# Comparison of Awareness on Aesthetic and Other Forest Values between Korean and Malaysian' University Student

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**Abstract**

*Forest ecosystem services are classified as provisioning, regulating, cultural, and supporting, and these are divided into 31 forest functions. These services and functions are also important in the Sustainable Forest Management (SFM). The purpose of this study is to identify any similarities and differences held by forestry and non-forestry students from South Korea and Malaysia to reveal the influence of education and country of residence background in rating the importance of forest functions and values especially aesthetic values in terms of SFM. Internet web-based questionnaires regarding the importance of the 4 forest services and 31 functions and priorities for 6 major forest values were distributed to forestry and non-forestry university students in both countries. Results showed a difference in perception of forest functions and values between Korean and Malaysian university students regardless of their university major, showing that country of residence affected people's awareness of forest functions and values.*

**Keywords:** Forest aesthetic values, Forest ecosystem service, Sustainable Forest Management (SFM), web-based survey, Forest functions

## 1. Introduction

Forest is an important element in the world' ecosystem and forest provides four services which are the provisioning service, regulating service, cultural service, and supporting services, of which consist of 31 forest functions (Millennium Ecosystem Assessment (MEA), 2005). These forest services and functions are also classified as economic, social, and environmental services (Bass, 2001, and McDonald and Lane, 2004). Sustainable Forest Management (SFM) which emphasized on all social, economic, and environmental services of the forest has become the major forest management system all over the world since 1980s (McDonald and Lane, 2004, and Wang, 2004).

However, many of the international SFM process are being criticized for providing only few criteria and indicators (C&I) related to forest social values especially forest' aesthetic values (Harshaw et al., 2007; Sheppard et al., 2004). This is because forest with high aesthetic value is considered as a well-managed forest (Ribe, 1989) and forest aesthetic value is crucial in the management of the forest (Sheppard et al., 2004). The visual appearance or the scenic beauty of the forest attracts people to visit the forest for tourism and outdoor recreation (Lindhagen and Hörnsten, 2000). One of the possible reasons for the lack of criteria and indicator related to forest' social values especially forest' aesthetic values in the SFM standard is due to the lack of public input during the development of the standard (Patel et al., 1999, and Toman and Ashton, 1996). Vitousek et al. (1997) stated that one of the important goals in SFM is fulfilling the public's social needs from the forest and Sheppard et al. (2006) stated that when developing the C&I of SFM, it is important to incorporate public values and participation. Macura et al. (2011) and Bakhtiari et al. (2014) also stated that for the success of any conservation activities and sustainability of forest resources, it is necessary to consider the people's attitudes, needs and opinions regarding the ecosystems. Thus, there is the need to understand the public' awareness on forest values.

According to various studies, the forest' aesthetic values and other forest values held by the public is affected by their nationality backgrounds and differs on each individual. For example, study by Kaplan and Herbet (1987) showed that western Australian and American students showed difference in their preference for certain landscape. Yu (1995) also showed that Chinese and Western people have difference preference on landscape aesthetic. A study by Sodhi et.al (2010) on four different Southeast Asian countries which are Myanmar, Thailand, Philippines, and Indonesia showed significant differences between the people in valuing the forest ecosystem services including the forest aesthetic values. Meijaard et al. (2013) showed difference in perceptions towards forest ecosystem services including forest cultural values in between the Indonesian and Malaysian people living on the Borneo region.

The public' perception on forest aesthetic values and other forest values are not only influenced by their country of residence but according to many studies, the public's attitudes on forest ecosystem service is also affected by their knowledge or education background. Sodhi et.al (2010) showed that not only nationality but education level also affected people's perception on forest ecosystem services including forest aesthetic values between Southeast Asian countries people. The same result is also showed in a study by Lim et al. (2015). The study regarding attitudes toward forest values on forestry expert group and non-forestry groups showed a difference in rating of the forest values and functions between the two groups, with the forestry group rating the forest 'cultural values higher than the non-forestry groups, indicating that people's prioritization on forest values differs based on their knowledge and education.

Therefore, the goals of this study is to study the similarities and differences on people's perceptions on forest functions and values especially forest aesthetic values between two countries which are Malaysia and Republic of Korea, in order to reveal the effect of different nationalities in rating the forest values in terms of SFM and to study the similarities and differences on attitudes on forest functions and values especially forest aesthetic values between the general public and the forestry experts to reveal the effect of knowledge or education in rating the forest values in terms of SFM. The groups in this study are (1) Korean forestry-major university students (2) Korean non-forestry major university students (3) Malaysian forestry-major university students (4) Malaysian non-forestry major university students. The non-forestry major university students from both countries represent the public while the forestry-major university students from both countries represent the forestry experts.

## 2. Methods

### 2.1 Questionnaire

Questionnaire survey method is used in this study. The questionnaire is designed based on public surveys conducted by previous research (Lim et al., 2015; Kozak et al., 2008; Harshaw et al. 2006) and followed the Tailored Design Method by Dillman et al. (2009). There are two parts in the questionnaire. In the first part, respondents are asked to indicate their opinion on the level of importance of the 4 forest services and 31 forest functions for future generations using a five-point Likert-type scale, with 1 = "Not important", 2 = "slightly not important", 3 = "Neutral", 4 = "slightly important", and 5 = "Important". For the second part, the Thurstone pair-wise comparison method is used whereby respondents are asked to select which forest values that have higher priority for forest sustainability in a pair-wise comparison of six major forest values. The six forest values re arranged in pairs such that each value was compared against the other five values, therefore 15 pairs are presented. For the first part of the questionnaire, the items in the questions are based on the forest ecosystem services as stated by Millennium Ecosystem Assessment (MEA, 2005) and for the second part of the questionnaire, the items are based on the forest values associated with forest' economical, ecological, and social values criteria used in SFM as used in previous research on public opinion survey on SFM (Hershaw, 2010). English version of the questionnaire is first developed and revised by native English speaker international university students in Korea for any error or uncertainty in the sentences. Then the questionnaire is translated into Korean and revised by native Korean speaker university students and into Malay language and revised by native Malay speaker, so that participants in each country can understand the contents of the questionnaire easily.

### 2.2 Survey participants

The questionnaire survey is administered through Internet web-based survey through Google online survey form. The Google survey form URL link is sent through email and students participate in the survey by visiting the online website. For Korean university students, the questionnaire survey form is sent to Forest Resource department undergraduate students in Suncheon National University and Forest and Environmental Science department undergraduate students in Kangwon National University, Republic of Korea. Questionnaire survey form is sent to undergraduate students of non-forestry related major such as arts and science department and social science departments in Sunchon National University. For Malaysian university students, survey is sent to undergraduate students of Forestry Science and Biodiversity department in University Putra Malaysia and undergraduate students of International Tropical Forestry, and Forest Plantation and Agroforestry department in University Malaysia Sabah, and to undergraduate students of non-forestry related major such as engineering department, dentistry and agriculture department in University of Kuala Lumpur and University Malaysia Terengganu, Malaysia. The survey is conducted from December 2020 till March 2021.

### 2.3 Quantitative data analysis

For the first part of the questionnaire which is the importance of 31 forest functions, descriptive statistics are calculated. The mean of response of forest function and cumulative ratings of the forest function for each student groups are calculated.

Then the means and ratings of the four forest services are calculated from the average of the responses of the 31 forest functions within each of the forest services. Factorial analysis of variance (ANOVA) with independent variables (i.e., major and country of residence) are performed to analyze the effect of forestry knowledge and country of residence or cultural background in rating the importance of the 31 forest functions including forest aesthetic values. One independent variable (major) had two levels (forestry and non-forestry), while another independent (country of residence) had two levels as well (Korea and Malaysia). To compare the ratings of the forest aesthetic value itself amongst the test groups, univariate ANOVA test is performed. For the second part of the questionnaire which is the opinions on the priorities for six major forest values, Thurstone paired comparison scaling method (Case V) is used (Harshaw et al. 2006, and Kozak et al. 2008). Thurstone scales are constructed for each of the four university student groups. The scales are constructed from the z-scores corresponding to the proportions of times/percentage (p) that each forest values are selected over the others forest values by the respondents. The Thurstone scales show the ranks or preferences of the six forest values in each student groups as well as the true relative distances between them. The origin of the scale, which is assigned to the lowest ranked forest values, is arbitrarily set to zero. The scale distance of each forest values is found by their cumulative distances from the origin. Therefore, greater values indicate higher level of preferences.

## 3. Results

### 3.1 Characteristics of respondents

There are 620 respondents in total, in which 306 respondents are from Malaysia and 313 respondents are from South Korea. There are 162 forestry related major students and 144 non-forestry related major students from Malaysia. On the other hand, there are 174 respondents from forestry related major undergraduate students and 140 respondents from non-forestry related major undergraduate students from South Korea. The mean age of respondents of forestry related major students from South Korea is 26.75 and non-forestry major related students is 27.36 and the mean age of respondents of forestry related major students from Malaysia 24.69 and non-forestry related students are 25.66. 59.8 % of forestry related major students from South Korea is male and 56.4 % of non-forestry related major students are male. On the other hand, 71.6 % of forestry related major students from Malaysia are female and 74.3 % of non-forestry related major students from Malaysia are female.

### 3.1 Opinions on importance of forest service and function

Both Malaysian forestry and non-forestry students give higher rating on all four forest-services compare to both Korean forestry and non-forestry student (See Table 1). Regulating service is also rated the highest amongst the four-forest services by all student groups. Cultural service is rated as the lowest by both Korean students and Malaysian non-forestry students while provisioning service as the lowest by Malaysian forestry students.

Table 1. Mean ratings of 31 forest functions by four student group.

| **Forest function** | **KFS** | **KNFS** | **Average** | **MFS** | **MNFS** | **Average** |
|---|---|---|---|---|---|---|
| **Provisioning services** | 4.18 | 4.20 | 4.19 | 4.47 | 4.45 | 4.46 |
| Food sources | 4.37 | 4.39 | **4.38** | 4.62 | 4.50 | **4.56** |
| Timber & fiber sources | 4.25 | 4.30 | **4.28** | 4.52 | 4.47 | **4.50** |
| Fuel sources | 4.07 | 4.08 | **4.08** | 4.35 | 4.37 | **4.36** |
| Genetic resources | 4.36 | 4.29 | **4.33** | 4.57 | 4.55 | **4.56** |
| Biochemical, natural medicines& pharmaceutical | 4.35 | 4.42 | **4.39** | 4.67 | 4.69 | **4.68** |
| Ornamental resources | 3.64 | 3.71 | **3.68** | 3.77 | 3.81 | **3.79** |
| Fresh water resources | 4.20 | 4.24 | **4.22** | 4.80 | 4.77 | **4.79** |
| **Regulating services** | 4.41 | 4.52 | 4.47 | 4.82 | 4.74 | 4.78 |
| Air quality regulation | 4.63 | 4.66 | **4.65** | 4.90 | 4.75 | **4.86** |
| Climate regulation | 4.57 | 4.69 | **4.63** | 4.90 | 4.80 | **4.85** |
| Water regulation | 4.54 | 4.65 | **4.60** | 4.86 | 4.81 | **4.83** |
| Erosion regulation | 4.44 | 4.44 | **4.44** | 4.90 | 4.77 | **4.84** |
| Water purification | 4.34 | 4.55 | **4.45** | 4.83 | 4.75 | **4.79** |
| Disease regulation | 4.09 | 4.49 | **4.29** | 4.59 | 4.62 | **4.61** |
| Pest regulation | 4.15 | 4.28 | **4.22** | 4.67 | 4.68 | **4.68** |
| Pollination | 4.47 | 4.41 | **4.44** | 4.80 | 4.68 | **4.74** |
| Natural hazard regulation | 4.47 | 4.51 | **4.49** | 4.91 | 4.83 | **4.87** |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Cultural service** | 3.94 | 3.95 | 3.95 | 4.57 | 4.44 | 4.51 |
| Cultural diversity | 3.99 | 3.93 | **3.96** | 4.49 | 4.43 | **4.46** |
| Spiritual & religious values | 2.93 | 3.10 | **3.02** | 4.33 | 4.15 | **4.24** |
| Knowledge systems | 3.89 | 3.85 | **3.87** | 4.59 | 4.59 | **4.59** |
| Educational values | 4.18 | 4.11 | **4.15** | 4.80 | 4.57 | **4.69** |
| Inspiration | 3.75 | 3.91 | **3.83** | 4.50 | 4.31 | **4.41** |
| Aesthetic value | 4.21 | 4.20 | **4.20** | 4.80 | 4.67 | **4.74** |
| Social relation | 3.76 | 3.91 | **3.84** | 4.48 | 4.26 | **4.37** |
| Sense of place | 3.92 | 3.94 | **3.93** | 4.40 | 4.22 | **4.31** |
| Cultural heritage values | 4.33 | 4.21 | **4.27** | 4.65 | 4.60 | **4.63** |
| Recreational & ecotourism | 4.46 | 4.36 | **4.41** | 4.70 | 4.61 | **4.66** |
| **Supporting service** | 4.39 | 4.39 | 4.39 | 4.81 | 4.73 | 4.77 |
| Soil formation | 4.38 | 4.35 | **4.37** | 4.78 | 4.74 | **4.76** |
| Photosynthesis | 4.63 | 4.61 | **4.62** | 4.91 | 4.81 | **4.86** |
| Primary production | 3.97 | 4.10 | **4.04** | 4.71 | 4.63 | **4.67** |
| Nutrient cycling | 4.44 | 4.37 | **4.41** | 4.77 | 4.70 | **4.74** |
| Water cycling | 4.53 | 4.51 | **4.52** | 4.87 | 4.78 | **4.83** |

KFS: Korean forestry related majored university students, KNFS: Korean non-forestry related majored university students, MFS: Malaysian forestry related majored university students, MNFS: Malaysian non-forestry related majored university students.

The overall average total mean rating of the thirty-one forest functions is rated higher by both Malaysian students comparing to both Korean students. Air quality regulation, climate regulation, water regulation, and photosynthesis functions are commonly rated as the most important by all groups of students and ornamental resources and spiritual and religious values are commonly rated the least important by all groups of students.

The results of the factorial multivariate ANOVA (2X2 design) with major and country of residence as the independent variable showed a significant effect of both major and country on the ratings of importance of all 31 forest functions: the major factor, F (31, 586) = 0.81 p = 0.13, and the country of residence factor, F (31, 586) = 0.372, p= 0.000, at a significant level 0.05 (see Table 2). However, there is no significant interaction between major and country of residence factor. Given the significant result of the multivariate ANOVA of the overall test, therefore univariate main effects are examined for each of the 31 forest functions.

Table 2. Factorial multivariate ANOVA (2X2) results in overall ratings of 31 forest functions.

| Effect | Value[a] | F | Hypothesis df | Error df | Sig.[b] |
|---|---|---|---|---|---|
| Country | .372 | 11.187 | 31.000 | 586.000 | **.000** |
| Major | .081 | 1.676 | 31.000 | 586.000 | **.013** |
| Major * Country | .071 | 1.443 | 31.000 | 586.000 | .059 |

(a). Pillai's Trace

(b). The significance level is 0.05; Significant results shown in bold

From the univariate results, it showed that there is significant effect on 30 forest functions except for ornamental resources for the country factor but for major factor, significant effect is found on only two forest functions (see Table 3). Therefore, result showed that there is a significant difference on perceptions on the thirty-one forest functions except for the ornamental resources function between Malaysian and Korean university student regardless of their university major. Malaysian university students significantly percept the forest functions as more important compared to Korean university students. The results also showed that there is a significant difference between forestry majored students and non-forestry major students regardless of their country of residence in their perceptions on the importance of forest functions. Significant difference can be seen in disease regulation and educational values function whereby the non-forestry students in both countries perceive the disease regulation function as more important compared to the forestry students while the non-forestry students regard the educational values as less important compared to the forestry students (see Table 1). Country of residence and major factor affected people' perception on the 31 forest functions.

Table 3. Follow-up univariate ANOVA (2X2) results with significant differences in the ratings of the 31 forest functions.

| **Factor** | **Dependent Variable** | **df** | **Mean Square** | **F** | **Sig.**[a] |
|---|---|---|---|---|---|
| Country | Food sources | 1 | 5.262 | 8.234 | **.004** |
| | Timber & fiber sources | 1 | 7.140 | 9.550 | **.002** |
| | Fuel sources | 1 | 12.650 | 13.415 | **.000** |
| | Genetic resources | 1 | 8.621 | 12.065 | **.001** |
| | Biochemical, natural medicines & pharmaceutical | 1 | 13.309 | 27.116 | **.000** |
| | Fresh water resources | 1 | 49.659 | 83.970 | **.000** |
| | Air quality regulation | 1 | 4.828 | 14.711 | **.000** |
| | Climate regulation | 1 | 7.217 | 23.026 | **.000** |
| | Water regulation | 1 | 8.615 | 28.943 | **.000** |
| | Erosion regulation | 1 | 24.145 | 68.476 | **.000** |
| | Water purification | 1 | 18.205 | 40.078 | **.000** |
| | Disease regulation | 1 | 15.406 | 24.804 | **.000** |
| | Pest regulation | 1 | 32.928 | 60.150 | **.000** |
| | Pollination | 1 | 13.991 | 33.899 | **.000** |
| | Natural hazard regulation | 1 | 21.929 | 63.141 | **.000** |
| | Cultural diversity | 1 | 38.097 | 51.684 | **.000** |
| | Spiritual & religious values | 1 | 231.532 | 184.134 | **.000** |
| | Knowledge systems | 1 | 79.960 | 115.430 | **.000** |
| | Educational values | 1 | 44.409 | 77.476 | **.000** |
| | Inspiration | 1 | 50.335 | 55.877 | **.000** |
| | Aesthetic value | 1 | 43.449 | 80.401 | **.000** |
| | Social relation | 1 | 42.683 | 51.941 | **.000** |
| | Sense of place | 1 | 22.691 | 27.673 | **.000** |
| | Cultural heritage values | 1 | 19.418 | 35.504 | **.000** |
| | Recreational & ecotourism | 1 | 9.297 | 20.326 | **.000** |
| | Soil formation | 1 | 24.467 | 60.835 | **.000** |
| | Photosynthesis | 1 | 9.065 | 29.167 | **.000** |
| | Primary production | 1 | 62.634 | 106.804 | **.000** |
| | Nutrient cycling | 1 | 16.679 | 37.949 | **.000** |
| | Water cycling | 1 | 14.080 | 42.206 | **.000** |
| Major | Disease regulation | 1 | 6.758 | 10.880 | **.001** |
| | Educational values | 1 | 3.545 | 6.184 | **.013** |

(a) The significance level is 0.05; Significant results shown in bold

Forest aesthetic value is rated higher by both Malaysian student groups compare to both of Korean student groups (see table 1). Malaysian forestry student gives mean rating of 4.80, while Malaysian non-forestry student gives mean rating of 4.67, while Korean forestry and non-forestry give mean rating of 4.21 and 4.20 respectively. Factorial univariate ANOVA (2X2 design) test for the country of residence and major factors on the ratings of importance of the forest aesthetic value showed that there is significant effect of country of residence factor only with F (1,616) = 80.40, P=0.000, and there is no significant effect of major and no significant interaction between major and country of residence factor at a significance level of 0.05 (see Table 4). Therefore, result showed that only country of residence affected people' perception on forest aesthetic value.

Table 4. Factorial univariate ANOVA results in the ratings of forest aesthetic value

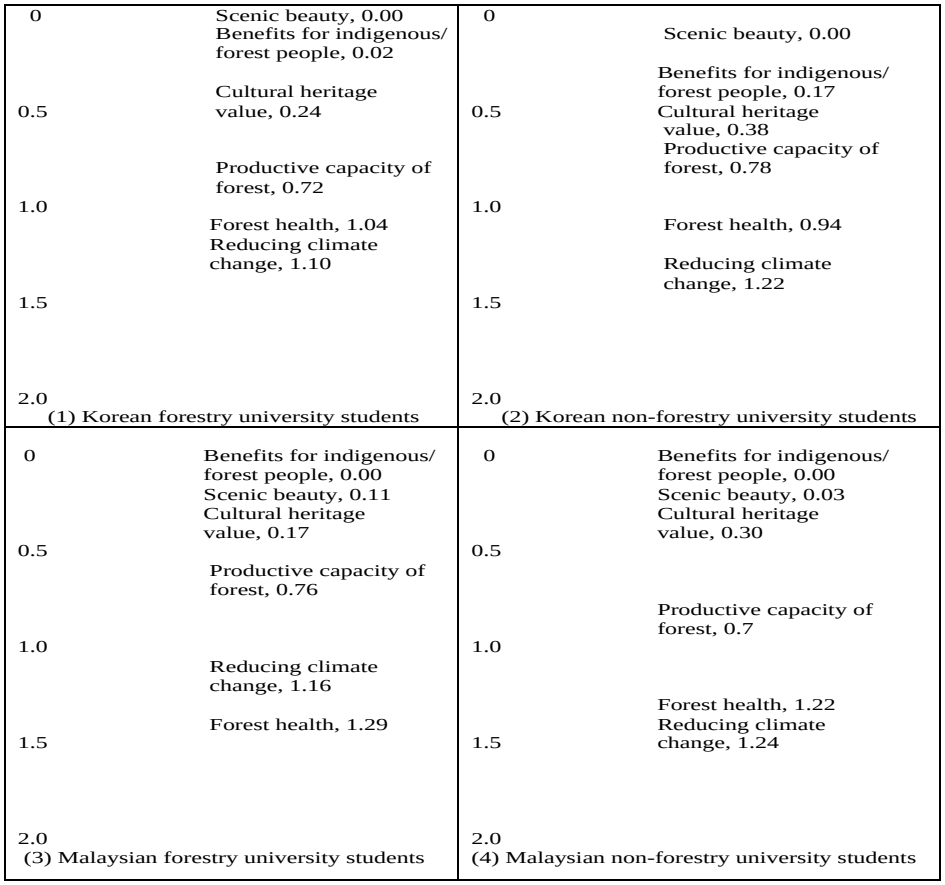
| **Source** | **Type III Sum of Squares** | **df** | **Mean Square** | **F** | **Sig.[a]** |
|---|---|---|---|---|---|
| Country | 43.449 | 1 | 43.449 | 80.401 | **.000** |
| Major | .646 | 1 | .646 | 1.195 | .275 |
| Country * Major | .516 | 1 | .516 | .954 | .329 |

(a) The significance level is 0.05; Significant results shown in bold

### 3.2 Priorities on six forest values

The Thurstone scale rankings and relative distances of the six major forest values by the four student groups are constructed from the z-scores corresponding to the calculated mean of proportions values (p) of each forest values. The resulting Thurstone scales show the ranks or preferences of the six forest values in each student groups (See Figure 1). The priority for sustaining forest scenic beauty when managing the forest is ranked last by both Korean university student group. Both Malaysian university student groups ranked sustaining the benefits that indigenous people receive from the forest as the last. Malaysian forestry student ranked forest health as the first priority when managing the forest while the other three student groups ranked managing forest to reduce climate change as the first priority. Productive capacity and cultural heritage value are ranked the third and the fourth respectively by all student groups.

Figure 1. Thurstone scale rankings and relative distances by four student groups.



The internal consistency or the degree to which the observed data fit the Thurstone case V model are tested by observing the average discrepancy values for each student groups. The average discrepancy values for the four student groups are well below the threshold of 7%–8% recommended by Thurstone (1959). The average discrepancy values for Korean forestry student are 3.6 %, Korean non-forestry student is 2.5 %, Malaysian forestry student is 2.8 % and Malaysian non-forestry student is 3.4. %.

**4. Discussion**

From the ANOVA test results, it showed that country of residence gives significant effect on the students' attitude towards the importance of forest functions and services. There was significant difference on 30 forest functions and four forest services between Malaysian and Korean university student. Malaysian students give higher mean rating on the importance of the thirty-one forest functions and four of forest service compared to Korean university students. This result is accordance with previous studies that showed country of residence affected people' opinions on forest ecosystem services (Lindemann-Matthies et al., 2014). Meijaard et al. (2013) also showed a difference in attitudes towards forest ecosystem service between Malaysian and Indonesian people. Hussain et al. (2014) showed that forest plays an important role in Malay culture because many of the Malay family' traditions are related with forest and Ismail and Hussein (2005) stated that nature including the forest plays an important role in informal learning for children in Malay culture. Therefore, the culture influence may contribute to the difference between Malaysian and Korean' perception on forest because the culture values imbedded in community in every country affected their way of life and the way they percept certain topic.

Oon et al (2002) also stated that the forest plays a crucial role for the resource-based socio-economic development in Malaysia. Thus, this may be the reason for the higher ratings on the forest provisioning service by the Malaysian student comparing to the Korean students. It may be well known to the students that Malaysia is one of the world's largest producers of timber and timber products as well as other forest' products like firewood, charcoal, wood oil and medicinal plants of which are also harvested (FAO, 2002). While in South Korea, timber is not the main products of forest and other forest products production like nuts and mushrooms has been decreasing throughout the year (Youn, 2009). Malaysia has experienced deforestation since the late 1800s during the British colonization (Ratnasingam and Ioras, 2006), and currently still undergoing high rate of deforestation (FAO, 2002). Knapen (2001) stated that people in the region with annual forest loss and longer history of deforestation tend to value forest more compared to the latter. Ratnasingam et al. (2014) showed that Malaysian youth are aware of the reducing forest cover in Malaysia and thus, perceived the importance of forest conservation.

Results obtained from this research showed that there is no significant difference on awareness on forest functions and services between the non-forestry (representing the public people) and the forestry students (representing the forestry expert), therefore people' education background does not play significant role in people' perceptions on forest ecosystem services.

This study's findings are consistent with those of Kearney and Bradley (2011), who discovered that varied levels of knowledge, including understanding of forest management, had no effect on preference for forest sceneries. Muhamad et al. (2014) also showed that education level does not affect the people' perception on forest ecosystem services. Environmental education has been formally taught in primary and secondary school curriculum in Malaysia since 1998 (Curriculum Development Centre, Ministry of Education, Malaysia, 1998) and in Korea since 1981 (Lee and Kim, 2017). Knowledge and awareness regarding forest ecosystem which plays an important role in the environment are also taught in the environmental education curriculum in both countries, therefore, the students in this research, regardless of their university major may already have a background knowledge regarding forest ecosystem, thus this may explain the lack of difference on opinions regarding forest functions and values between the forestry and non-forestry students.

Result showed that country of residence affected the students' opinion on forest aesthetic values in this research. Similar results are also found in a study by Sodhi et al. (2010) that showed people from four different Southeast Asian countries which are Myanmar, Thailand, Philippines and Indonesia gave different perceptions on forest' aesthetic values. Forest aesthetic value or scenic beauty is rated the most important function amongst the other forest functions in culture service by both Malaysian students while both Korean students rated recreational and ecotourism function as the most important functions in the forest cultural service. The result of the Thurstone scale ranking also showed that Korean student rated sustaining the forest scenic beauty as the least important value when managing forest while Malaysian student rated sustaining forest scenic beauty as the fifth most important value amongst the six forest values. A national survey regarding Korean citizens' preference on forest use showed that majority of the respondents rated recreation as the most important use of a forest (Gallup Korea, 2006).

Although Lindhagen and Hörnsten (2000) stated that the visual appearance or the scenic beauty of the forest attracts people to visit the forest for tourism and outdoor recreation, Koreans may view forest as a place for leisure time and recreation regardless the scenic beauty of the forest. Jo et al. (2020) showed that the length of trails in the forest in Korea does not affect the visitor's visit to the forest for recreational purpose. Thus, this explains Korean student's high rating on the recreational and ecotourism forest function. Forest recreation culture also existed in Korean since the pre-modern society called the Joseon Dynasty and has continue since then (Kim and Park, 2017). On the other hand, in Malaysia, forest scenic view like the mountainous terrains and waterfall is the main attributes that attract visitor's visit to the forest (Mapjabil et al., 2015; Aziz et al., 2017). Malaysia' recreational forest also serves as a measure to conserve the forest' flora and fauna (Manual Perhutanan 2003, 2005). Therefore, this explains the higher rating on the forest aesthetic values by both Malaysian students compare to both Korean students. Zainol and Au-Young (2016) also showed that young Malaysian (age 15-24) visit the forest to enjoy the outdoor and nature view because it gives positive effect on their psychological and physiological health, therefore they perceive the forest beautiful landscape features as important.

## 5. Conclusion

Study results showed that country of residence affected people's opinion on the importance of forest functions and services. Malaysian students regardless of their university major rated the forest functions and services higher than both Korean student groups. It is believed that factors such as different cultural background, country's economic background and forest condition may cause the differences in their perceptions. Results suggest that it is important to input each participating countries' local people' views during the development process of any of the international SFM standards to fully achieve the objective of SFM because people from every country have different perceptions on the importance of forest and forest functions and services.

When compared to ecological and environmental values, respondents from both countries gave social and cultural values relatively low scores. However, among the 10 social and cultural forest functions, however, the forest aesthetic value was ranked very high. The four groups who took part in the study gave a mean score of 4.20 to 4.80 for forest aesthetic values. Considering the 5-interval scale, anchored at 'Important (5)' and 'Not important (1),' the ratings of the forest aesthetic value by the four groups were reasonably high. The findings indicate that to observe the changes in forest aesthetic qualities and quantities, the forest aesthetic indicators for SFM standards must be developed.

This study showed that there is not significant effect of knowledge background on the awareness of forest ecosystem services. In order to fully understand the influence of knowledge background, further study is necessary to reveal whether forestry majored university students can be representative of experts' groups in terms of awareness of forest values and aesthetic preferences and preferably research on forestry majored graduate students as higher education level students may possess higher knowledge on forestry and affected their opinion on forest values.

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