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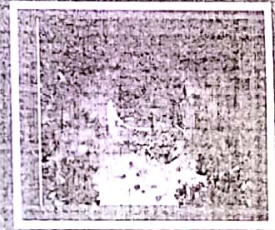
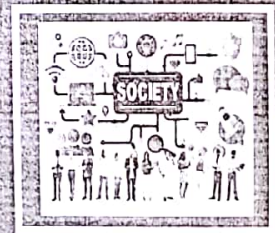
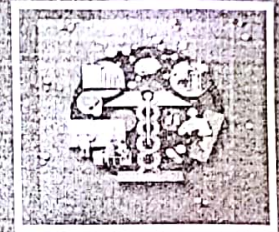
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Address  
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## Spatial Temporal Variation of Biogas in Kolhapur District

Krishna B. Patre<sup>1</sup> Dr. Sambhaji Shinde<sup>2</sup> Santosh P Mane<sup>3</sup>

<sup>1</sup>Assistant Professor, Vitthalrao Patil Mahavidyalaya Kale

<sup>2</sup>Professor & Head Department of Geography, Shivaji University, Kolhapur

<sup>3</sup>Assistant Professor & Head Department of Geography, Sameer Gandhi Kala Mahavidyalaya, Malshiras

### Abstract

The socio-economic background or the profile of the biogas plant holders can give an idea about the social and economic strata of the society who are using biogas. It is also necessary to review the social and economic background of the biogas plant holder in order to assess the relationship between biogas plants and rural development. For example rural families having animals, agriculture land, required area for biogas plant, financial ability, climatic suitability and desire to build the biogas plants leads into increasing numbers of biogas plants and vice versa.

**Keywords:** - Spatial Temporal, Variation, Biogas

### Introduction

As National Biogas & Manure Management Programme has been popular among the rural area in Kolhapur. All efforts for completion of target are taken by Zilla Parishad Kolhapur. The procedure of implementation starts from grampanchayat level. Gramsevak in their monthly meetings are informed about the programme and their role as promoter. Being Facilitator, Block Development Officer, Agriculture Officer and Extension Officer (Agri.) sometimes attend gramsabha to explain the importance of biogas plant among farmer. Again in their regular visits to villages there are constant efforts to identify the beneficiaries i.e. farmers with minimum 2-3 animals. Total no of families in Kolhapur District are 4.96 lakhs out of which cattle holding families are 3.16 lakh. With sufficient information education and communication by means of leaflet, posters and agril. Exhibition, article in news paper and mazine etc. promoted beneficiaries give their applications for biogas construction. With the certificates of Gramsevak for availability of sufficient livestock and space for biogas plant construction, the applications are given to Panchayat Samiti. The agriculture wing of Panchayat Samiti makes scrutiny of applications and gives technical sanction for construction. After approval for construction, the beneficiaries construct the plant through the trained masons from nearby villages. Regular inspection is made by Agriculture Officer and Extension Officer (Agri) during construction. After completion of plant, the proposals for subsidy claims are prepared including plant photographs showing linked toilets manure pits etc. The house assessment records updated with biogas plants is also main component of the proposal. In this way complete proposals are submitted at panchayat samiti.

**Objective:-** To Study Spatial Temporal Variation of Biogas in Kolhapur District

### Study Area

Kolhapur district is situated in the southern part of Maharashtra state. It lies between 15°43' and 17°17' North latitude and 73°40' and 74°42' East longitude (Map 2.1). It is surrounded by Belgum district of Karnataka state to the east and south, Sangli district to the north and Ratanagiri and Sindhudurg district to the west. The Sahyadri ranges to the west and Warana River to the north form the natural boundaries.

The last and most important subcomponents in the spatial distribution of biogas is the spatial temporal variations in the biogas. In fact, in geographical point of view, Spatiotemporal variation can be classified in to four sub groups according to the nature and extent of variation over a period of time and space.

1. **Pure Spatial Variation :** In this variations variables changes across the spatial transect but they become stable/ constant from one period of time to another.
2. **Pure Temporal Variation :** Factors fluctuate starting with one time then onto the next yet are consistent crosswise over space.
3. **Spatial and Temporal Variation :** It can happen together; for this situation, the variables change starting with one time then onto the next yet stay steady crosswise over space.
4. **Pure Spatiotemporal Variation:** it occurs changes in factors with both space and time make a moving mosaic.

The Spatial Temporal Variation are measured on Likert Three Scale i.e Always, Sometime and Never. The scale always represents the Pure Spatiotemporal Variation and scale sometime indicates the



Spatial and Temporal Variation and lastly scale Never represents the Pure Spatial Variation. The table 1 indicates the Geo-climatic zone wise Spatial Temporal Variation in the various environmental or physical variables of biogas over a period of time.

**Table:-1, Spatial Temporal Variation of Biogas**

Spatial Temporal Indicator	Always (Pure Spatiotemporal Variation)	Sometime (Spatial and Temporal Variation)	Never (Pure Spatial Variation)	Total
<b>Western Zone</b>				
Changes in Land Uses	0(0)	12(12.63)	83(87.37)	95(100)
Reduction in Indoor Air Pollution	80(84.21)	12(12.63)	3(3.16)	95(100)
Improved Health Conditions due to Closed Toilet and Biogas Cooking	90(94.74)	5(5.26)	0(0.0)	95(100)
Environment Pollution (due to Drainage Water and Waste Generated by Biogas)	74(77.89)	6(6.32)	15(15.79)	95(100)
Positive Changes Habits and Behavior	68(71.58)	15(15.79)	12(12.63)	95(100)
Improved Agriculture Productivity due Biogas Compost	55(57.89)	19(20.0)	21(22.11)	95(100)
<b>Middle Zone</b>				
Changes in Land Uses	11(5.24)	89(42.38)	110(52.38)	210(100)
Reduction in Indoor Air Pollution	165(78.57)	25(11.90)	20(9.52)	210(100)
Improved Health Conditions due to Closed Toilet and Biogas Cooking	188(89.52)	11(5.24)	11(5.24)	210(100)
Environment Pollution (due to Drainage Water and Waste Generated by Biogas)	179(85.24)	17(8.10)	14(6.67)	210(100)
Positive Changes Habits and Behavior	201(95.71)	4(1.90)	5(2.38)	210(100)
Improved Agriculture Productivity due Biogas Compost	125(59.52)	68(32.38)	17(8.10)	210(100)
<b>Eastern Zone</b>				
Changes in Land Uses	26(7.58)	38(11.08)	279(81.34)	343(100)
Reduction in Indoor Air Pollution	279(81.34)	15(4.37)	49(14.29)	343(100)
Improved Health Conditions due to Closed Toilet and Biogas Cooking	265(77.26)	21(6.12)	57(16.62)	343(100)
Environment Pollution (due to Drainage Water and Waste Generated by Biogas)	299(87.17)	27(7.87)	17(4.96)	343(100)
Positive Changes Habits and Behavior	231(67.35)	38(11.08)	74(21.57)	343(100)
Improved Agriculture Productivity due Biogas Compost	234(68.22)	64(18.66)	45(13.12)	343(100)

Source: Based on Field Work 2018

**Spatial Temporal Variation of Biogas in Western Zone**

It is interesting to note that there is no existence of pure spatiotemporal variations in case of changes in land use pattern due to biogas in western zone of Kolhapur district. On the contrast, the high degree of pure spatial variation is observed in case of changes in land use pattern. The variables

such as reduction in indoor air pollution, improved health conditions due to closed toilet and biogas cooking, environment pollution (due to drainage water and waste generated by biogas), positive changes habits and behavior, and improved agriculture productivity due biogas compost are reveals the pure spatiotemporal variations in western Geo-climatic zone. The minor evidences are recorded in case of Spatial and Temporal Variation and Pure Spatial Variation

#### **Spatial Temporal Variation of Biogas In Middle Zone**

It is interesting to note that there is a little existence of pure spatiotemporal variations in case of changes in land use pattern due to biogas in middle zone of Kolhapur district. On the contrast, the high degree of pure spatial variation is observed in case of changes in land use pattern. The variables such as reduction in indoor air pollution, improved health conditions due to closed toilet and biogas cooking, environment pollution (due to drainage water and waste generated by biogas), positive changes habits and behavior, and improved agriculture productivity due biogas compost are reveals the pure spatiotemporal variations in middle Geo-climatic zone. The minor evidences are recorded in case of Spatial and Temporal Variation and Pure Spatial Variation

#### **Spatial Temporal Variation of Biogas In Eastern Zone**

It is interesting to note that there is also a very little existence of pure spatiotemporal variations in case of changes in land use pattern due to biogas in eastern zone of Kolhapur district. On the contrast, the high degree of pure spatial variation is observed in case of changes in land use pattern. The variables such as reduction in indoor air pollution, improved health conditions due to closed toilet and biogas cooking, environment pollution (due to drainage water and waste generated by biogas), positive changes habits and behavior, and improved agriculture productivity due biogas compost are reveals the pure spatiotemporal variations in eastern Geo-climatic zone. The minor evidences of Spatial & Temporal Variation and Pure Spatial Variation are recorded eastern geo-climatic zone.

#### **Conclusion**

The issue of rural energy is one of matter of great concern to the policy makers in India. The rural area has having huge potential of non conventional energy sources but due to technological back up and effective planning, planners are fail to address the issue of rural energy in proper manner. The biogas plays very crucial role in the rural development that has been explained with the help of following heads.

To study spatial pattern of biogas plants in Kolhapur district; to assess the economics of biogas plants.; and to examine the relationship between biogas plants and rural development. By considering these three main objectives chapter has attempted to make more impartial and precise study. It has comprehensively presented social background, economic background and agriculture profile of the sample biogas plant holders. In depth analysis of spatial pattern, economics of biogas and its role in rural development has carried out by applying standard tools and techniques. The environmental significance of biogas is also appreciable and it has proven as a good source of green energy to the rural area.

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