on the basis of the following definition. Productivity is equal to total production divided by the total area under cultivation. The productivity of all crops is presented in the following Table 3.14.

Table 3.14: Agricultural Productivity (Per Acre Productivity in Quintals)

S. No.	Crops	Marginal Farmers		Small Farmers		Semi-medium Farmers	
		BE	AE	BE	AE	BE	AE
1	Rice	5.4	8.0	5.9	8.7	7.2	9.1
2	Maize	16.0	19.0	17.0	21.0	15.7	20.9
3	Plantain tree	00	45.0	43.0	48.5	43.0	51.2
4	Mango tree	00	00	00	00	91.0	102.6
5	Vegetables	3.0	5.0	4.0	5.5	3.8	6.1
6	Total Food (1 to 5)	14.0	17.0	14.3	17.3	15.4	19.6
7	Coconut tree	117.0	135.0	106.3	132.2	112.0	135.1
8	Turmeric	7.3	8.4	6.6	7.5	7.2	8.7
9	Sugarcane	75.0	85.3	78.2	89.4	110.2	135.6
10	Cotton	3.6	4.2	3.8	4.4	3.5	4.8
11	Flowers	00	00	00	00	00	5.5
12	Total Non-food (7 to 11)	22.9	39.3	53.4	59.3	45.0	54.7
13	Total (6 & 12)	17.2	24.2	30.8	35.4	27.0	33.7

(Per Acre Productivity in Quintals)

S. No.	Crops	Medium Farmers		Large Farmers		Total Farmers	
		BE	AE	BE	AE	BE	AE
1	Rice	8.8	10.2	8.9	11.0	8.4	10.2
2	Maize	18.3	21.3	18.5	23.7	18.0	22.2
3	Plantain tree	49.3	56.7	48.5	70.2	47.3	58.4
4	Mango tree	92.3	105.8	96.6	110.2	94.1	106.4
5	Vegetables	4.5	8.5	6.2	11.3	4.8	8.3
6	Total Food (1 to 5)	17.1	20.7	17.8	22.5	17.0	21.0
7	Coconut tree	121.5	148.2	135.1	170.5	124.2	151.2
8	Turmeric	8.2	10.5	7.6	13.3	7.7	11.0
9	Sugarcane	170.3	225.6	190.5	300.7	125.7	206.4
10	Cotton	4.5	6.1	4.8	7.5	3.9	5.4
11	Flowers	3.0	6.0	6.0	7.3	5.3	6.5
12	Total Non-food (7 to 11)	62.7	79.2	59.2	115.1	55.2	81.4
13	Total (6 & 12)	27.6	35.7	27.0	44.3	27.2	38.2

Note: 1. BE means before electrification and AE means after electrification.

From the above Table 3.14, it can be observed that, per acre productivity of all crops has increased from 27.2 quintals per acre to 38.2 quintals per acre in selected area of this study. With the electrification farmers have at least started thinking about changing traditional crops and in reality they have also started experimenting with various kinds of crops, which obviously require irrigation. Hence, pump sets brought significant change in the cropping pattern has increase the use of fertilizers. However, there has been an amazing increase in the production and productivity of crops. The use of electricity in various activities in agricultural sector resulted in increase of agricultural production and productivity. The all sample farmers answered positively that electricity has definitely proved beneficial for increasing agricultural production and productivity.

3.8. Conclusion

In this chapter, the impact of electrification on cropping pattern, production and productivity of crops have been analyzed. Due to electrification more number of farmers is inclined towards non-food crops from food crops. The area under food crops has decreased and area under non-food crops has increased due to electrification. Now a days, number of farmers have started cultivation of coconut tree, flowers and other commercial crops. The use of electrification for the various activities in agricultural sector has helped in shifting the cropping pattern from traditional to commercial one. The production and productivity of non-food crops has increased significantly in comparison with the food crops. Hence, electricity has played an important role in shifting cropping pattern, increasing production and improving productivity.