# Gender and Natural Resource Consumption

Venus A. Solar

***Abstract*— Natural resource consumption is a global concern that greatly affects the environment and economies of all countries. The study identifies which gender, male or female, consumes more of the natural resources. The research was conducted year 2010 and 2011 in internet computer laboratories through online quiz personal ecological footprint calculator sponsored by the global footprint network. The personal ecological footprint calculator measures whether a person is living within the means of what is available in nature. The findings suggest that male and female have similar demands of natural resource. However, it was found out that female's personal ecological footprint rate was more varied than males, thus, it suggests that females have uncontrolled use on natural resources that may possibly lead to the global increase of natural resource consumption. The ecological merit of the study is to push the academic institutions to include environmental accounting in the curriculum in order to intensify environment management on the individual lifestyle of the students particularly among females.**

***Index Terms*—Ecological footprint, environmental accounting, gender difference, natural resources, personal ecological footprint calculator.**

## I. Introduction

The idea of an ecological footprint emerged in the late 1980's in British Columbia through the research of Mathis Wackernagel and William Rees. Their objective was to estimate the area of land and compare it to the amount of natural resource needed to support an individual, or a community in any society to further measure the relative impact of an environmental demands and consumption.

Based on the study of National Footprint Edition conducted by the Global Footprint Network as of 2009, the world has 0.8 Ecological Deficit based on the computed ecological footprint and biocapacity of the world's total population. Today, in the recent study of the Global Footprint Network as of 2011, humanity uses the equivalent of 1.5 planets to provide all the resources needed by the people and absorb all their waste. This mean, it now takes the earth one year and six months to generate what peoples' use in a year. Moderate scenarios suggest that if current population and consumption trends continue by the 2030's to 2050's, humanity will need the equivalent of two earths.

The idea of comparing the Personal Ecological Footprint between male and female is to awaken in us the reality that gender difference contributes in the increasing extraction and degradation of the environment. Investigating which gender contributes more in the extraction of natural resources can lead in setting out clear solutions, correct promotions and proper establishment of policies that can address another possible root cause of ecological degradation. The researcher challenges the idea that the increase in natural resource consumption is due to different lifestyle of male and female attributed by different age levels. The perspective of the study can promote a higher level of awareness and long term consciousness and cognizant about the current situation of the earths' natural resources.

Male and female college students were the principal respondents because any future plans of action to solve environmental degradation can easily be addressed through classroom learning integration and enrichment outreach programs imposed by the institution. The research setting was done in an academic institution in order to closely monitor, trace, follow up future related studies, and determines any change of patterns of development for long term experimental related PEF research studies.

Changing the individual lifestyle of neither male nor female through proper education instilled in the academe, from the ecological theoretical learning point of view, to actual application of ecological principles in homes and by practicing self sufficient city living can contribute in lessening the demand of consumption to our natural resources and therefore beneficial to the environment.

Manuscript received October 8, 2011, revised October 10, 2011. This work was supported by the Philippine Commission on Higher Education and the Manila Central University.

V. A. Solar is with the Manila Central University, Edsa, Caloocan City, Manila, Philippines (e-mail: mcuresearch@yahoo.com and ven_nervegate@yahoo.com).

## II. Methods

### A. Data Instrumentation and Collection Technique

To identify which gender contributes more in the extraction of natural resources, technology based Personal Ecological Footprint Calculator was used. The personal ecological footprint quiz was done inside the university internet computer laboratories. The online quiz is sponsored by the Global Footprint Network which can be downloaded at www.myfootprint.org. or at www.footprintnetwork.org.

Global Footprint Network is a licensed nonprofit research organization that specializes in servicing researches on economics of environmental protection and sustainability.

Moreover, the online quiz ecological footprint calculator was used to obtain a fast, convenient and precise survey results. Quiz results were sent through email, then printed and compiled.

### B. The Personal Ecological Footprint Calculator Process

To get the male and female individual's ecological footprint rate, the researcher used the free downloadable online personal ecological footprint calculator sponsored by the Global Footprint Network. The said technology based footprint calculator is meant to give an idea whether a person is living within the means of what is available in nature relative to the individual's lifestyle.

In terms of the accuracy of the footprint calculator, the quiz is not that flexible to accommodate all possible lifestyles but the 27 questions provided in the quiz is credible enough to estimate the personal ecological footprint rate for most people. The footprint quiz usually begins with the per capita average carbon, food, housing, goods and services values based on the national consumption of a particular country and then makes a series of additions or deductions to these values based on the choices made by the quiz taker. At the end of the quiz, the quiz taker in the website is told how many planets would be needed if the quiz taker consumption habits was extended to everyone on the planets. If the number of planets is less than one, it implies that a person is living a sustainable lifestyle because it is within the biological capacity of one earth. If the number of planets is more than one, it implies that a person is living an unsustainable lifestyle that would require the biological capacity of more than one earth to be sustainable overtime.

Up to this moment, footprint methods are still evolving. Footprint experts are still working to fill in gaps to account environmental pollution and sustainable resource management.

### C. Statistical Treatment

Three statistical techniques were used to conduct the comparative study.

T-test was used to identify the significant difference between male and female personal ecological footprint. Pearson's r was used to determine the degree of correlation between age and personal ecological footprint, and to measure the personal ecological footprint range of variation on both genders, coefficient variation was used.

## III. Results and Discussion

Conventional wisdom suggests that because of technology and trade, global ecological footprint increases. Also, in the study of global footprint network in year 2008, *footprint intensity* is high because of high population density and high consumption or both.

However, the researcher challenges the idea that the increase in global ecological footprint can also be traced its root from the individual's personal ecological footprint gender difference. Though the idea was too wide to grasp, still it is substantial to have a pinch of knowledge to somehow understand that gender difference may result to the imbalance used on natural resource that might possibly lead to increase global ecological footprint.

The first statistical analysis was conducted in year 2010 through cluster sampling technique. A total of one hundred respondents were selected to take the personal ecological footprint quiz. Based on the statistical result shown in table 1, t-test proved that male and female personal ecological footprint have no significant difference, meaning, male and female have similar demands of natural resources. In terms of age and personal ecological footprint relationships, Pearson's r proved that the rate of personal ecological footprint for both genders has no correlation with age. However, in females, personal ecological footprint variation was higher than in males (Figure 1). Thereby, it is suggested that females have uncontrolled use on natural resources that may possibly increase global ecological footprint rate.

TABLE I: SUMMARY OF THE STATISTICAL RESULTS IN YEAR 2010: CLUSTER TECHNIQUE

| Gender | Mean and Standard Deviation | T-test at 5% level of significance | Pearson's at 5% level of significance (Age 16-24) and PEF Correlation | Coefficient Variation |
|---|---|---|---|---|
| Female | X = 47.56<br>S = 13.60 | No significance t = 0.22< 1.660 tabular value | No correlation r -0.06<0.232 tabular value | 28.6 % |
| Male | X= 47<br>S= 9.76 | | No correlation r 0.19<0.325 tabular value | 20.7 % |

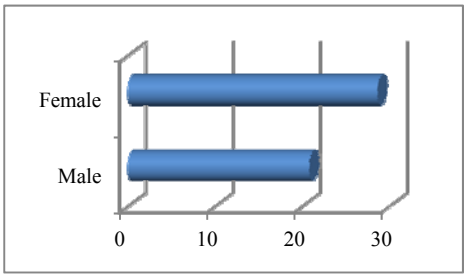


Fig. 1. Coefficient variation: Graphical representation showing that females have higher personal ecological footprint variation than males (2010)

To further ratify the data conducted in year 2010, another sampling technique was done in July 2011. One hundred male and one hundred female respondents were purposively selected during the quiz proper which gives a total number of two hundred respondents.

Based on the statistical results as shown in table 2, male and female have similar demands of natural resources. It shows again that age has no correlation with the personal ecological footprint rate, and still the personal ecological footprint coefficient variation in females is higher than in males (Figure 2).

TABLE 2: SUMMARY OF THE STATISTICAL RESULTS IN YEAR 2011: PURPOSIVE TECHNIQUE

| Gender | Mean and Standard Deviation | T-test at 5% level of significance | Pearson's at 5% level of significance (Age 16-24) and PEF Correlation | Coefficient Variation |
|---|---|---|---|---|
| Female | X = 47.18<br>S = 13.38 | No significance t = 0.632< 1.645 tabular value | No correlation r -0.19<0.195 tabular value | 93.87 % |
| Male | X= 48.35<br>S= 12.94 | | No correlation r 0.-.208<0.195 tabular value | 86.8 % |

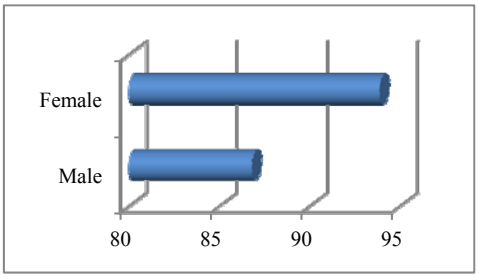


Fig. 2. Coefficient variation: Graphical representation showing that females have higher personal ecological footprint variation than males (2011).

To justify the assumption that females highly contribute to the degradation of environment, the researcher applied logical analyses to intimately understand the global environmental impact of the study.

Since the result of the study shows that females have higher personal ecological footprint variation, the word variation can be associated to fluctuation, an uncontrolled action. An uncontrolled action indicates the uncontrolled consumption of females on the use of natural resources that may further cause an increase in the global ecological footprint.

There were research studies and scientific principles that can magnify the concept of the study. In the study of Yuchisun and Johnson (2004), it was found out that majority of compulsive buyers are females and that compulsive consumption causes economic consequences such as debt or even bankruptcy (O'Guinn and Faber, 1992). On the technical point of view, the uncontrolled use of females on natural resources can be associated to the principle of energy expenditure, that, a fluctuating voltage results to a faster flow of kWHr meter of electricity that registers higher energy consumption. Whereas, on the ecological point of view, fluctuations or climatic changes in the ecosystem directly weakens the intensity of interactions between living organisms, thus, reduces population growth rates.

All the conceptual analyses and scientific principles mentioned above emphasized one common analogy, that, any uncontrolled action has consequential impact in the system.

The ecological merit of the study is to give a point blank ecological awareness and reality check among male and female students and on gender's individual lifestyle.

However, the research is limited only for the purpose of identifying and determining the natural resource consumption correlation between male and female personal ecological footprint rate, therefore, it is recommended to further categorize and identify what particular lifestyle should be monitored, balanced and controlled in order to lessen the personal ecological footprint rate.

## IV. Generalization

The possible increase in natural resource consumption is due to gender difference caused by high variations in lifestyle particularly among females.

## V. Recommendations

The academic merit of the study is to push the academic institutions to include environmental accounting in the curriculum in order to intensify environment management on the individual lifestyle of the students particularly among females.

## Acknowledgment

Prof. Paul Garry Abello and Mr. Jerry Heteroza from Math and Physics Department, Manila Central University, research statisticians. Prof. Suzzeth Untalan, faculty, Natural Science Department, Manila Central University, Dr. Angelina Galang, Executive Director, Environmental Science Institute, Miriam College, research consultant. Ms. Anna Rhodora A. Solar, faculty, International Studies Department DLSU-CSB, and Mr. Jupiter A. Solar, Information Technology, technical support.

Ateneo de Manila University, Biology Department and Manila Central University.

## References

[1] K. Bleasme, *A Community Indicator Case Study: Addressing the Quality of Life in Two Communities*. San Francisco C.A. Redefining Progress 1999, pp.44

[2] G. David, "An explanation of ecological footprint.," Pappus Magazine, vol.20, no 1, 2001.

[3] N. Eissa, *Employment, Environmental Taxes and Incomes Taxes.* San Francisco C.A. Redefining Progress 2000, pp. 74

[4] Ewing et al. (2010). The ecological footprint atlas. *Oakland: Global Footprint Network [Online ].* Available: http://www.myfootprint.org.

[5] A. Galang, *The Philippine Environment in the Ecozoic Age: Principles of Environmental Science in the Philippine Setting.*ANVIL publishing Inc. Pasig City, Philippines, 2009, chapter 1, pp. 112-193.

[6] J. Hammer and C. Folke, " Investigating in natural capital: The ecological economics approach to sustainability", *Washington: Island Press,* pp. 362-390, (n.d.)

[7] J. Hoerner, *Burdens and benefits of environmental tax reforms: An analysis of distribution by industry.* San Francisco C.A. Redefining Progress 2000, pp. 59.

[8] C. Jakab, " Environment in focus: Ecological Footprints", *Benchmark Book Publishing,( n.p.)*, 2010

[9] A. Koehler, "Comparing the environmental footprints of home care and personal hygiene products: The relevance of different life-cycle phases," *Institute of environmental Engineering. Zurich, Switzerland. Environmental Science Technology. American Chemical Society*, pp.8643-8651, 2009.

[10] S. Murray, " The ecological footprint- issues and trends. *School of Biological Science.* University of Sydney. NSW, 2006.

[11] P.J. Meier, "US electrical industry response to carbon constraint: a life-cycle assessment of supply alternatives, *Energy Policy*, Hindawi Publishing Corporation, vol. 33, no.9, pp. 1099-1108, 2010.

[12] O'Guinn and Faber, "Progress in Neuro-Psychopharmacology and Biological Psychiatry Volume 30, Issue 8, 30 December 2006, Pages 1542-1544.

[13] C.M. Pablo et al. " Corporate ecological footprint: New conversion factors," *Department of Economy and Department of Environment,* Austria, Spain, 2008

[14] W. Rees, "Ecological footprints and appropriate carrying capacity: What urban economics leaves out", *Environment and Urbanization, pp. 4, 2, 121-130, 1992.*

[15] W. Rees and M. Wackernagel, " Ecological footprint and appropriated carrying capacity: Measuring the natural capital requirements of the human economy", (n.p.), 1994

[16] R. Smolko, "Community indicators handbook: Measuring progress toward health and sustainable communities (electrical resources). *Oakland, C.A. Redefining Progress,* pp. 119, 2006.

[17] G. William, "The effects of environmental tax shifting on U.S. capital information, *San Francisco, Redefining Progress, pp. 45, 2000.*

[18] M. Wackernagel, "The ecological footprint and appropriated carrying capacity: A tool for planning toward sustainability", Unpublished Ph.D. Thesis, University of British Columbia School of Community and Regional Planning. Vancouver, 1994.

[19] M. Wackernagel and W. Rees, " Our ecological footprint: Reducing human impact on the earth", Gabriola Island, BC and Philadelphia, PA: New Society Publisher, 1995.

[20] G. Wolf, " When will Business want environmental taxes? San Francisco. Redefining Progress, pp. 38, 2000.

**Venus A. Solar** was born on June 25, 1978 at Tarlac City, Philippines. She finished her Bachelor of Science major in Biology at Far Eastern University, Manila, Philippines, 1999. She earned her Master of Biology at Ateneo de Manila University, Katipunan, Quezon City, Philippines, 2007.

Currently, she is the RESEARCH DIRECTOR of the Manila Central University, Edsa, Caloocan City, Philippines. Her research interest is environmental science and animal/plant biology.

Assistant Professor Venus is a life-time member of the Philippine Society for Biochemistry and Molecular Biology.