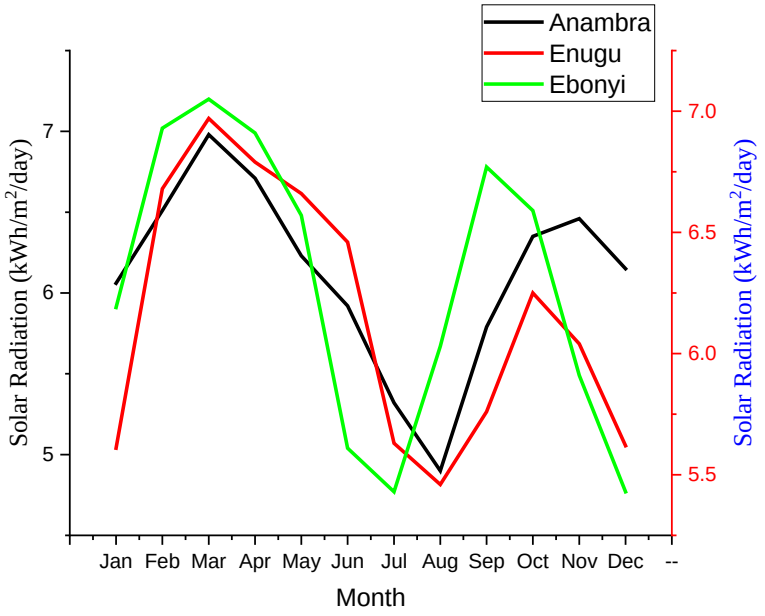

Fig. 1.3e: Monthly variation of ground – measured solar radiation for the year 2017

Figure 1.3a, is the monthly variation of ground – measured solar radiation for the year 2013. It was observed that maximum monthly average solar radiation value of 7.00 kWh/m^2/day was recorded in Anambra state in the month of March, 6.71kWh/m^2/day in Enugu in April and 6.40kWh/m^2/day in Ebonyi state in March. In Anambra state, the lowest solar radiation value of 4.93 kWh/m^2/day was observed in the month of August.

Figure 1.3b is the monthly variation of ground – measured solar radiation for the year 2014. Peak solar radiation of 6.66 kWh/m^2/day was observed in Anambra state in the month of March, 6.98kWh/m^2/day in Enugu and 6.39kWh/m^2/day in Ebonyi state. In Anambra, least measured solar radiation was 4.91 kWh/m^2/day in the month of August. These observations were similar to that of 2013.

Figure 1.3c, is the monthly variation of ground – measured solar radiation for the year 2015. Maximum radiation value of 7.00 kWh/m^2/day was observed in Anambra State, 6.99kWh/m^2/day in Enugu state and 6.40kWh/m^2/day in Ebonyi state; all in the month of March. 4.94 kWh/m^2/day was the least radiation value observed in the month of August in Anambra State.

In figure 1.3d, the monthly variation of ground – measured solar radiation for the year 2016, showed the maximum value of 7.01 kWh/m^2/day and 7.00 kWh/m^2/day in Anambra and Ebonyi respectively in the month of March. Enugu State had the maximum value of 6.83 kWh/m^2/day in the month of April. 4.94kWh/m^2/day was the least radiation observed in the month of August in Anambra State.

Figure 1.3e is the variation of ground – measured solar radiation for the year 2017. Maximum radiation of 6.98 kWh/m^2/day was recorded in Anambra, 7.00 kWh/m^2/day in Enugu state and 7.02 kWh/m^2/day in Ebonyi State, all in March. 4.90 kWh/m^2/day was the least value of radiation observed in the month of August in Anambra State.

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CONCLUSION

It was observed from the analysis that maximum monthly average solar radiation value of approximately 7.00 kWh/m^2/day was recorded in Anambra state between the months of March and April and it varied between 6.39kWh/m^2/day-6.99kWh/m^2/day in other states. This can be attributed to the fact that the months of March, April and May fall within the period of longer days and shorter nights experienced in the Southern hemisphere. A longer day implies longer sunshine hours per day. Under normal conditions, the longer the period of sunshine and shorter the night, the greater the amount of solar radiation received in an area (Rajan, 2017).

Results also showed that based on the ground measurements of solar radiation all over the study area as presented in figure 3.1a to 3.1e, a minimum monthly mean solar radiation value of 4.92 kWh/m^2/day was recorded in Anambra state in the month of August. The lowest solar radiation values were observed in the months of July and August in all the three states, as well as December and January in Enugu and Ebonyi states. This is due to the rainy season which is characterized by clouds in the area, which have high capacity to intercept the incident solar radiation received in the area. A similar conclusion was reached by Ojosu (1990) who observed that in Nigeria, the rainy season also records low levels of solar radiation especially in the months of July and August.

Finally, the study showed that the optimum period for harnessing solar energy in the study areas were in the months of March and April, since the highest insolation was recorded within these months.

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