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## EMPIRICAL ESTIMATION AND VERIFICATION OF SUSTAINABILITY OF CHECK DAMS IMPLEMENTED BY GRAMA PANCHAYATHS IN KARNATAKA

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### Abstract

According to research, Construction of check dams is one of the programmes implemented by grama panchayaths under MGNREGA and Ministry of Rural Development. Ministry of Rural Development has implemented sixteen different programmes under MGNREGA. Most of these programmes have been implemented by grama panchayaths. One of the objectives of Ministry of Rural Development programme is to ensure the sustainability of rural development. In the present paper an attempt has been made to evaluate the green potential and effectiveness of check dams implemented by grama panchayaths. It has found from the study that the greening of check dams not completely achieved in the study area as the green index value is less than one and there are significant differences in the green index values among the grama panchayaths. The major reason for not achieving complete greening check dams is due to lack of green potential and ineffective implementation of check dams. Accordingly, the objective of ministry of rural development has not realised. As the study is based on sample data and with tested proofs, the arguments of the study are applicable to the entire states and Nation. Therefore, the ministry of rural development has to lay down rules and regulations for implementation of programme and there is also need to take necessary disciplinary action against the implementing authorities for not ensuring greening of check dams. At the same time, it is also necessary to evaluate the programmes implemented by grama panchayaths. Accordingly, the present study has significantly contributed for evaluating rural development programmes for their sustainability.

**Keywords:** Sustainability, Green potential, Green index, Check Dams, Rural Development.

## Introduction

Check dams implemented by grama panchayaths in karnataka, being one of the major infrastructures play vital role in rural development (Mahesha & Lokesha, 2016), (Novosad, Asher, & Paul, 2018). Construction of check dams is one of the programmes implemented by grama panchayaths under MGNREGA and Ministry of Rural Development (Das, 2016). Ministry of Rural Development has implemented sixteen different programmes under MGNREGA (Ambujam & Anuradha, 2020). Most of these programmes have been implemented by grama panchayaths (Bassam, 3-June-2016). One of the objectives of Ministry of Rural Development programme is to ensure the sustainability of rural development (Ramathilagam, Murugesan, Manikandan, and Armugaraja, 2017), (Singh, Singhal, Neeru, & Yuvika, 2016), (Beg & Danish, 2018), (Singh; Ranvir, 2018), (Saha & Prasenjit, 2016). The sustainability of implementation of these programmes is depending upon two important aspects, one is green potential and another one is effectiveness in implementation (Vedanthadesikan & Sundar, 2018). The green potential of the programme again depending upon four important aspects like, increasing productivity, improvement in sustainability, reduction of negative impact on local activity and resilience to natural calamities. The ministry of rural development has developed a methodology to compute sustainable rural development green index based on green potential and effectiveness for all the programmes implemented by grama panchayaths under MGNREGA (UNDP, 2012). In the present paper an attempt has been made to evaluate the green potential and effectiveness of Check dams implemented by grama panchayaths in karnataka implemented by grama panchayaths.

## Review of Literature

Check dams implemented by grama panchayaths in karnataka, have been considered to be major source of movement of human and goods (Mahesha & Lokesha, 2016). Lack of check dams infrastructure is a major hurdle for rural development in general and agriculture and allied sector development in particular (Ambujam & Anuradha, 2020). There are multiple linkages between check dams, rural development and sustainability (Singh, Singhal, Neeru, & Yuvika, 2016), (Saha & Prasenjit, 2016), (Singh; Ranvir, 2018). Most of the previous studies have attempted to examine the impact of check dams on rural development (Bharghava, 2014), impact of check dams on agriculture (Novosad, Asher, & Paul, 2018), impact of check dams on allied activities (Vasanthakumari, 2011). Limited previous studies have also tried to establish the linkages between Check dams (Francis & Nandini, 2015). Previous studies have also analyzed the impact of check dams on rural health and educational development (Bell & Clive, 2012). Few studies have also tried to analyze the rural development programmes (Motwani, Anchlia, & Dharmesh, 2012). Previous studies have hardly evaluated the sustainability of rural development (Francis & Nandini, 2015). However, the previous studies have not systematically and scientifically evaluated the sustainability of rural check dams and paths for their green potential and effectiveness. Accordingly, in the present paper an exclusive effort has been made to evaluate the green potential and effectiveness of grama panchayaths check dams by computing green index for grama panchayaths check dams.

## Objective of the study

1. To study the product green potential and effectiveness in implementation karnataka.
2. To analyse the sustainability of check dams implemented by grama panchayaths in karnataka.

## Methodology

The present paper has attempted to compute index for sustainability of Check dams implemented by grama panchayaths in karnataka. The index of sustainability of Check dams implemented by grama panchayaths is given by;

$$GI \text{ of check dams grama panchayaths } GI = \frac{\sum_{i=1}^{i=N} GV}{4N}$$

GV is the product of green potential and effectiveness in implementation.

Green potential is estimated on the presence of; Productivity, Sustainability, Impact and Resilience.

Effectiveness of implementation is calculated based on; 0 for Worthless, 0.1 for Minimal, 0.25 for Low, 0.5 for Medium and 1 for High.

The computation of green index has done by using primary data collected from 13 panchayaths and 442 responses (including both grama panchayaths representatives residents) with the help of stratified sampling method. The data has enumerated from Hunsur taluk and the Justification for selection of Kottegala and Moduru panchayaths is most of the under MGNREGA are implemented in Mysuru district and most of the programmes under MGNREGA are implemented in Hunsur taluk. Accordingly, Hunsur taluk has been selected for present study.

## Results and Discussion

The green potential, effectiveness in implementation and green index have computed and analyzed. The major focus of this paper is to understand the status of greening of rural programmes and also to find differences among the Kottegala and Moduru panchayaths. Accordingly, in the following section the computed values are presented for green potential, effectiveness and green index in the sequence.

The level of green potential of check dams grama panchayaths implemented in the panchayaths of Hunsur taluk have computed and found that the minimum green potential is found in Kottegala panchayaths with the green potential of 2.5. The maximum green value is found in Moduru panchayaths with the green potential of 3.353. in the following section an attempt has made to create groups by considering all the 02 panchayaths based on the average green potential and standard deviation in the average.

## Analysis of Loose Boulder Check Dams:

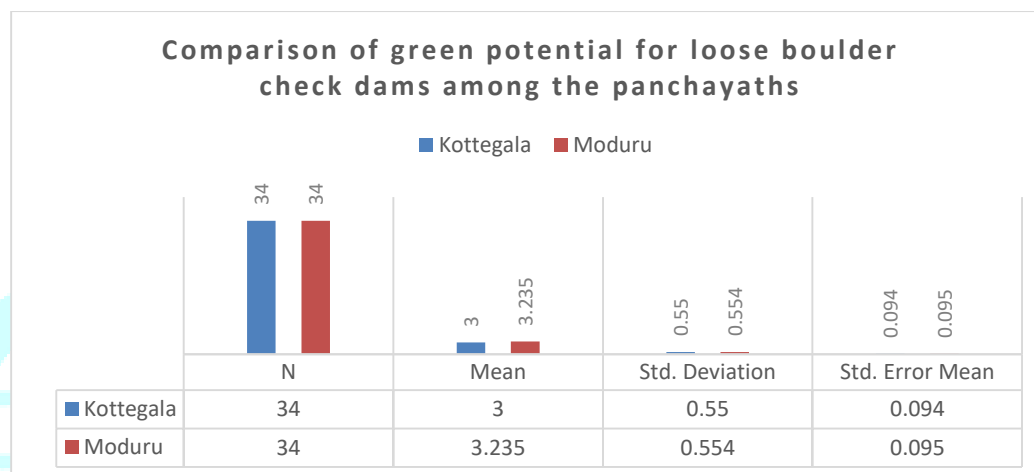
The loose boulder check dam is a small wall constructed with rock, gravel bags, sand bags other reusable products across the drainage ditch. This canal controls the effective slopes thereby avoiding velocity of the water flow. (Ramathilagam, Murugesan, Manikandan, and Armugaraja, 2017).

**Table 01.1**  
**Comparison of Green Potential for Loose Boulder Check Dams among the Panchayaths**  
**(Values in Numbers)**

| Gram Panchayaths                           | N  | Mean  | Std. Deviation | Std. Error Mean |
|--|----|-------|----------------|-----------------|
| <b>Kottegala</b>                           | 34 | 3.000 | 0.550          | 0.094           |
| <b>Moduru</b>                              | 34 | 3.235 | 0.554          | 0.095           |
| <b>F-test Value: 2.642, Sig:0.109</b>      |    |       |                |                 |
| <b>t- Value: -1.757, df:66, Sig: 0.084</b> |    |       |                |                 |

**Source:** Primary data and results are computed by researcher

**Figure: 01**



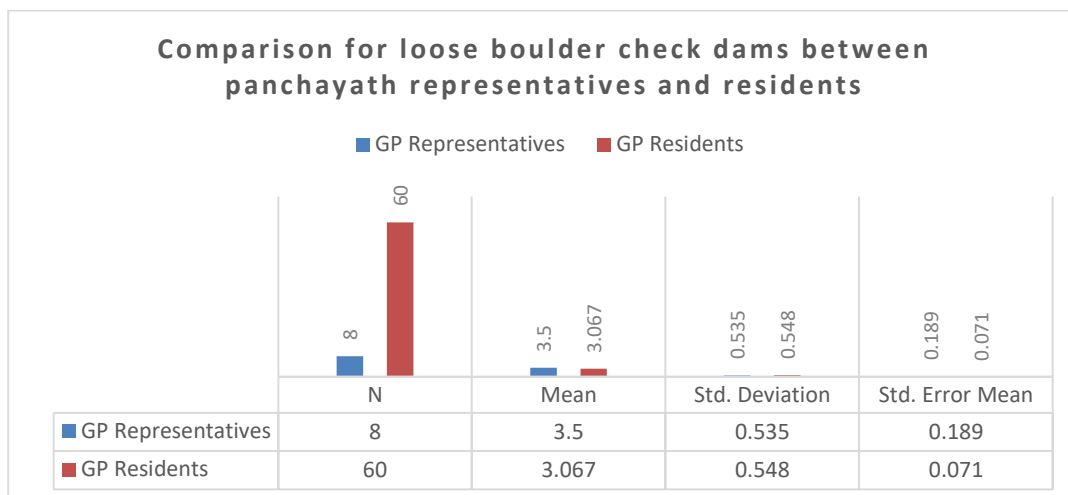
Loose boulder check dams have implemented and constructed in only two panchayaths of Hunsur taluk. Accordingly, the values are computed only for these two panchayaths and presented above. The average index for green potential for Kottegala panchayath is 3.000 and it is 3.235 for Moduru panchayath. The F-test is 2.642 and not significant at five percent level. Therefore, the variance in the green potential within the panchayath and between the panchayaths is not significant. The t-test value is -1.757 and not significant at five percent level. Therefore, there are no significant difference in the average green potential for loose boulder check dams between Kottegala and Moduru panchayaths.

**Table 01.2**  
**Comparison for Loose Boulder Check Dams between Panchayath Representatives and Residents**  
**(Values in Numbers)**

| Respondents                                | N  | Mean  | Std. Deviation | Std. Error Mean |
|--|----|-------|----------------|-----------------|
| <b>GP Representatives</b>                  | 8  | 3.500 | 0.535          | 0.189           |
| <b>GP Residents</b>                        | 60 | 3.067 | 0.548          | 0.071           |
| <b>F-test Value: 1.083, Sig:0.302</b>      |    |       |                |                 |
| <b>t- Value: 2.106, df: 66, Sig: 0.039</b> |    |       |                |                 |

**Source:** Primary data and results are computed by researcher.

**Figure: 02**



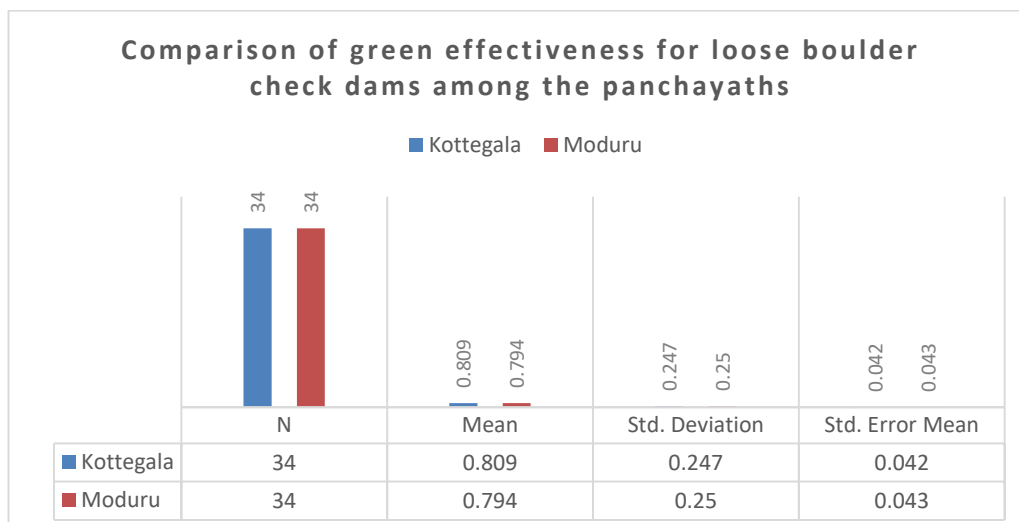
The t-test has computed to find the significant difference in the green potential for loose boulder cheek dams between GP representatives and residents. The F-test value is 1.083 and not significant at five percent level. Therefore, there is no significant difference in the variance within the group and between the groups. The mean value of green potential for GP representatives is 3.5 and it is 3.067 for GP residents. The t-test value is 2.106 and significant at five percent level. Therefore, the GP representatives have over rated the green potential for loose boulder check dams.

**Table 01.3**  
**Comparison of Green Effectiveness for Loose Boulder Check Dams among the Panchayaths**  
 (Values in Numbers)

| Gram Panchayaths                               | N  | Mean  | Std. Deviation | Std. Error Mean |
|--|----|-------|----------------|-----------------|
| Kottegala                                      | 34 | 0.809 | 0.247          | 0.042           |
| Moduru   | 34 | 0.794 | 0.250          | 0.043           |
| <b>F-test Value: 0.235, Sig: 0.630</b>         |    |       |                |                 |
| <b>t-test Value: 0.244, df: 66, Sig: 0.808</b> |    |       |                |                 |

Source: Primary data and results are computed by researcher.

**Figure: 03**



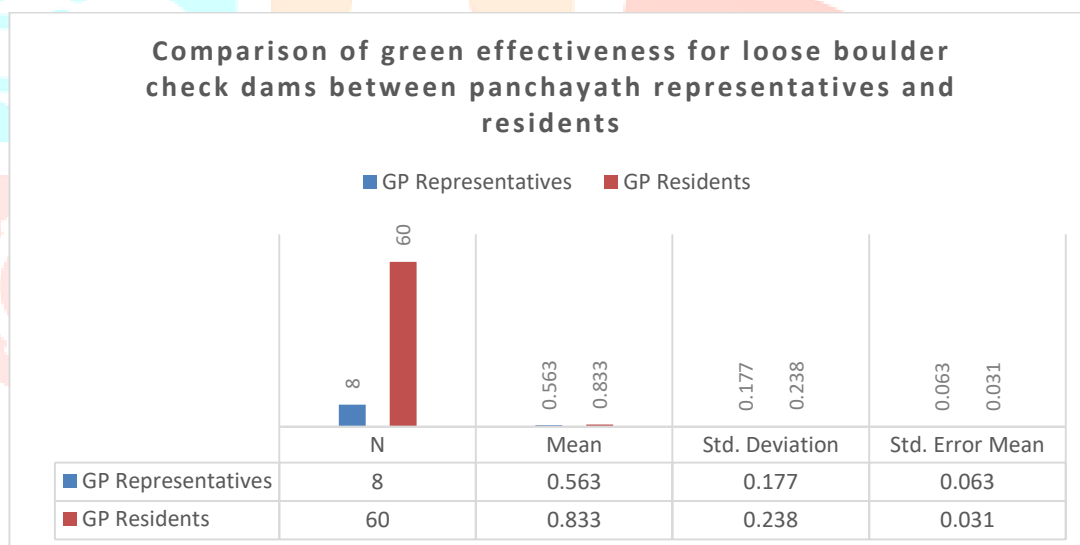
The t-test has computed to find the significant difference in effective implementation for loose boulder check dams among the panchayaths of Hunsur taluk. The F-test value is 0.235 and not significant at five percent level. Therefore, there is no significant difference in the variance within the group and between the groups. The mean value of effective implementation of Kottegala panchayath is 0.809 and it is 0.794 for Moduru panchayath. The t-test value is 0.244 and it is not significant at five percent level. Therefore, effective implementation for loose boulder check dam has not statistically different between Kottegala and Moduru.

**Table 01.4**  
**Comparison of Green Effectiveness for Loose Boulder Check Dams between Panchayath Representatives and Residents**  
**(Values in Numbers)**

| Respondents                                | N  | Mean  | Std. Deviation | Std. Error Mean |
|--|----|-------|----------------|-----------------|
| GP Representatives                         | 8  | 0.563 | 0.177          | 0.063           |
| GP Residents                               | 60 | 0.833 | 0.238          | 0.031           |
| <b>F-test Value: 12.024, Sig: 0.001</b>    |    |       |                |                 |
| <b>t-Value: -3.102, df: 66, Sig: 0.003</b> |    |       |                |                 |

Source: Primary data and results are computed by researcher.

**Figure: 04**



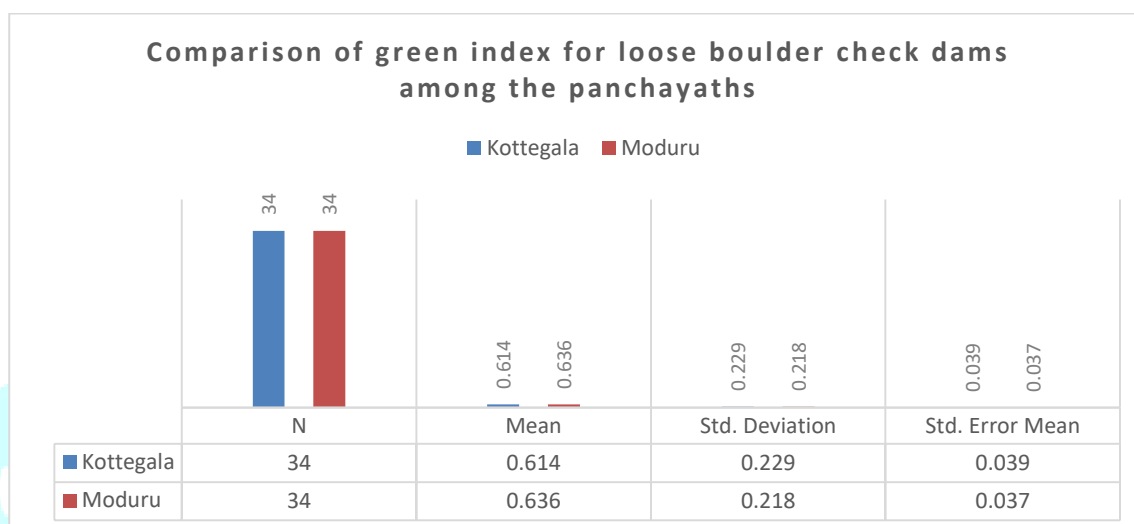
The t- test has computed to find the significant difference for loose boulder check dams in effective implementation between GP representatives and resident. The F-test value is 12.024 and significant at one percent level. Therefore, there are significant in the variance within the group and between the groups. The mean value of effective implementation for GP representatives is 0.563 and it is 0.833 for GP residents. The t-test value is -3.102 and significant at one percent level. Therefore, the GP representatives and residents have different level of opinion about effective implementation of loose boulder check dams.

**Table 01.5**  
**Comparison of Green Index for Loose Boulder Check Dams among the Panchayaths**  
**(Values in Index)**

| Gram Panchayaths                           | N  | Mean  | Std. Deviation | Std. Error Mean |
|--|----|-------|----------------|-----------------|
| Kottegala                                  | 34 | 0.614 | 0.229          | 0.039           |
| Moduru                                     | 34 | 0.636 | 0.218          | 0.037           |
| <b>F- test Value: 0.184, Sig:0.670</b>     |    |       |                |                 |
| <b>t- Value: 0.406, df: 66, Sig: 0.686</b> |    |       |                |                 |

**Source:**Primary data and results are computed by researcher.

**Figure: 05**

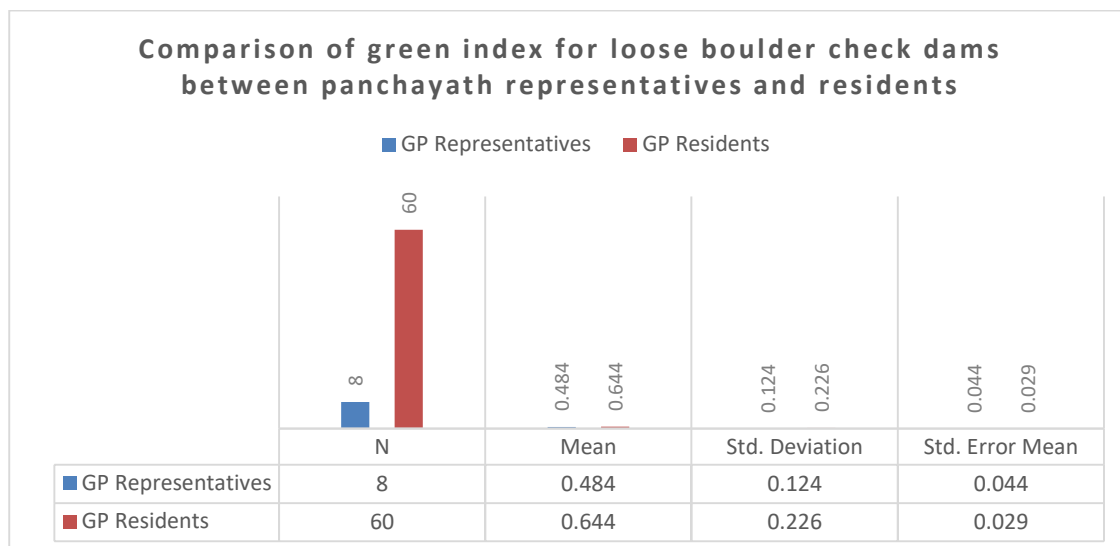


Loose boulder check dams have implemented in and constructed in only two panchayaths of Hunsur taluk. Accordingly, the values are computed only two panchayaths and presented above. The average green index for Kottegala panchayath is 0.614 and it is 0.636 for Moduru panchayath. The F-test is 0.184 and not significant at five percent level. Therefore, the variance in the index within the panchayath and between the panchayath is not significant. The t-test value is 0.406 and not significant at five percent level. Therefore, there are no significant differences in the average index value for loose boulder check dams between Kottegala and Moduru panchayaths.

**Table 01.6**  
**Comparison of Green Index for Loose Boulder Check Dams between Panchayath Representatives and Residents**  
**(Values in Index)**

| Respondents                                 | N  | Mean  | Std. Deviation | Std. Error Mean |
|---|----|-------|----------------|-----------------|
| GP Representatives                          | 8  | 0.484 | 0.124          | 0.044           |
| GP Residents                                | 60 | 0.644 | 0.226          | 0.029           |
| <b>F-test Value: 8.493, Sig: 0.005</b>      |    |       |                |                 |
| <b>t- Value: -1.943, df: 66, Sig: 0.056</b> |    |       |                |                 |

**Source:**Primary data and results are computed by researcher.

**Figure: 06**

The t-test has computed to find the significant difference in green index for loose boulder check dams between GP representatives and residents. The F-test value is 8.493 and significant at one percent level. Therefore, there is no significant difference in the variance within the group and between the groups. The mean value is 0.484 for GP representatives and it is 0.644 for GP residents. The t-value is -1.943 and not significant at five percent level. Therefore, the GP representatives have over rated the green index for loose boulder check dams.

### Conclusion

The present paper has estimated and analysed greening of Check dams Hunsur taluk of Kottegala and Moduru grama panchayaths Mysore district, Karnataka. The study has computed green potential values, values for effective implementation and green index. It has found from the study that the greening of Check dams grama panchayaths not completely achieved in the study area as the green index value is less than one and there are significant differences in the green index values among the grama panchayath. The major reason for not achieving complete greening of Check damss is due to lack of green potential and ineffective implementation of Check dams grama panchayaths. Accordingly, the objective of ministry of rural development has not realised. As the study is based on sample data and with tested proofs, the arguments of the study are applicable to the entire states and Nation. Therefore, the ministry of rural development has to laydown rules and regulations for implementation of programme and there is also need to take necessary disciplinary action against the implementing authorities for not ensuring greening of Check damsgrama panchayaths. At the same time, it is also necessary to evaluate the programmes implemented by grama panchayath. Accordingly, the present study has significantly contributed for evaluating rural development programmes for their sustainability.



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