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# Assessment Of Sports Facilities And Its Influence On Inter-Regional Sports Participation Among Jawahar Navodaya Vidyalayas

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**Abstract**
Sports facilities have been widely considered as a necessary precondition for institutional engagement in competitive sport but the relationship between sports and institutional engagement has not been quantified at the school level in Jawahar Navodaya Vidyalaya (JNV) system of North-East India. The present study analysed the effect of sports facility adequacy split into four sub-domains (Ground, Indoor, Outdoor and Equipment) on the Inter-Regional (JNVS) participation of the ninety-eight (98) JNVs of the Shillong Region during the decade 2015 to 2025. Using descriptive-analytical, correlational design, the facility data was collected through structured 23-item Observation Schedule, which was combined into the ground, indoor, outdoor, equipment, and composite Facility Index scores of the 98 institutions (census sampling), and were correlated with the number of participants each institution sent to the JNVS Inter-Regional competitions. Correlations between facility sub-scores and participation ranged from $r = .778$ to $r = .833$ (all $p < .001$); the composite Facility Index correlated with participation at $r = .882$ ($p < .001$). Inter-Regional participation was best explained by a multiple linear regression model with four predictors (Grounds, Indoor, Outdoor and Equipment scores) that accounted for 77.7% of the variance in the participation ($R^2 = .777$, adjusted $R^2 = .767$, $F(4, 93) = 80.95$, $p < .001$), with equipment adequacy being the strongest predictor ($\beta = .251$, $p < .001$). The results provide solid empirical evidence for the hypothesis of the study that there is a significant and very strong positive relationship between Facility-adequacy and Inter-Regional sports participation and has direct implications for Infrastructure-planning priorities in the JNVS Shillong Region
**Keywords:** Sports facilities; Jawahar Navodaya Vidyalaya; Inter-Regional participation; JNVS; Shillong Region; correlation; multiple regression

## INTRODUCTION

In the residential-school model of Jawahar Navodaya Vidyalaya Samiti (JNVS), physical education and competitive sport is accorded to a central place and Games and Sports is regarded as an integral part of all-round development of talented rural youth (Jawahar Navodaya Vidyalaya Samiti [JNVS], 2020). It is widely believed, however, that to promote JNV students to the national arena School Games Federation of India (SGFI) through institutional participation, the physical infrastructure a school can provide to its students such as playgrounds, indoor halls, outdoor courts and well-stocked equipment stores is the primary pathway (Mili, 2016). As Rao (1970) pointed out in an early and oft-quoted formulation, without adequate playgrounds and infrastructure, any effort to promote physical education and sport is bound to fail, and the National Education and Sports Policy (NESP) of Government of India (1998) explicitly linked achievement in sport with the state of facilities available

to the sponsoring institution (Gr, 2023). Facility–participation connection is often mentioned in the PE literature but has not been widely reported in the Shillong Region geographically scattered and infrastructurally heterogeneous, comprising eight of the North-Eastern States and Union Territories (UTs), till now (Etim, 2024).The findings emphasize the critical role that adequate sports facilities play in enhancing student participation in competitive sports, reinforcing the need for investment in infrastructure within JNVs.

The question becomes extremely pertinent in view of the known inequities in the access to facilities in India. Just a small percentage of rural households had access to playgrounds and sports fields as reported by National Sample Survey Office (2012) and just a small minority of Indian schools had qualified sports facilities as per the Confederation of Indian Industry (2019) (Setiawan & Wibowo, 2023). These disparities at the national level make it imperative to determine, empirically and region-specifically, whether the facility available facilitates measurable competitive participation, especially given the fact that the Shillong Region JNVs are predominantly in rural/semi-rural and hilly/ remote area (Sujana, 2018).

The Shillong Region has ninety-eight JNVs and is also heterogeneous in terms of geographical location, connectivity and maturity of the campus, from a relatively easily reached region like Brahmaputra valley and Barak valley of Assam to hill areas of Arunachal Pradesh, Manipur, Mizoram and Nagaland. This diversity provides an analytically valuable setting to test, empirically, whether there is a systematic relationship between facility adequacy and Inter-Regional participation. (Pawar, 2016)

This paper is a part of an exhaustive doctoral study of sports facilities and participation in JNVs in Shillong Region which will focus on one of the independent-dependent variables pairing: Sports Facilities (Ground, Indoor, Outdoor and Equipment adequacy) and Participation in JNVS Inter-Regional Competition.

### 1.1. Objectives of the Study

The specific objectives that were followed in the present paper were the following:

a) The overall objective of the study is to evaluate the ground, indoors, outdoor and equipment facilities of 98 JNVs in Shillong Region.
b) To assess the extent of Inter-Regional (JNVS) participation of the 98 JNVs in 2015-2025 period.
c) To see if there is a relationship between facility sub-domain scores and Inter-Regional participation and how strong it is.
d) To determine, using multiple regression, the percentage of the variance of Inter-Regional participation can be explained by each facility sub-domain.

## 2. LITERATURE REVIEW

Reportedly, gaps in infrastructure limit the diversity and level of participation in institutional sporting facilities in previous investigations. Based on a survey of sports facilities in Indian Central Universities, (K & Gasti, 2021) observed that a significant number of the surveyed institutions were found to be lacking in terms of personnel, facilities in various sports disciplines, which was also reflected in low level of competitiveness in these institutions. In the present study of Kendriya Vidyalaya Sangathan schools, (Shashi & Prasad, 2016) found that the provision of facilities and the utilisation of programme were directly associated with the participation and achievement of the students at school, regional and national level competitions. (Ramniwas, 2015) discovered that the amount of participation in an external tournament was found to be directly proportional to the quality of the playing surface, indoor amenities, and standard equipment provided by the private and public sector undertakings. On conceptual grounds, (Hadire & Pathak, 2020) suggested that facilities are needed even if it is only to allow participation, but also to enhance player morale and the image that is projected which will encourage continued involvement, as is also the case in the present paper's empirical exploration of the facility–participation association. All these studies together point towards the fact that facility adequacy and competitive participation should have a positive and significant relationship something which they did not test particularly for the JNVS Shillong Region as of now.

## 3. METHODOLOGY

### 3.1 Research Design

Appropriate for this study, and for the larger methodological framework of the parent doctoral study (Chapter 3), was the descriptive-analytical, cross-sectional, correlational research design where the focus is to describe the

natural attributes of institutions and to assess the strength of relationships between those attributes without experimental manipulation.

**3.2 Population and Sample**

All ninety-eight (98) Jawahar Navodaya Vidyalayas in the Shillong Region as on the reference date were covered. N = 98 institutions, not a sample, are the units of analysis in this paper as the population study is finite and accessible and moderate in size, the Census Method (complete enumeration) was used.

**3.3 Variables**

Independent Variables: Grounds facility score, Indoor facility score, Outdoor facility score, Equipment score (all obtained from the Facility Observation Schedule), and the Overall Facility Score (sum of the above scores) and Facility Index (percentage of maximum score).

The Dependent Variable is the Total No. of participants fielded by each JNV in JNVS Inter-Regional competitions during 2015-2025 (sum of the institution-wise Participation Records), along with the Participation Frequency.

**3.4 Instrument**

A structured Observation Schedule with 23 items designed to evaluate the adequacy of the facility was used in six domains: Grounds (4 items), Indoor facilities (4 items), Outdoor facilities (3 items), Equipment (6 items), Maintenance (2 items) and Safety (4 items) each scored on a 3-point scale (1 = Not Available, 2 = Available but Inadequate, 3 = Available and Adequate). Sub-domains were obtained by adding the domain scores and the Overall Facility Score (range 23-69) was translated into a Facility Index (range 0-100) for ease of interpretation.

**3.5 Data Source and Collection**

Data on facilities were collected through direct observation of the institutions and participation data were collected from JNVS Regional Office (Shillong) Inter-Regional participation records for the last ten years (2015-2025) following the documented data-collection procedure used in the parent study (Chapter 3).

**3.6 Statistical Treatment**

Descriptive statistics (mean, standard deviation, range) were used for all facility and participation variables; Pearson product-moment correlation coefficients between each facility sub-score and Inter-Regional participation were used; and a standard (simultaneous) multiple linear regression with the four facility sub-scores as predictors of Inter-Regional participation was used, with variance inflation factor (VIF) diagnostics applied to assess multicollinearity. A 0.05 level of significance was used.

**4. RESULTS**

**4.1 Descriptive Statistics**

This study includes 98 observations and the descriptive statistics for the facility and participation variables are shown in Table 1. The mean scores for Grounds Facility (8.10 ± 2.00) and Indoor Facility (8.26 ± 2.05) reveals a moderate level of facility availability, while the score for Outdoor Facility (6.07 ± 1.51) was comparatively lower. The mean Equipment Score was 12.24 ± 3.00 indicating a moderate level of equipment availability, with significant variation across the observations.

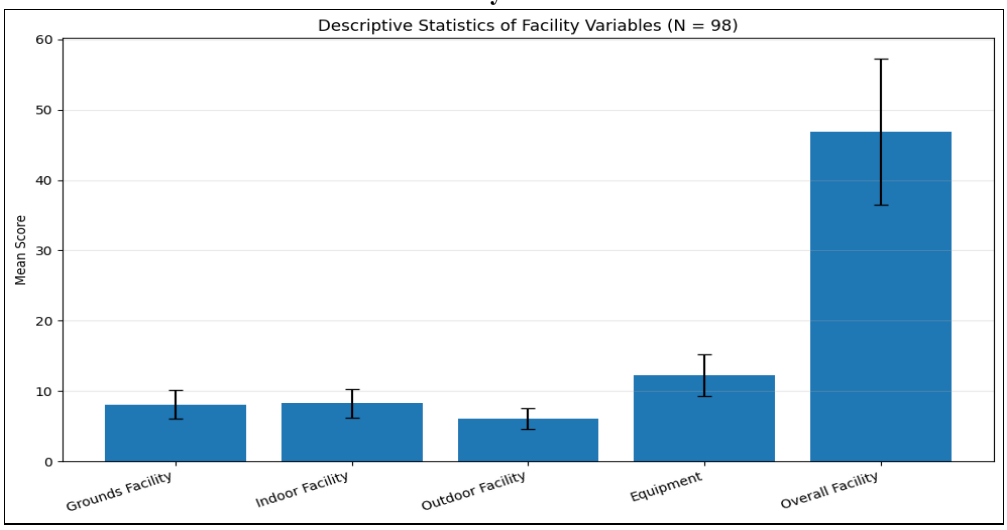
The Overall Facility Score was 46.91 ± 10.41, ranging from 30 to 63. Similarly, the mean Facility Index of 67.98 ± 15.09% ranged from 43.48% to 91.30% suggesting a moderate overall level of Facility provision and variability between the sampled Units. As regards participation, the mean number of Inter-Regional Participants was 209.06 ± 93.61, with a large range of 77 to 424, thus showing a significant variation in inter-regional participation. The mean Participation Frequency was 44.66 ± 7.94 with a range of 28 to 65 suggesting moderate variation in participation frequencies.

**Table 1. Descriptive Statistics for Facility and Participation Variables (N = 98)**

| Variable | Mean | SD | Min | Max |
|---|---|---|---|---|
| Grounds Facility Score | 8.10 | 2.00 | 4 | 12 |
| Indoor Facility Score | 8.26 | 2.05 | 4 | 12 |
| Outdoor Facility Score | 6.07 | 1.51 | 3 | 9 |
| Equipment Score | 12.24 | 3.00 | 6 | 18 |
| Overall Facility Score | 46.91 | 10.41 | 30 | 63 |
| Facility Index (%) | 67.98 | 15.09 | 43.48 | 91.30 |
| Inter-Regional Participants | 209.06 | 93.61 | 77 | 424 |
| Participation Frequency | 44.66 | 7.94 | 28 | 65 |

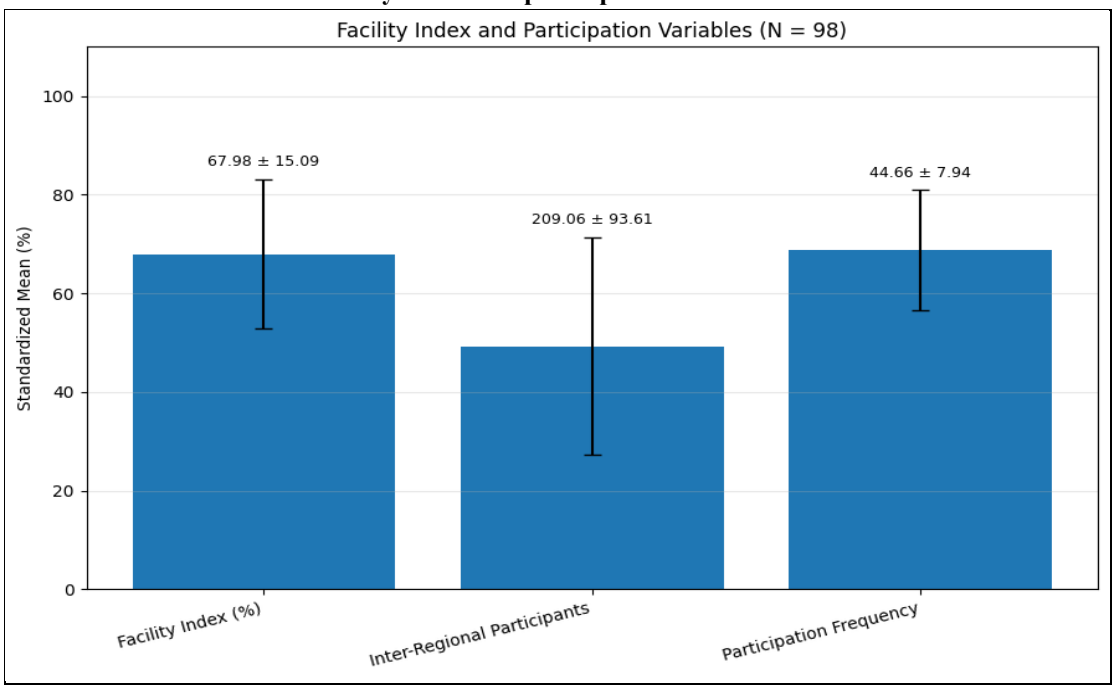
Error bars represent the standard deviation (SD) around the mean scores of the facility related variables (Figure 1). The Overall Facility Score had a mean of 46.91 (SD = 10.41), while the component scores were 8.10 ± 2.00 for Grounds Facility, 8.26 ± 2.05 for Indoor Facility, 6.07 ± 1.51 for Outdoor Facility, and 12.24 ± 3.00 for Equipment. Outdoor Facility Score had the lowest mean score of the individual components. The results show that the provision of different types of facilities varies in the sampled observations.

**Figure 1. Error bars represent the standard deviation (SD) around the mean Scores Descriptive Statistics of Facility Variables**




The descriptive statistics of the Facility Index and participation related variables are shown in figure 2. The mean Facility Index was 67.98% (SD = 15.09), thus suggesting a moderate level of provision in facilities overall. There was significant inter-regional participation with a mean of 209.06 (SD = 93.61) Inter-Regional Participants. The average Participation Frequency was 44.66 (SD = 7.94) which is in the moderate range of participation frequency. The findings show that there is a large degree of variation in the provision and participation by the 98 observations overall.

**Figure 2. Error bars represent the standard deviation (SD) around the mean Scores descriptive statistics of the Facility Index and participation-related variables.**




***4.2 Correlation Analysis***

Pearson correlation coefficients for the relationships between different facility sub-scores and inter-regional participation are shown in Table 2. Results showed that all the facility-related variables were significantly and positively associated with inter-regional participation. There was a strong positive correlation between Grounds Facility Score and participation ($r = .796$ $p < .001$), as well as between Indoor Facility Score ($r = .787$ $p < .001$) and participation. Outdoor Facility Score ($r = .778$ $p < .001$) also had a strong positive association with participation. The inter-regional participation had a very strong positive correlation with Equipment Score ($r = .833$, $p < .001$). In addition, Overall Facility Score was very highly positively correlated with participation ($r = .882$, $p < .001$). Similarly, a strong positive correlation was found between Facility Index (%) and inter-regional participation ($r = .882$, $p < .001$). The relationships of all were significant at the 0.001 level and had large effect sizes.

**Table 2. Pearson Correlations between Facility Sub-Scores and Inter-Regional Participation**

| Facility Variable | r (with Participation) | p-value | Effect Size |
|---|---|---|---|
| Grounds Facility Score | .796 | < .001 | Large |
| Indoor Facility Score | .787 | < .001 | Large |
| Outdoor Facility Score | .778 | < .001 | Large |
| Equipment Score | .833 | < .001 | Large |
| Overall Facility Score | .882 | < .001 | Large |
| Facility Index (%) | .882 | < .001 | Large |

The Pearson correlations of the facility sub-scores with inter-regional participation are shown in Figure 3. The figure shows that there are consistently high positive relationships in all dimensions of the facility. The correlation coefficients varied from $r = .778$ to .882; all these coefficients were significantly higher than the large effect criterion $r = .50$. The highest correlations were found for Overall Facility Score ($r = .882$) and Facility Index ($r = .882$) and second for Equipment Score ($r = .833$). Inter-regional participation also had strong positive associations with Grounds Facility Score ($r = .796$), Indoor Facility Score ($r = .787$), and Outdoor Facility Score ($r = .778$). The results show that facility provision and equipment availability are strongly related to higher inter-regional participation. The figure shows overall the correlation results in Table 2 graphically. These relationships are, however, statistical associations, and should not be interpreted as causal relationships.

**Figure 3. Pearson Correlation Coefficients between Facility Sub-Scores and Inter-Regional Participation**

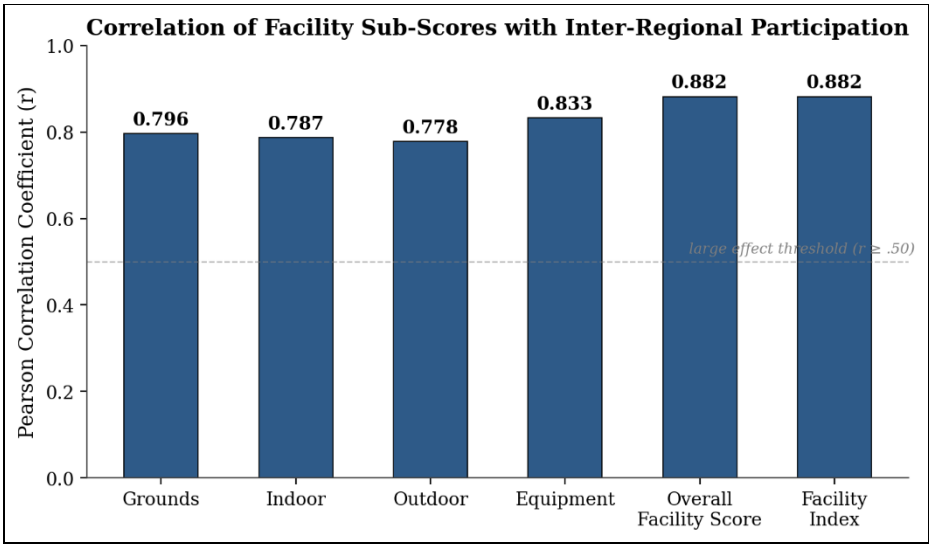
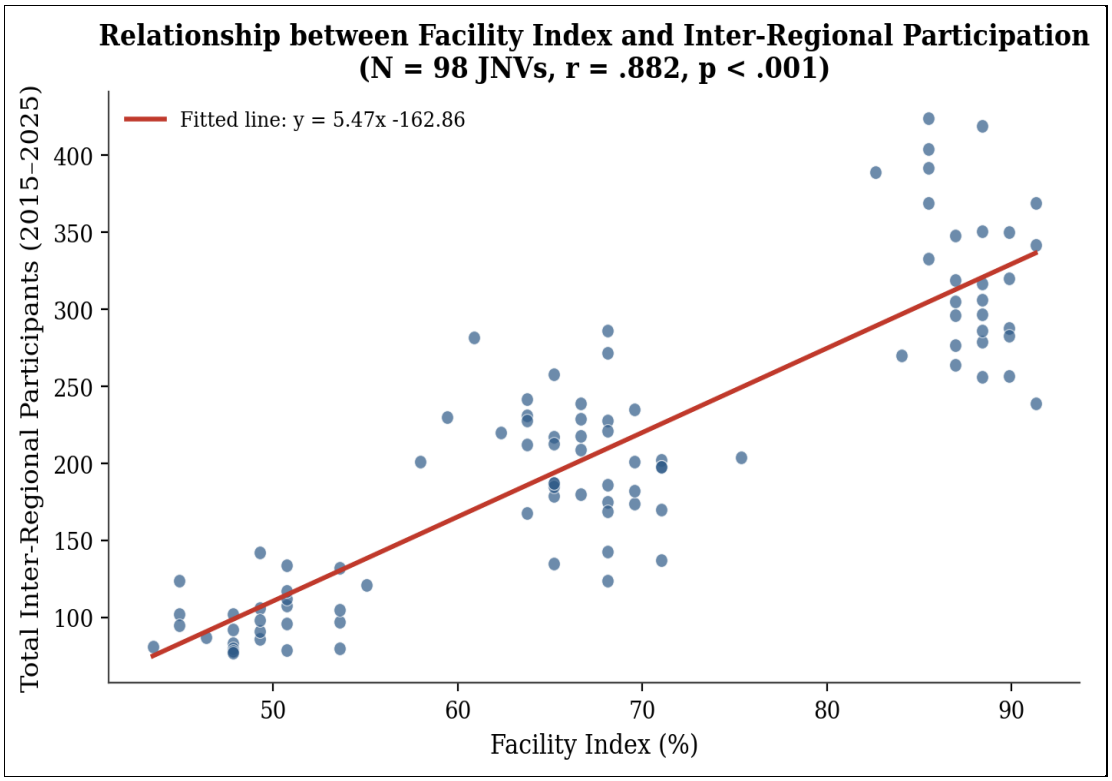



Figure 4 displays the correlation between Facility Index (%) and the number of all inter-regions involved in the JNVs ($n = 98$). There is a strong positive linear association between the two variables, with a Pearson correlation coefficient of $r = .882$ ($p < .001$) as shown in the scatter plot. The fitted regression line also slants upward, suggesting that the higher index of the facility, the more likely the inter-regional participation is to be.

The fitted regression line was y = 5.47x − 162.86, so that for every 1 percentage point increase in Facility Index the number of participants in the inter-regional level would increase by an estimated 5.47. The coefficient of determination ($R^2$ = .778) suggests that the linear relationship between Facility Index and inter-regional participation predicts about 77.8% of the variance in participation levels. The other 22.2% could be due to other factors and unexplained variation.

Overall, the figure strongly suggests that there is a positive correlation between facility availability and inter-regional participation graphically and statistically. The findings however, should be interpreted as associational and not causal since the correlation and regression analysis alone cannot prove that better facility infrastructural improvement is directly a cause of improved participation.

**Figure 4. Scatter Plot of Facility Index against Total Inter-Regional Participants, with Fitted Regression Line**




### *4.3 Multiple Regression Analysis*

Table 3 shows the multiple regression analysis that was carried out to ascertain the proportion of Grounds Facility Score, Indoor Facility Score, Outdoor Facility Score and Equipment Score in predicting inter-regional participation during the period 2015 to 2025. The overall regression model was found to be statistically significant, F(4, 93) = 80.95, p < .001. The model accounted for 77.7% of the variance in the total inter-regional participation with an R2 of .777. The Adjusted $R^2$ of .767 also suggests that the model still accounted for a substantial amount of variance, even after taking into account the addition of the predictors in the model.

All four predictor variables contributed significantly to the prediction of inter-regional participation and in a positive manner. Grounds Facility Score was a significant positive predictor (B = 9.15, SE = 4.32, β = .142, t = 2.12, p = .037). This means that, with the other predictors constant, the predicted increase in participation in inter-regional events for a 1-unit increase in Grounds Facility Score was of the order of 9.15 participants.

Indoor Facility Score also emerged as a significant positive predictor (B = 9.83, SE = 3.96, β = .154, t = 2.48, p = .015). Also, Outdoor Facility Score was a significant and positive predictor of inter-regional participation (B = 12.70, SE = 5.19, β = .148, t = 2.45, p = .016). These results indicate that better infrastructure – both indoor and outdoor – is positively correlated with increased inter-regional participation.

Equipment Score was the strongest standardized predictive contribution of all four variables (B = 10.97, SE = 3.02, β = .251, t = 3.63, p < .001). Availability and quality of equipment were therefore the two facility-related factors that were most uniquely associated with inter-regional participation when other factors were controlled.

**Table 3. Multiple Regression Coefficients Predicting Inter-Regional Participation**

| Predictor | B | SE | β | t | p |
|---|---|---|---|---|---|
| Constant | −157.63 | 20.94 | – | −7.53 | < .001 |
| Grounds Facility Score | 9.15 | 4.32 | .142 | 2.12 | .037 |
| Indoor Facility Score | 9.83 | 3.96 | .154 | 2.48 | .015 |
| Outdoor Facility Score | 12.70 | 5.19 | .148 | 2.45 | .016 |
| Equipment Score | 10.97 | 3.02 | .251 | 3.63 | < .001 |

Each of the 4 predictors contributed significant unique variance to the model ($p < .05$ in all cases): Equipment adequacy showed the highest standardised predictor ($\beta = .251$, $p < .001$), followed by the scores for the facilities' outdoor ($\beta = .148$), indoor ($\beta = .154$) and grounds ($\beta = .142$) areas.

The Variance Inflation Factor (VIF) for the predictors in the multiple regression model are given in Table 4. VIF was used to check for the presence of multicollinearity among the Grounds Facility Score, Indoor Facility Score, Outdoor Facility Score, and Equipment Score. The VIF values obtained ranged between 2.94 and 3.90.

The VIF values of the Grounds Facility Score, Indoor Facility Score and Outdoor Facility Score were 3.56, 3.13 and 2.94, respectively. The VIF value for Equipment Score was the highest (3.90). The predictors shared some common variance, but none of the VIF values exceeded 5.0, which is the generally accepted threshold for multicollinearity, indicating that the level of multicollinearity was not high enough to threaten the stability or interpretation of the regression coefficients.

**Table 4. Variance Inflation Factors for Regression Predictors**

| Predictor | VIF |
|---|---|
| Grounds Facility Score | 3.56 |
| Indoor Facility Score | 3.13 |
| Outdoor Facility Score | 2.94 |
| Equipment Score | 3.90 |

A simple linear regression model with only the composite Facility Index as the predictor produced an almost identical fit ($R^2 = .778$, $F(1, 96) = 336.0$, $p < .001$; $B = 5.47$, 95% CI [4.88, 6.06]), meaning that for every point increase in Facility Index scores, there was an estimated 5.5 Inter-Regional participants per institution over the study period.

***4.4 State-wise Pattern***

Table 5 shows the Facility Index and Inter-Regional Participation for each State for the eight North-Eastern States covered by the study. Results show significant differences between the states in facility availability and in participation among inter-regions.

Arunachal Pradesh recorded the highest Mean Facility Index (73.40) as well as the highest Mean Inter-Regional Participation (243.06). This means that the state used relatively strong facility conditions, and had higher rates of inter-regional participation. Manipur also had a relatively high Mean Facility Index (72.33) and a high Mean Inter-Regional Participation (239.82) thereby ranking among the better-performing states in both the indices.

The Mean Facility Index of Sikkim was 70.66 and the Mean Inter-Regional Participation of 218.75. Nagaland had the highest participation level of 217.64 and a Mean Facility Index of 67.19. The Mean Facility Index of Tripura was 66.85 and Mean Inter-Regional Participation was 212.62. The Mean Facility Index in Mizoram was 66.67 and Mean Inter-Regional Participation was 193.75.

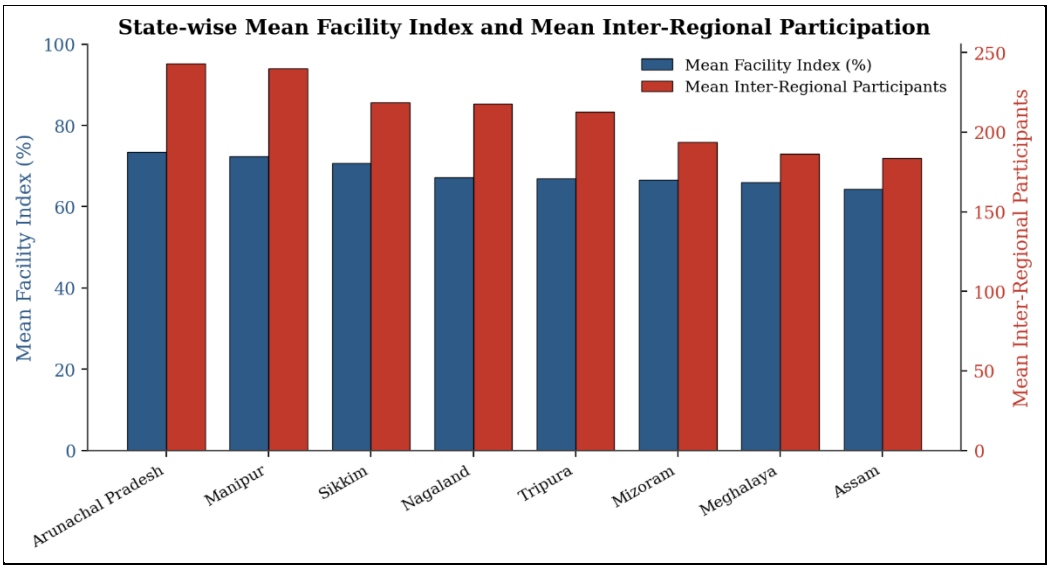
There were comparatively lower values in Meghalaya and Assam in both the indicators. While Assam had the lowest Mean Facility Index (64.36) and Mean Inter-Regional Participation (183.70) among the states studied, Meghalaya had Mean Facility Index of 65.94 and Mean Inter-Regional Participation of 186.50.

**Table 5. State-wise Mean Facility Index and Mean Inter-Regional Participation**

| State | N (JNVs) | Mean Facility Index | Mean Inter-Regional Participants |
|---|---|---|---|
| Arunachal Pradesh | 17 | 73.40 | 243.06 |
| Assam | 27 | 64.36 | 183.70 |
| Manipur | 11 | 72.33 | 239.82 |
| Meghalaya | 12 | 65.94 | 186.50 |
| Mizoram | 8 | 66.67 | 193.75 |
| Nagaland | 11 | 67.19 | 217.64 |
| Sikkim | 4 | 70.66 | 218.75 |
| Tripura | 8 | 66.85 | 212.62 |

This picture of the pattern of states is also represented graphically in Figure 3 in paired bars which show that the four States with above-average Facility Index scores are indeed the same four States that have above-average mean Inter-Regional participation while Assam, with the lowest mean Facility Index, also has the lowest mean participation.

**Figure 5. State-wise Mean Facility Index and Mean Inter-Regional Participation, Ranked by Facility Index**




## 5. DISCUSSION

The findings showed that the hypothesis of positive relationship between the sports facility adequacy and Inter-Regional participation of Shillong Region JNVs was strongly supported with empirical evidences. The size of the correlations reported (r = .778 to .882) is quite high compared to what is generally reported in similar facility-level studies at the school level, indicating that in the relatively homogenous administrative and policy context of the JNVS system facility adequacy is a relatively uncontroversial and strong predictor of participation, which is generally consistent with the findings of (Ndlangamandla et al., 2012) (Saha & Gopinath, 2012) who have linked facility adequacy to participation and achievement outcomes in various institutional settings.

The single most important finding is the rise of Equipment adequacy as the strongest predictor among all the factors. Equipment stocks are relatively easy and cheap to increase and replace, unlike the Grounds or Indoor, where significant capital is needed and availability of land and terrain is a major constraint, especially in the hill districts of the region. This indicates that in the short to medium term targeted equipment-grant interventions could provide JNVS administrators a relatively quick and cheap option to boost Inter-Regional participation, prior to their longer-term investment in grounds and indoor infrastructure.

## 6. CONCLUSION

The null hypothesis that there is no relationship between the two variables (facility adequacy and Inter-Regional participation) is rejected. Sports facility adequacy in the three domains (ground, indoor, outdoor and equipment)

was identified as having strong, statistically significant and positive influence on the level of participation in JNVS Inter-Regional activities among the 98 JNVs in Shillong Region with the three domains together accounting for about 78% of the variance in participation. The findings substantiate the overall doctoral thesis that the facilities provided to the various JNVs across the region are material factors that promote the sporting participation of the region and highlight the utility of continued investment in facilities, especially in the short term (equipment) as a means of enhancing the region's Inter-Regional sporting participation

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