



# Assessment of Diploma Agricultural Students' Attitude towards Educational Sustainability: A Study of Selected Agricultural Training Institutes of Bangladesh

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## Authors' contributions

This work was carried out in collaboration between all authors. Author SSH designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. Authors MEH and IZS managed the analyses of the study. Author MAH managed the literature searches. All authors read and approved the final manuscript.

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## ABSTRACT

**Aims:** Sustainability in agriculture can be better understood in the form of learning process. Hence, sustainability education describes the practice of teaching for promoting sustainability in education. Through this article it has been assessed the Bangladeshi diploma agricultural students' attitude towards sustainability in education.

**Study Design:** A descriptive survey design was administered into this study where interview schedule was the main tool being utilized to collect data from the respondents.

**Place and Duration of Study:** Out of 15 government Agricultural Training Institute (ATI), this study

was carried out in Sher-e-Bangla Nagar, Dhaka ATI and Shimultali, Gazipur ATI of Bangladesh. Data were collected from the 6th Term students of the two ATIs.

**Methodology:** The total number of 248 students of 6th term of the two ATIs were the population of the study. Out of these students, 90 students were considered as the sample. The data collection instrument, i.e., the interview schedule was prepared as per the objective of this study. Moreover, five point Likert scale was utilized to judge the attitude of the students and all the statistical calculation were done by means of SPSS program.

**Results:** Most percentage of the students (87%) were in between 20 years of age and entered ATIs as students after completing Secondary School Certificate (SSC) with average GPA of 3.71 in a scale of 04. The findings of this study exhibited that maximum students were moderately agreed to the sustainable diploma agricultural educational statements. Out of 14 different statements/items, half of the statements were moderately agreed and five items were disagreed by the respondents. Moreover, most of the respondents perceived sustainable agricultural education as an important tools of agricultural development of Bangladesh, although currently the respondents were not obtaining sufficient sustainable agricultural knowledge from their respective institutions.

**Conclusion:** The implication of the findings stated that educational organizations can play crucial role to implement sustainability in education. Therefore, the concerned authority can positively think about the existing curriculum of the Diploma Agricultural Education based on the attitude of the students and can adopt sustainable agricultural education which can enable the students to think and practice sustainability in agriculture and other fields.

*Keywords: Students' attitude; sustainable education; diploma agriculture; agricultural training institute.*

## 1. INTRODUCTION

Bangladesh is an agro-based country of huge population (144.1 million) with high population density (964/ km<sup>2</sup>) [1, Hasan et 17]. Huge number of people (about 50%) are involved with agriculture related activities. The economic growth of Bangladesh depends largely on agricultural development [2, Kashem, 13]. The crop production of Bangladesh has boosted up extensively over the years, yet it is a great challenge to carry on this momentum in the coming years due huge population growth and agricultural land loss [3]. For overcoming this challenge, it is crucial to apply as well as adopt demand based sustainable agricultural technologies to the fields through better extension services. The Agricultural Diploma graduates are getting opportunities to get job in agricultural extension services as well as different research organizations of both public and private sectors in Bangladesh.

Sustainable development means the maintenance of development over time. Holmberg and Sandbrook [4] pointed out more than 70 definitions of sustainable development. The importance of sustainable development was certified internationally during 1992 by 180 world leaders through signing up Agenda 21 [5]. Education was accepted as an important catalyst of attainment of sustainable development, accordingly, education for sustainable

development (EfSD) became more popular feature of the primary curriculum in September 2000. Although in reality, the implementation of the Agenda 21 was slower. There exists different assumptions about the theory and practice of education for sustainable development (EfSD). Some observer [6,7] comments that education should progress towards specific ideologies and concluding with sustainable development. However, others think it is a process of involving both personal and societal change and should be characterized by holistic, action-oriented, participatory, and philosophical [8]. Although, Jickling and Spork [9] state that education should train and develop skill about sustainable development. Moreover, the United Nations General Assembly during 2002 accepted the Resolution 57/254 which was to select the 2005-2015 decade as the United Nations Decade of Education for Sustainable Development [10,11]. For triggering this declaration by the United Nations, several efforts have been made for incorporating sustainable development issues into the educational practices [12]. Some common aims of educational sustainability as pinpointed by Schroter [13] are human, economic, social and environmental sustainability. Educational sustainability integrates education for sustainable development in case of values, practices and principles of sustainable development into all branches of education [14]. Furthermore, findings from McKeown [15] signified that both education

and diffusion of knowledge is necessary to attain sustainability.

A world wide survey was conducted by Azapagic et al. [16] on the engineering students understanding of sustainable development revealed a low level knowledge of sustainable development and existed knowledge gaps in the sense of economic and social aspects of sustainable development. Through a survey study conducted by Emanuel and Adams [17] on campus sustainability concluded the students willingness to participate and sustain sustainable initiative. He et al.'s [18] study with Shanghainese and Gansunese students discovered the people in higher standard areas of living were willing to pay more for environmental protection. Another study in Malaysia conducted by Esa [19] on the knowledge, attitudes and practices of environmental issues of pre-service secondary teachers pointed out that the respondents were aware about several issues of environmental facts which accordingly helped them in incorporating the education for sustainable development concept.

Some previous studies suggested that sustainability knowledge might persuade one's values, beliefs and intensions [20-22] and knowledge could be acquired from both formal and informal learning. Moreover, knowledge can shape one's belief and ultimately belief influence one's attitude [23-24]. While, Perloff [22] highlights that a person's belief is expressed by his attitude and belief is articulated through action and thought. The study of Mifsud [25] stated a positive change of the student's belief and attitude towards sustainability who took sustainable development courses. Similarly, Anderson et al. [26] reported that education for sustainable development had positive impact on the attitude of the students towards sustainable development.

In Bangladesh in the mid to late 1990s, the Agricultural Training Institute (ATI) have become vocational education institutes under the joint management of Bangladesh Technical Education Board (BTEB) and Department of Agricultural Extension (DAE). Now in Bangladesh there are 16 functional Government ATI present. ATIs primarily conduct the agricultural diploma issued by the Technical Education Board. There are variations based on location with demand for more skills based training in some ATIs. This resulted in a number (about 160) of private ATIs

being developed. The entire diploma agricultural institutes (ATIs) follow the curriculum structure arranged by Bangladesh Technical Education Board (BTEB). According to the rule of BTEB, ATIs were established to provide a 4-year diploma for the expansion of DAE grass root staff - the Sub Assistant Agricultural Officer (SAAO) and Research Assistant in different Agricultural Research Institutes. Total 4-year diploma courses are divided into eight semesters. The total duration of each semester with final examination week is (14+02) week and 36-40 period class arrangement is mandatory in each week. A total number of 160 credit hours is required to complete for obtaining Diploma degree by any student in ATI of Bangladesh. These 160 credit hours are distributed through different courses and all these courses are being offered using face to face method and distance method. Face to face method is the regular method and the students take part in both theory and practical classes regularly. But through distance method the students are needed to attend a 50 minutes class of each subject on Friday (holyday) per week. All these strategies are present in the curriculum developed by Bangladesh National Technical Education Board. Basically distance learners were developed for the service holders. The basic aim of taking this education was to upgrade their position in the job. On the other hand, majority of the fresh learners followed face to face learning system in order to build up their career by achieving and utilizing this degree. The assessment strategy for theory includes two types of evaluation - Midterm Evaluation (covers 50% marks) and another one is Final Evaluation (covers 50% marks). Similarly, the assessment strategy for practical classes also includes two types of evaluation. One of them is regular practical class evaluation (covers 60% marks) and another one is practical final evaluation (covers rest 40% marks). Each student of diploma agricultural institute has to complete their field attachment in field level at their seven semesters according to the rules of Bangladesh Technical Education Board in their own institutes.

Therefore, it is important to find out the students' attitude towards educational sustainability in ATIs. But no previous study on students' attitude towards educational sustainability has conducted in Bangladesh. Hence, this study explores the current situation of the Bangladesh Diploma Agricultural students' attitude towards sustainability in education.

## 2. METHODOLOGY

The study administered a descriptive research design and utilized interview schedule as instrument. The respondents of the study were the students of two Agricultural Training Institute (ATI), namely, Gazipur ATI and Sher-e-Bangla Nagar ATI, Dhaka of Bangladesh. Thus, the students of both Sher-e-Bangla ATI and Gazipur ATI were the population of the study. Required sample respondents were selected by two-stage proportionate random sampling technique. At first sixth term students were selected randomly. Total number of students in sixth term of Gazipur and Sher-e-Bangla ATI were 118 and 130, respectively. From those students, 90 Students (45 from each) from the two ATIs were selected as sample employing the Equation 1 developed by Kothari [27] and followed by others [28-29].

$$n = \frac{z^2 \cdot \sigma^2 \cdot N}{e^2 (N - 1) + z^2 \cdot \sigma^2} \quad (1)$$

where,  $n$  is the sample size,  $z$  is the value of the standard variety at a given confidence level. In the present study it was considered standard normal deviate at 95% confidence level = 1.96;  $\sigma$  is population standard deviation obtained from past research and here it is 0.63;  $e$  is the acceptable margin of error and usually considered as 0.10;  $N$  is the population size.

The English interview schedule was converted into the Bengali language for easy understanding to the respondents. Then face to face interview was executed to collect data from the respondents.

### 2.1 Measurement Technique of Different Variables

Age was computed by asking direct question to the respondents and was measured in terms of complete years from their birth to the time of interview. Previous study of the respondents was measured in terms of numbering after passing each degree (SSC, HSC, Bachelor, and Master). Previous result was determined by measuring their CGPA and the measuring range of their CGPA was out of five. ATI last result was also determined by measuring their CGPA obtained from the exam but in this case the measuring range was out of four. Meanwhile, Parents' annual income was measured by estimating the annual income of the respondent's parents in terms of Bangladeshi Taka (BDT).

The students' attitude towards sustainable agricultural education practices in ATI was determined by adding up their responses to the 14 items in the interview schedule with 5-point Likert scale. The 5-point scale were strongly agree, agree, undecided, disagree and strongly disagree with assigned scores of 5, 4, 3, 2 and 1, for positive statements, respectively and vice versa for negative statements. Similar types of scale were also utilized by several other authors [30-32]. Likert scale is the most widely utilized technique for measuring attitude type variables [33] and this type of scales employ close form of reaction for measuring attitude [33-35]. Then according to the mean, the statements were categorized into five categories. These were: when the mean is 1.00-1.49 = Strongly Disagree (SDA); mean 1.50-2.49 = Disagree (DA); mean 2.50-3.49 = Moderate Agree (MA), mean 3.50-4.49 = Agree (A) and mean 4.50-5.00 = Strongly Agree (SA). Similar types of categories were also followed by Agahi et al. [36].

### 2.2 Calculation of Reliability of the Attitude Statements in the Interview Schedule

The reliability of the attitude statements belonged to the interview schedule were measured with the help of Cronbach's Alpha test. This test is used as reliability method and the Alpha coefficient is ranging from 0 to 1 [37]. For this study, the following formula 2 was used to calculate the Conbach's Alpha:

$$\alpha = \frac{\bar{K}C}{(\bar{v} + (K-1) \bar{C})} \quad (2)$$

where,  $K$  is the number of scale items,  $v$  is the average variance of each component (item), and  $c$  is the average of all covariances between the components across the current sample of persons (that is, without including the variances of each component).

According to the formula 2 of Conbach's Alpha test, the reliability of the attitude statements in the interview schedule was computed [29,32]. A total number of 14 respondents' attitude was judged and the value of Alpha was 0.729. As a commonly accepted thumb rule of internal consistency of the value of Cronbach's Alpha is, > 0.9 is Excellent, > 0.8 is Good, > 0.7 is Acceptable, > 0.6 is Questionable, > 0.5 is Poor, and < 0.5 is Unacceptable [38-40]. Hence, the attitude statements for the present

**Table 1. Item analysis from SPSS output**

<b>Item total statistics</b>	<b>Scale mean if item deleted</b>	<b>Scale variance if item deleted</b>	<b>Corrected item total Correlation</b>	<b>Cronbach's Alpha if item deleted</b>
Statement 1	39.4667	36.838	0.003	0.744
Statement 2	39.9333	34.352	0.189	0.731
Statement 3	38.9333	33.067	0.403	0.708
Statement 4	39.8667	31.124	0.526	0.692
Statement 5	40.2000	34.600	0.162	0.734
Statement 6	40.3333	31.381	0.571	0.690
Statement 7	40.0000	30.571	0.666	0.679
Statement 8	39.6000	34.400	0.215	0.727
Statement 9	39.4000	31.257	0.424	0.703
Statement 10	40.0667	27.781	0.688	0.663
Statement 11	38.8000	38.886	-0.212	0.764
Statement 12	40.4000	30.400	0.552	0.687
Statement 13	40.6667	28.524	0.667	0.668
Statement 14	39.6000	37.829	-0.110	0.759
<b>Reliability Coefficient for case 14</b>			<b>Cronbach's alpha</b>	<b>Standardized Item alpha</b>
			0.729	0.717

study were reliable according to the Cronbach's Alpha value.

Throughout the study, different types of descriptive statistics like mean, standard deviation, frequency count, and percentage was measured to achieve the objectives of this study utilizing Statistical Package for Social Science (SPSS) version 16 program. Moreover, different categories were employed to classify the data.

### 3. RESULTS AND DISCUSSION

#### 3.1 Demography of the Respondents

Findings from [41-43] suggest that gender, age and socio-economic status activates as cause of differentiation of environmental attitude of the respondents. The respondents were asked to inform their demography and the findings were furnished in Table 2. The students' age ranged from 17 to 42 years. It is found from the data of Table 2 that about 98 percent students are 30 years of age category although the average age of the respondents was 19.80 years. Only 2 percent students were over 30 years of age. This is because in ATI of Bangladesh the students of any age group can enter for degree. It is a common practice in Bangladesh that students after passing SSC examination get their admission into ATIs. But students after passing HSC, Bachelor or Master can also enter into ATI as a student irrespective of all background of Science, Arts or Commerce. According to the data contained in Table 2 indicated that most

percentage of the students (83.3%) took their admission after completing their SSC examination. Although, some students also took admission in ATI after their Bachelor and Master degree and mostly they were service holder and tried to upgrade their position in service by getting Diploma in Agriculture degree from the concerned ATIs.

The students were asked about their previous/last degree result before their admission at ATI's. Based on this issue the students were categorized into five categories (Table 2). Most percentage of the respondents (73%) obtained CGPA ranging from 3.01-4.0 with average CGPA of the students was 3.71 (CGPA was calculated out of 5). On the other hand, only few respondents (22%) obtained CGPA ranging from 4.01 and above. Data furnished in Table 2 exhibited that about 80 percent students obtained CGPA 3.0 to 4.0 (CGPA was calculated out of 4) in their last semester ATI result. Although, the average CGPA was 3.29. According to the findings in Table 2, the students parents' average annual income was about 168155 BDT (about 2000 USD annually).

#### 3.2 Attitude of Students Regarding Sustainable Agricultural Education Practices in ATI

In social psychology, attitude, is defined as favorable and unfavorable assessments of and feedback to people, objects, condition or

anything of the world which able to forecast and can change our behavior [44]. According to Newhouse [45] the attitudes that are evolved from the reality of life and also from education heavily influence behavior. Ugulu and Erkol [46] pointed out that students attitudes affect their own behavior more specifically their choice of response and their tenacity to give a decision.

Through this study the attitude level of the respondents regarding sustainable agricultural practices were examined and the findings are presented in Table 3. According to the findings of this Table, out of 14 items on attitude of students towards sustainable agricultural education, seven items were placed in moderate agree category, while five items were in disagree category and two items were agreed category.

Findings from Table 3 shows that no items were placed in strongly agree and strongly disagree categories. Important items related with the moderate agree (MA) were, 'Multidisciplinary subject taught in each term', 'Social, cultural and environmental related subject taught', and 'Field based experimental work is done'. Accordingly, the items were in disagree (DA) category were, 'I

learned how to protect environment from my courses/institute', 'Experiment and practical based curriculum so both teacher and student learning is possible', and 'I learned to respect for cultural diversity is necessary for sustainable development from my courses'. Meanwhile, the items under agree (A) category were related to, 'Agricultural food system related subject taught' and 'Internship experience by the students is practiced here'.

Shephard [47] thought that the students gain their knowledge, skill, attitude, and behavior from their cognitive domain (related to knowledge) and affective (related to values and attitude). While some others [48-49] argued that increment of knowledge level of a person doesn't necessarily affect on behavioral change. Although, authors [50-51] recommended that individual's environmental behavior is reverberated by his/her environmental knowledge. Ajzen [52] believed that attitude of the students towards agriculture is a crucial factor that affects their professional behavior. Duncan and Broyles [53] defined attitude as the susceptibility, feeling, acting and thinking in a specific way. Attitude also provides guidance and purpose of their work

**Table 2. Demographic features of the respondents**

Categories	No.	Percentage	Mean	SD
<b>Age</b>				
Up to 20 years	78	86.7	19.80	3.60
21-30 years	10	11.1		
31-40 years	1	1.1		
Over 40 years	1	1.1		
<b>Joining at ATI</b>				
After SSC	75	83.3	10.44	1.22
After HSC	13	14.4		
After bachelor	1	1.1		
After masters	1	1.1		
<b>GPA before ATI admission (GPA out of 5)</b>				
CGPA 2.5-3.0	4	4.4	3.71	0.45
CGPA 3.01-3.50	25	27.8		
CGPA 3.51-4.0	41	45.6		
CGPA 4.01-4.5	14	15.6		
CGPA >4.5	6	6.7		
<b>ATI last result</b>				
CGPA 2.5-3.0	18	20	3.29	0.29
CGPA 3.01-3.50	50	55.6		
CGPA 3.51-4.0	22	24.4		
<b>Parents annual income (BDT)</b>				
Less than100000	21	23.3	168155.3	1.21
100000-250000	58	64.4		
250001-400000	9	10		
Over 400000	2	2.3		

**Table 3. Attitude of the students regarding sustainable agricultural education practices in ATI**

Statement of SAE related items	Mean	SD	Category
1. Multidisciplinary subject taught in each term	3.45	0.98	MA
2. Social, cultural and environmental related subject taught	3.14	0.95	MA
3. Agricultural food system related subject taught	3.72	1.13	A
4. Environmental education is necessary for sustainable education	2.65	1.15	MA
5. Practical work is always done in the field	2.97	1.14	MA
6. I learned how to protect environment from my courses/institute	2.30	0.96	DA
7. Experiment and practical based curriculum so both teacher and student learning is possible	2.38	1.03	DA
8. Our teaching method/ subject matter is very much related with modern agriculture	3.22	1.27	MA
9. Field based experimental work is done here	3.25	1.16	MA
10. I learned to respect for cultural diversity is necessary for sustainable development from my courses	2.14	1.05	DA
11. Internship experience by the students is practiced here	3.94	1.06	A
12. Short term field visits arranged by the institution	2.46	1.15	DA
13. Regular conversation with the advanced farmers by the students about modern agricultural practices	1.91	1.04	DA
14. Regular consultation is made by the instructors about the course curricula of sustainable education	3.05	0.98	MA

Note: SDA = Strongly Agree, DA = Disagree, MA = Moderate Agree, A = Agree, SA = Strongly Agree

and behavior [54]. It simply means to a human being's assessment of any psychological matter [55]. Some other studies conducted by different researchers [56-60] also worked on attitude towards sustainable agriculture and found different results. Some results show positive attitude of the respondents towards sustainable agriculture while some findings showed negative attitude towards sustainable agriculture. While Asuamah et al. [61] conducted their study on agricultural science students attitude towards sustainable agriculture in Ghana and identified some demographic variables of the students which may affect on their attitude. The variables include gender, age, religion, family status of the students, their parent educational status, their knowledge on sustainable agriculture etc.

Based on the overall attitude score regarding sustainable diploma agricultural education, the respondents were classified into three categories, i.e., less favorable, moderate favorable and highly favorable attitude towards sustainable agricultural education. Similar types of categories were followed by Hasan et al. [29].

Data contained in Table 4 exhibit that most percentage of the respondents' attitude ranged from less to moderate favorable attitude (79%) towards sustainable diploma education. Although about 21% of the respondents were the bearer of highly favorable attitude towards sustainable diploma education. The attitude towards sustainable agriculture is an indicator of credibility of students about sustainable agriculture.

**Table 4. Overall attitude of the respondents towards sustainable diploma agricultural education**

Category	Farmers		Mean	Standard deviation
	Number	Percent		
Less favorable attitude (up to 32)	10	11.1		
Moderately favorable attitude (33-48)	61	67.8		
Highly favorable attitude (over 48)	19	21.1	40.71	8.05
Total	90	100		

**Table 5. Students view regarding sustainable ATI education**

Sl.	Statement	Strongly agree		Agree		Undecided		Disagree		Strongly disagree		
		No.	%	No.	%	No.	%	No.	%	No.	%	
1.	My college/course/course leaders practice and promote good social and environmental skills or sustainable agricultural practices	6	6.6	20	22.2	3	3.4		49	54.5	12	13.3
2.	Teachers are obliged to develop students' social and environmental skills as part of their courses	9	10.0	10	11.1	5	5.6	46	51.1	20	22.2	
3.	Considering the present situation of our country it is very important to practice sustainable agricultural education	58	64.4	31	34.4	1	1.1	0	0	0	0	
4.	It is important for different Agricultural Institutes to give emphasis on sustainable agriculture	55	61.6	35	38.8	0	0	0	0	0	0	
5.	Entire agricultural development will be possible if sustainable agricultural system is practiced in our country	45	50	43	47.7	2	2.2	0	0	0	0	

**3.3 Students view in Connection with Sustainable Education at ATI**

Opinion of the students regarding sustainable ATI education is basically the reflection of students thinking about sustainable educational system and what extent it is needed for total agricultural development of our country. Their constructive opinion also includes what extent of facilities they are getting in case of learning about sustainable agricultural system and the extent of facilities they want. For ascertaining view of the student on the extent of specific statement a total weighted score for each statement was given like 5 for strongly agree, 4 for agree, 3 for undecided, 2 for disagree, and 1 for strongly disagree. Data regarding this issue are shown in Table 5.

From the findings depending on their view about these statement it is evident from Table 5 that most of the respondents agree to sustainable agricultural education and it's practices are very important for agricultural development of Bangladesh and at the same time different

institutes should give emphasis on sustainable agricultural education. Although they differ that as a current practice, they are not getting sufficient knowledge or input of sustainable agricultural education from their institutes or courses. The reasons behind this might be that their course curriculum is not organized in such a way where teachers can deliver knowledge or practice about sustainable agriculture's socio-cultural and environmental topics in theory class, or in a practical way in farmers' field. As it is observed that in ATIs the students are required to complete quite good amount of credit hours for their diploma degree. Hence, it is easier for them to know and practice sustainable agricultural issues if these issues are properly addressed into their Diploma curriculum.

After getting the Diploma Degree, the students of ATIs in Bangladesh mainly works as Agricultural Extension worker. Therefore, good knowledge and attitude of the students are crucial to practice and promote sustainable agriculture to the field in future. The students be able to get opportunity to acquire enough understanding of sustainable



agriculture from ATIs. Hence, the current findings can give input to re-design the courses of ATIs.

#### 4. CONCLUSION AND RECOMMENDATIONS

The present study was undertaken to find out diploma agricultural students attitude towards educational sustainability in two ATIs in Bangladesh. Important findings demonstrated that about 98 percent respondents were within 30 years of age and entered into ATI after completing SSC. Although they can enter in ATI after HSC and/or Bachelor/Masters Degree. Initially their average GPA was 3.71 (out of 5) but after starting ATI education their average GPA was 3.29 (out of 4) which implied improvement of their academic results. About 79 percent of the respondents had less to moderately favorable attitude towards sustainable diploma agricultural education. Meanwhile, the respondents moderately agreed to several issues like multidisciplinary courses they were being taught and social, cultural and environmental related courses they had been taught. Although the respondents disagreed that they didn't learn how to protect the ecosystem fully from their courses and they disagreed about their inability to respect cultural diversity as a part of sustainable education. Hence, by utilizing the findings of this study and employing the students' attitude, the planners, policy makers and/or curriculum experts of Bangladesh Technical Education Board should adopt policies to incorporate ESD issues in its future program to enrich the existing curriculum of ATIs. All components of ESD particularly socioeconomic and environmental issues need to be given more emphasis to make the existing curricula of Diploma Agricultural programs more sustainable. Accordingly, similar type of research should be conducted in other government and non government ATIs and to identify different sustainability criteria with more parameters.

#### CONSENT

As per international standard or university standard, patient's written consent has been collected and preserved by the author.

#### ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author.

#### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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