World Journal of Economics and Sustainable Development
Vol. 4, No. 1, April 2020, pp. 1-16
Available online at http://wjesd.com/

Research article

QUALITY OF LIFE AND ITS IMPLICATION TO SUSTAINABILITY AND MANAGEMENT OF MEDICINAL PLANTS IN THE MINING AREAS OF DAVAO REGION, PHILIPPINES

Joel S. Pardillo[1,2], Sonnie A. Vedra[2], Jessie G. Gorospe[2], Helen J. Vicente[2] and Chris Rey M. Lituañas[3]

[1]Department of Environment and Natural Resources Region XI, Philippines
[2]Mindanao State University at Naawan, 9023 Naawan, Misamis Oriental, Philippines
[3]Central Mindanao University, Bukidnon, Philippines

E-mail: vedrasonnie@gmail.com

ABSTRACT

A study on the socio-demographic conditions of the Mandaya group in Davao Region was done to assess their level of perception in terms of the implications to their utilization of various medicinal plants and their sustainability, conservation and management. Survey questionnaire was employed to the chosen respondents among the Mandaya group. Results revealed that the respondents had strongly agreed and rated very high on the topic on the ethnobotanical knowledge helped the Mandaya tribe socially and economically. Similarly, the respondents observed and strongly agreed with high to very high ratings on the topic on the ethnobotanical knowledge helped the Mandaya tribe in their works on nomadic farming, their health needs, their way of living within their own families, and shared equally on various tasked among men and women in their area. However, the Mandaya group unanimously agreed that decrease of diversity of the medicinal plants are alarming that in turn could affect the lives of the future generations. Hence, the tribal leaders agreed to implement and program to reintroduce all the knowledge on ethnobotany to the new generation without exemption, avoid any harms to natural sites where medicinal plants are inhabiting, urge governmental supports for their plan of action of conservation and collaborate to mining authorities on their plan of actions for the sustainability of the medicinal plants within their ancestral domains.

Keywords: medicinal plants, ethnobotany, Mandaya tribe, Davao Region

INTRODUCTION

The quality of environment and life are closely linked to each other. Society depends for its well-being on the preservation of a viable natural environment (SAFE, 2005) where people lived longer in a healthier life. However, not everyone has benefited from this achievement of the higher quality of life that this implies. Great disparity has

existed between and within countries (UNPF, 2011) where such disparities are mostly felt by the indigenous peoples who used to be left behind even vital services from the government. It was estimated that indigenous peoples living in more than 70 countries worldwide constituted roughly about 370 million with distinct groups to be around 5,000 to 6,000. By their cultures and traditions, they usually lived in remote or upland / hilly areas or riverbanks where survival depends primarily on the natural resources in their surroundings (Cohen, 1999 in Beltran, 2000; UN, 2014) without taking consideration the dangers of possible natural disasters brought about by landslides or floods / flashfloods.

The International Labor Organization – Convention 169 explained that the indigenous peoples are those people whose status is regulated wholly or partially by their own customs or traditions or by special laws or regulations wherein their social, cultural and economic conditions can be distinguished from other sections of the national community. In Nepal, it was estimated that the indigenous peoples comprising around 7 million are living below the poverty line wherein majority of them still anchored on nomadic lifestyle. Studies revealed that the nominal per capita consumption correlates more closely with the poverty index than nominal per capita income does the correlations manifested a very high result of 0.98 (Subba et. al, 2014). With the advent of modernization, the traditional cultures of the indigenous peoples were being denied and sacrificed in lieu of the so-called developments. Deprivation came in as when they discovered that they are powerless, second class citizens, discriminated against and exploited by the dominant society. Only then, its vision and desires in terms of social and economic goals failed to materialize (Mc Graw Hill, 2008).

In the Philippines, the indigenous peoples were referred to as the National Minorities by the 1973 Philippine Constitution and changed into National Cultural Minorities in the 1987 Constitution. They are group of people or homogeneous societies identified by self-ascription and ascription by others, who have continually lived as organized communities on community bounded and defined territory, and who have, under claims of ownership since time immemorial, occupied, possessed and utilized such territories, sharing common bonds of language, customs, traditions, and other distinctive cultural traits, or who have, through resistance to political, social, and cultural inroads of colonization, non-indigenous religions and cultures, become historically differentiated from the majority of Filipinos (RA 8371 s. 1997). The National Commission on Indigenous Peoples (NCIP) have estimated the population of the Indigenous Peoples in the Philippines to be around 12 – 15 million more or less spread out in the 65 provinces nationwide. Of its totality, 33% are found in Luzon, 6% in Visayas islands while Mindanao have the most numbered of indigenous peoples of about 61%.

There are wide disparities in income and quality of life across regions and sectors. The number of poor people remained high where 26.5% of the total population lives below the poverty line, including 10 million women. The National Statistics Office (NSO) (2010) revealed that Cordillera region remains to be one of the poorest and most marginalized regions in the country while Mindanao contributes to 31% to total poverty in the country. The Family Income and Expenditure Survey of NSO indicates that poverty incidence in Mindanao is even higher than the national average of 40%, ranging from 46% in Southern Mindanao to 74% in the ARMM. While the country is rich and abundant in natural resources, environmental assets remain unavailable to poor groups particularly to minorities owing to exclusion, insecure land tenure, lack of access to technologies; or the resources are degraded. Social inequities are rife and impact indigenous people, women and the informal sector the most. In the 2013 Human Development Report, the Philippines scored 0.418 in the Gender Inequality Index, reflecting inequalities in labor market participation, political representation, and access to health services (UNDP, 2013).

In 2014 Quality of Life Index (QLI), the province of Davao Oriental ranked number 65 in among the 77 provinces in the Philippines. In 2007, Davao Region ranked number 58 in Human Development Index. The Human Development Index (HDI) is a composite statistic of life expectancy, education, and income indices used to rank human development. It can be noted that Davao Oriental was one of the province in Mindanao furiously ripped by Typhoon Pablo in December 2013 which until now still painfully crawling on the ground, struggling to redeem itself from the tragedy that apparently—unarguably—was triggered, exacerbated by human greed for money and power, spawning bleeding environment and human misery (NewsDesk, 2013).

Few years ago, scientists predicted human sensitivity and vulnerability to various stressors and exposure to economic pressures, general health, access to knowledge, population pressure, infrastructure, natural resources pressure and agricultural dependency. Finally, the adaptive capacity index had also reduced which measures the ability or potential of a country's institutions, economy and society to adjust or to take advantage of existing or anticipated stress from environmental changes. Hence, this study tried to describe the quality of life and

perceptions on sustaining plant species with ethnomedicinal properties and some social aspects like social and economic practices, nomadic farming, health, family life, and gender equality among the Mandaya indigenous group in the Province of Davao Oriental, Region XI, Mindanao, Philippines.

MATERIALS AND METHODS

Research design and data collection

In this study, there were two sampling barangays in the City of Mati, Davao Oriental: at Barangay Macambol at N $6^0$42'22.8" and E $126^0$14'17.50" and Cabuaya at N $6^0$42'15.52" and E $126^0$12'56.96" wherein the Mandaya community is located. To this, the mountain areas surveyed from 200 masl to 700 masl are their sources of plants with ethnomedicinal values (Figure 1).

The method used in this study is descriptive as it involved describing, analyzing and interpreting the existing conditions of the Mandaya community. The study used survey research design and dealt with the descriptive-normative form wherein a set of questionnaire was used to extract information from the 90 IP respondents in the two barangays considered.

Primary data were obtained using a survey questionnaire, which served as the research instrument used in the study. It was written in English and translated into vernacular or Cebuano. The research instrument was pre-tested to some sample respondents within the area. The data focused on: (1) socio-demographic and economic profile of the respondents and (2) and perceptions on management sustainability strategies of the plants with ethnomedicinal values related to their quality of life.

Data analyses

In this qualitative research, the collection and content analysis of the questionnaire-checklist which served as the interviews and the non-verbal data that provided valuable resources for baseline process and values data. The respondents' responses on the survey questionnaire and interview recordings were studied, organized chronologically and tabulated into frequency and percentages. Data from the instrument were pooled together. Inconsistencies of the respondents' responses were verified. The physical reactions of the interviewees were differentiated from the responses by enclosing it with a parenthesis and written in italics. Throughout the study, the respondents' responses, viewpoints, thoughts and non-verbal data were reviewed. The respondents were given the opportunity to respond to the initial analysis before a final draft of the study was written. Frequency and percentage distribution were used to describe the socio-demographic response of the respondents. A chi-square test was also used to determine some relationships on their quality of life. The score of the respondents' perceptions were analyzed using a scale of response options with a range of 1-5 (Leong, 1988) (Table 1).

World Journal of Economics and Sustainable Development
Vol. 4, No. 1, April 2020, pp. 1-16
Available online at http://wjesd.com/

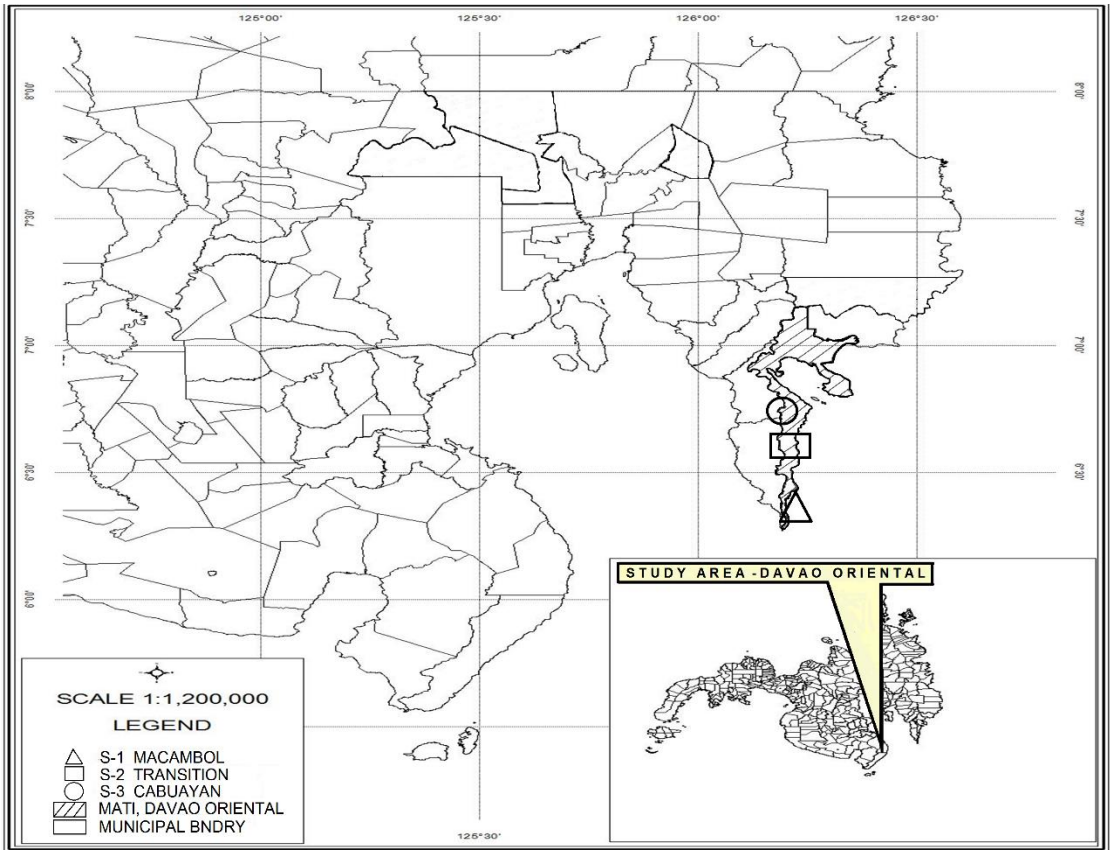

Figure 1. The location of the study areas showing the 3 stations (S1-S3) in Mati City, Davao Oriental, Region XI.

Table 1. The response options scale (Leong, 1988).

Response Option	Range	Mean	Qualitative Description
Strongly Agree	5	4.21-5.00	Very high
Agree	4	3.41-4.20	High
Undecided	3	2.61-3.40	Average
Disagree	2	1.81-2.60	Low
Strongly disagree	1	1.00-1.80	Very low

RESULTS AND DISCUSSION

Socio-demographic profile

Gender

The data showed that out of the 90 IP respondents, the females constituted 62% and the male respondents were 38% (Figure 2). Males opted to work for the daily needs of the family. As part of most of the culture, males were obliged to support the needs of his family (Daku 2002; Butt et al., 2010). Compare to female, even though more common during these present times, females do as breadwinners, but in this societal culture, females handled and managed household chores and care for the children and the entire family. In uplands, very often males operate the farms to grow whatever crops. They were the ones who take up the responsibility on the whole process on the production that starts from planting to harvest. Females though, did also the work in some farms but mostly they

were the ones who are assisting their spouse (Fliege, et al, 2001; Gómez-Limón. Et al, 2012; Atibioke, et al, 2012). In this study, mostly males were engaged in finding/searching plants which could cure certain ailments as prescribed by their *baylan.* The females in turn, served as nurses in tending the sick members of their families. Henceforth, each gender has its own role in the community for his/her own family's needs.

Age

Majority of the Mandaya respondents were aged 40-49 years old constituted to 18.3% for the female and 13.3% for the male respondents with a total of 31.6% out of the whole respondents. This age group was the stage of human productivity is at its peak level, thus could imply their confidence to do lots of things on finding opportunities and trying anything to search for good for their family and responsibilities in the tribe. They are the most attentive people to any event to never missed any better possibilities for the future of the tribe (Virtanen, 2015; Abe and Ohtani, 2013; Ammakiw and Odiem, 2014). These was followed by respondents aged 30-39 years old. This also shows that despite their doubts behind the curiosity, they were trying to get involved and starting to join any opportunities for sake of learning how their elders do things. Another aged group were 50 – 59 years old with 23.3%, these were some of the numbers belonging to the elders, although mostly have reduced their energy in doing heavy works, but they still do the responsibilities to advice and guide the tribe on handing medicinal plants to take good care. The next was aged group 20- 29 years old with 13.3% and lastly with the 60 and above aged group with 0.3% (Figure 2) were the respective elders whom one of the most knowledgeable in the tribe aside from the *baylan* in records of any medicinal plants (Teklehaymanot and Giday, 2012; Rajeh et al, 2010)

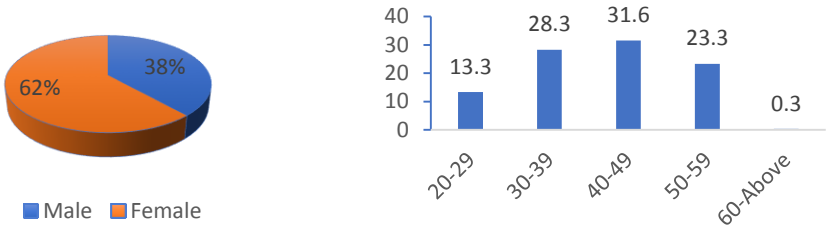

Figure 2. Total percentage distribution of respondents' gender and age group.

Civil status

Majority of the respondents were married for both male (29.3%) and female (34%) (Figure 3). This means that medicinal plants were highly needed to maintain good health in their respective families in order to avoid any occurrence of sickness. This is because they need to ensure that each member's capacity to do their works must be accomplished for them to survive. These could mean also that medicinal plants could be taken good care and get well-managed to make it easily accessible to the members of the family and tribe when needed (Gutierrez, et al, 2013; Munro et al, 2015; Ugulu,2012), hence, majority of the married respondents have medicinal gardens within their backyards.

Educational attainment

Majority of the respondents were elementary graduate with 23.3% among males and 16.6% among the females and have a total of 40% (Figure 3) out of all the Mandaya respondents. Very few in numbers had completed secondary and tertiary level of education. As outside influence, increase in literacy of the individuals and lack of tribal teaching to the new generations, it would threaten their indigenous knowledge on ethnomedicine, its mode of preparation and application and other related information. Their reliability on modern medicine due to increased literacy could mask the use of natural ethnomedicine present in their community. Hence, the council of elders through government supports tried to reeducate younger generations of various important tribal undertakings, especially on the knowledge about ethnomedicinal plants. This is also true in other areas where the values of ethnomedicinal plants are widely used (Smith and Ward, 2000; Foster, 2012; Okullo et al, 2014).

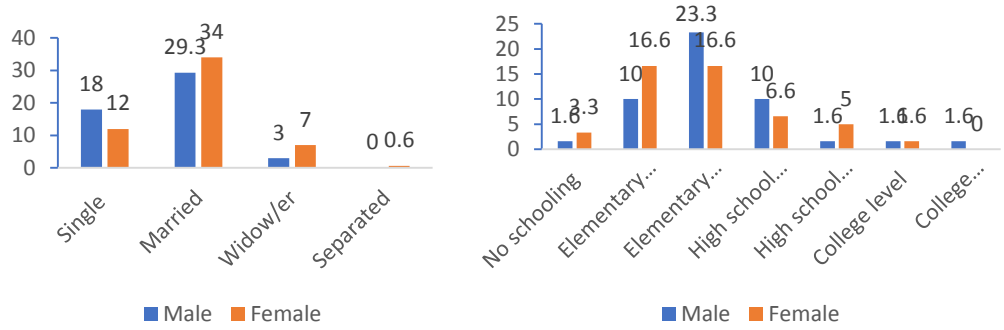

Figure 3. Percentage distribution of respondents' civil status and educational attainment for both male and female

Family size

Majority of the families of Mandaya had 5 to 7 children at 38.3% from the total respondents' population (Figure 4). This constitutes to 20% among male and 18.3% among female respondents, respectively. This finding would relate that highly productive community implicates to have good supplements from their society in terms of food and other necessities like natural medicinal sources (Odhiambo et al, 2011; Mafimisebi and Oguntade. 2010).

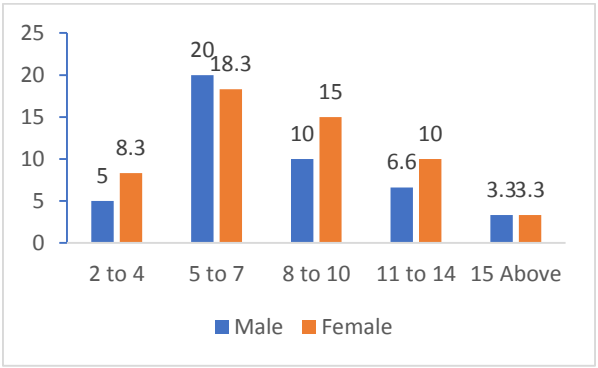

Figure 4. Percentage distribution of respondents' family size for both male and female.

Socio-economic profile

Livelihood

Result revealed that mining work comes out to be the main source of livelihood of the Mandaya people with a total of 58.3% for the whole respondents (Figure 5). One of the tribal leaders said that before, their way of living and their income were below the poverty line. Nowadays, upon operation and economic help of the mining company, it had uplifted their usual means of living and their quality of life had improved. Children were sent to schools, and most importantly, they could buy some things they need in their respective families like clothing and other accessories. Being employed in the mining company secured their occupation and increase their source of income. In other areas, the presence of some financial institutions helped the communities overcome financial trials and made them financially sustained (Varnika et al, 2012; Bussman, and Sharon, 2006; Asiimwe et al, 2014)

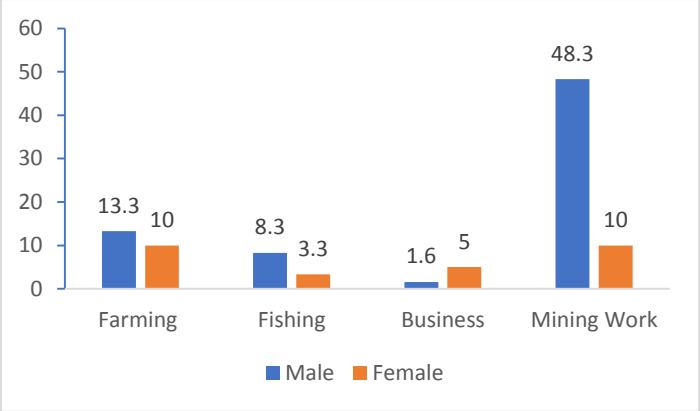

Figure 5. Percentage distribution of respondents'' livelihood for both male and female.

Family income

The Mandaya family mostly earned PhP 9,000 to PhP 11,000 at 23%, in which males with 16.6% and females with 21.6%, respectively. It has been followed by monthly earnings at PhP 6,000 to PhP 8,000 with 12% (Figure 6). Although there were some monthly income below the poverty threshold, but in the advent of new financial opportunities, the economic needs would somehow be overcome. As income of the tribal people increases, many business opportunities would occur, and in turn, could help their community sustain financially (Barbalho et al, 2012; Liu and Gong, 2011; Foster, 2012). This also implies that it could open up any new knowledge that led to help them improve more on the current information and status of medicinal plants (Adam, 2007; Ammakiw and Odiem, 2014; Fliege, et al, 2001).

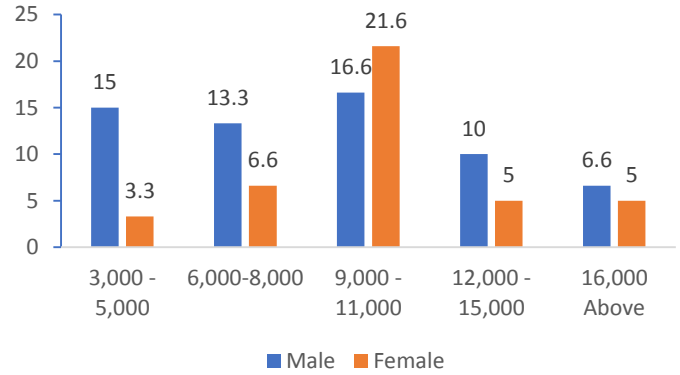

Figure 6. Percentage distribution of respondents' monthly family income for both male and female.

Perception of respondents on quality of life

Social and economic practices

The respondents, both male and female, in the two barangays where the Mandaya community is located were asked if the ethnobotanical knowledge that exists would help them in terms of the social and economic aspects. Both gender in the sampled respondents strongly agreed on this topic. It had weighted values ranging from 4.27 to 4.45 among males and 4.50 to 4.70 among females (Table 2). This means a high to very high responses on the topic being presented to them. The statistical analysis showed that their respective responses with respect to the ethnomedicinal plants located at the 200 masl (S1), 500 masl (S2) and 700 masl (S3) had significant differences (P value < 0.05). This means that both gender unanimously agreed on the topic presented to them. Ethnobotanical knowledge had really helped them in their lives since time immemorial, particularly on interacting with each other and sharing knowledge to anyone who lacked information on ethnomedicinal plant species. This is to address their medicinal needs in treating minor illnesses and other afflictions. In economic practices, ethnomedicinal plants

helped them by no longer purchasing over-the-counter drugs, saved them from medical fees and other expenses due to certain afflictions of diseases. Drinking decoctions from some plant parts thought to be a source of tonic and promote healthy benefits had helped them did various farming activities and other related jobs like hunting and firewood gathering. These findings had similar findings with other ethnomedicinal studies (Motlhanka and Nthoiwa, 2013; Focho et al., 2011; Prigge et al., 2005; Mesfin et al., 2013).

Table 2. Perception of respondents on quality of life in terms of social and economic practices.

1		Male				Female			
	Statement	200 masl	500 masl	700 masl	Total	200 masl	500 masl	700 masl	Total
The Ethnobotanical knowledge helps the Mandaya tribe socially and economically	Agree	10	7	5	22	15	16	11	42
	Undecided	0	1	0	1	12	12	1	25
	Disagree								
	Total	10	8	5	23	27	28	12	67
	Weighted Mean	4.27	4.3	4.45		4.5	4.77	4.7	
	X^2 value	0.6	0.2	0.2		0.6	0.3	0.5	
	P value	0.001	0.001	0.001		0.021	0.011	0.004	

		Male				Female			
	Statement	200 masl	500 masl	700 masl	Total	200 masl	500 masl	700 masl	Total
People around my neighborhood are willing to help their neighbors	Agree	14	7	5	26	15	12	11	38
	Undecided	0	3	0	3	10	12	1	23
	Disagree								
	Total	14	10	5	29	25	24	12	61
	Weighted Mean	4.28	4.63	3.98		3.79	4.05	4.36	
	X^2 value	0.7	0.3	0.34		0.9	0.24	0.42	
	P value	0.001	0.011	0.001		0.012	0.011	0.004	

		Male				Female			
	Statement	200 masl	500 masl	700 masl	Total	200 masl	500 masl	700 masl	Total
All children were sent to schools	Agree	7	13	12	32	22	17	17	56
	Undecided	1	0	0	1	0	0	1	1
	Disagree	0	0	0		0	0	0	0
	Total	8	13	12	33	22	17	18	57
	Weighted Mean	3.98	4.1	4.25		3.94	4.23	4.2	
	X^2 value	0.8	1.2	1.62		0.9	1.23	1.38	
	P value	0.011	0.001	0.001		0.001	0.011	0.002	

Nomadic Farming

Nomadic farming is one of the oldest ways of farming that is still present in indigenous groups up to present and still practiced by some members of the Mandaya community. Both male and female respondents from the two barangays were asked on this topic. Results revealed that they all strongly agreed on this topic (Table 3). This means a high to very high responses on the topic being presented to them based on the rating scale described by Leong 1988. The statistical analysis revealed that the responses of both male and female respondents had significant differences (P value < 0.05). This means that both gender unanimously agreed that ethnobotanical knowledge relates to their current nomadic farming technique. While this is true, some members gathered

herbaceous medicinal plant species and planted them at home, particularly those with aromatic properties used for home cooking like lemon grass, basil, and other herbs. Somehow, their quality of life improved as they knew that those herbal plants planted at home did more than its usual medicinal values through helping them earned extra income when some members of the community brought their herbs to market to sell them. In some indigenous communities, ethnobotanical knowledge helped them address health issues, and that, through this knowledge it helped them restore their normal health conditions while doing their usual ways of nomadic farming practices (Suart, 2014; Assefa et al, 2010; Coopoosamy and Naidoo, 2012).

Table 3. Perception of respondents on quality of life in terms of nomadic farming.

2		Male				Female			
	Statement	200 masl	500 masl	700 masl	Total	200 masl	500 masl	700 masl	Total
The Ethnobotanical knowledge helps the Mandaya tribe in their works on Nomadic Farming	Agree	12	10	15	37	16	19	14	49
	Undecided	0	0	1	1	2	1	0	3
	Disagree								
	Total	12	10	16	38	18	20	14	52
	Weighted Mean	4.21	4.43	4.46		4.4	4.23	4.62	
	X^2 value	0.6	0.3	0.3		1.7	0.3	0.3	
	P value	0.001	0.001	0.001		0.021	0.011	0.004	

		Male				Female			
	Statement	200 masl	500 masl	700 masl	Total	200 masl	500 masl	700 masl	Total
Animals like carabao / cow are used in plowing farm	Agree	10	14	13	37	20	15	17	52
	Undecided	0	1	0	1	0	0	0	0
	Disagree	0	0	0		0	0	0	
	Total	10	14	13	38	20	15	17	52
	Weighted Mean	4.16	4.22	3.79		3.99	4.23	4	
	X^2 value	0.8	0.2	0.23		0.6	0.42	0.5	
	P value	0.001	0.011	0.002		0.011	0.001	0.001	

		Male				Female			
	Statement	200 masl	500 masl	700 masl	Total	200 masl	500 masl	700 masl	Total
Slash and burn cultivation / kaingin is still practice for purposes of total clearing of the farmland	Agree	13	16	10	39	15	14	19	48
	Undecided	0	0	1	1	2	0	0	2
	Disagree	0	0	0		0	0	0	
	Total	13	16	11	40	17	14	19	50
	Weighted Mean	4.02	4.1	4.3		4.18	4.07	3.98	
	X^2 value	0.62	1.05	1		0.92	1	1	
	P value	0.001	0.011	0.001		0.012	0.011	0.004	

Health

In terms of health needs of the Mandaya tribe, the respondents of the two barangays considered both male and female strongly agreed (Table 4) and of significant relationship (P values < 0.05) based on the contribution of ethnobotanical knowledge towards the needs of the group during times of health needs. This is particular during health emergencies and money is the main problem for hospitalization of the afflicted individual. Henceforth, the Mandaya group undeniably rely totally on ethnobotanical knowledge of medicinal plants since time immemorial. Their faith healers in the community still and always prescribed medicines from their surroundings through the help of the spirits which revealed certain plant species for the cure of specific illness. The healing process and mode of preparations were also dependent on the guides of the spirits as revealed to their *baylans.* For the non-IPs, health risks were the main issue, however for them, faith that those medicinal plants could cure their illnesses matters the most. Their quality of life as per health concerns had depended so well on their faith on the healing properties of the medicinal plants prescribed by their healers. For instance, saluyot (*Corchorus olitorius)* grown in their backyards were easily got and used to treat someone with fever. Hence, this is a glaring example on how dependent the community is through ethnomedicines, and therefore, the ethnobotanical knowledge for health needs, and survival as a whole (Caniago and Siebert, 1998; Langenberger et al, 2005).

Table 4. Perception of respondents on quality of life in terms of health.

3		Male				Female			
	Statement	200 masl	500 masl	700 masl	Total	200 masl	500 masl	700 masl	Total
The Ethnobotanical Knowledge helps the Mandaya tribe in terms in their health needs.	Agree	14	17	13	44	15	12	17	44
	Undecided	0	1	0	1	1	0	0	1
	Disagree	0	0	0			0	0	
	Total	14	17	13	45	15	12	17	45
	Weighted Mean	4.2	4.13	4.16		4.4	4.2	4.53	
	X^2 value	0.7	1	1		1.02	1	0.78	
	P value	0.001	0.011	0.002		0.011	0.001	0.001	

		Male				Female			
	Statement	200 masl	500 masl	700 masl	Total	200 masl	500 masl	700 masl	Total
Illnesses / sicknesses are effectively treated by the babaylan / faith healers or by themselves	Agree	9	11	14	34	20	18	16	54
	Undecided	0	1	0	1	1	0	0	1
	Disagree	0	0	0		0	0	0	
	Total	9	11	14	35	21	18	16	55
	Weighted Mean	3.77	4.01	3.98		3.9	3.78	4	
	X^2 value	0.7	0.83	0.92		0.93	1	0.78	
	P value	0.001	0.011	0.002		0.011	0.001	0.001	

		Male				Female			
	Statement	200 masl	500 masl	700 masl	Total	200 masl	500 masl	700 masl	Total
Indigenous people have a long life expectancy	Agree	17	9	15	41	13	20	15	48
	Undecided	0	1	0	1	0	0	0	0
	Disagree	0	0	0			0	0	
	Total	17	9	15	42	13	20	15	48
	Weighted Mean	4	4.17	4.13		4.02	4.12	4.14	

X^2 value	0.95	1.03	1	1	0.9	0.92	
P value	0.001	0.011	0.002	0.011	0.001	0.001	

Family life

Most of the respondents, both male and female from the two barangays had strongly agreed (Table 5) and significantly different (P values <0.05) on the statement that ethnobotanical knowledge helped the way of living of each family on the Mandaya group. This is rooted from the best governance and practices of their tribal leaders whom oral commands served as policies of the community. This has resulted into good community made from each single good family in the group, which resulted from the good relationship inside the family and its subsequent mutual relationships to other families. A harmonious family was a product of totally healthy individuals and suffered less problems. Their simplicity in terms of all family undertakings and their simple mode of living standards kept them away from the bondage of several loans and other monetary consequences, hence improved their quality of life in some ways. This could be related to their indigenous knowledge on ethnobotany and the medicinal properties of the plants species they have known to cure certain illnesses. This is true to some tribal communities as well (Khatun et al, 2011; Alpuerto et al, 2010; Lavoie, 2013).

Table 5. Perception of respondents on quality of life in terms of family life.

		Male				Female			
	Statement	200 masl	500 masl	700 masl	Total	200 masl	500 masl	700 masl	Total
4									
The Ethnobotanical Knowledge help the way of living of each family in the Mandaya Tribe	Agree	9	11	15	35	21	19	14	54
	Undecided	0	0	0	0	0	0	1	1
	Disagree	0	0	0			0	0	
	Total	9	11	15	35	21	19	14	55
	Weighted Mean	4.14	3.69	3.45		3.97	4.07	4.01	
	X^2 value	0.89	0.23	0.45		1.2	0.16	0.13	
	P value	0.001	0.011	0.002		0.011	0.001	0.001	

		Male				Female			
	Statement	200 masl	500 masl	700 masl	Total	200 masl	500 masl	700 masl	Total
Marriage is sacred and cannot be just set aside by any means except death	Agree	8	13	11	32	22	15	19	56
	Undecided	0	2	0	2	0	0	0	0
	Disagree	0	0	0			0	0	
	Total	8	15	11	34	22	15	19	56
	Weighted Mean	4.3	3.69	4.02		4.01	4.12	4.15	
	X^2 value	0.89	0.23	0.45		1.2	0.16	0.13	
	P value	0.001	0.011	0.002		0.011	0.001	0.001	

	Male				Female			
Statement	200 masl	500 masl	700 masl	Total	200 masl	500 masl	700 masl	Total
Agree	9	10	15	34	19	19	15	53
Undecided	2	0	0	2	0	1	0	1

Family is important than any other else	Disagree	0	0	0			0	0	
	Total	11	10	15	36	19	20	15	54
	Weighted Mean	4.31	4.05	3.87		4.11	4.02	4.03	
	X^2 value	0.96	0.43	0.45		0.67	0.42	0.4	
	P value	0.001	0.011	0.002		0.011	0.001	0.001	

Gender Equality

The Mandaya group, both male and female, had strongly agreed with significantly different responses (P values <0.05) in the statement the ethnobotanical knowledge helped them promote the gender equality. Division of roles per gender was a manifestation that each gender respected each other. For instance, males gathered the medicinal plants from anywhere, and when done, the females prepared the plants to be used for healing. Individual respect for each gender especially in dealing with the sick individuals was mostly observed among the Mandaya group. Through mutual respect of each gender, no doubt this would bear a healthy quality of life among them as no discrete discriminations that occurred among their community. In some tribes, gender equality really occurred, for instance, the choice being faith healers could be done either by a male or a female (Idowu et al, 2010; Teklehaymanot and Giday, 2012; Ticktin, 2004).

Table 6. Perception of respondents on quality of life in terms of gender equality.

5		Male				Female			
	Statement	200 masl	500 masl	700 masl	Total	200 masl	500 masl	700 masl	Total
The Ethnobotanical Knowledge help the Mandaya Tribe promote Gender equality	Agree	16	9	17	42	14	21	13	48
	Undecided	0	0	0	0	0	0	0	0
	Disagree	0	0	0			0	0	
	Total	16	9	17	42	14	21	13	48
	Weighted Mean	3.95	4	4.01		4	4.1	3.73	
	X^2 value	0.6	0	0		1.1	0	0	
	P value	0.011	0.011	0.001		0.011	0.001	0.004	

		Male				Female			
	Statement	200 masl	500 masl	700 masl	Total	200 masl	500 masl	700 masl	Total
Women can do better business and marketing like men	Agree	13	16	8	37	17	14	20	51
	Undecided	0	0	2	2	0	0	0	0
	Disagree	0	0	0			0	0	
	Total	13	16	8	39	17	14	20	51
	Weighted Mean	4	3.77	4		4.11	3.99	3.95	
	X^2 value	0.89	0.71	0.32		0.91	0.56	0.66	
	P value	0.001	0.021	0.002		0.001	0.001	0.001	

	Male				Female			
Statement	200 masl	500 masl	700 masl	Total	200 masl	500 masl	700 masl	Total
Agree	7	18	12	37	21	12	18	51

An education among the children its important to let both boy and girl go to school	Undecided	2	0	0	2	0	0	0	0
	Disagree	0	0	0			0	0	
	Total	9	18	12	39	21	12	18	51
	Weighted Mean	3.97	4	4.12		4.13	4	4.05	
	X^2 value	0.92	1	1.05		0.89	0.79	0.92	
	P value	0.001	0.011	0.002		0.011	0.001	0.001	

Generally, the concept of good quality of life in this study was confidently responded by the Mandaya community through their mutual respect for each other despite their individual differences. However, it did not limit them to open new opportunities for new advanced medicines to treat illnesses beyond the capacity and healing properties of the medicinal plants present in their surroundings. They were open for new innovations of medical practices and the eventual improvement of their quality of life in the modern world. Their knowledge implicated on ethnomedicinal healing properties of certain plant species had really helped them augment their quality lives through improved social relationships and interdependence since past generations, hence worthy to be sustained in the future.

CONCLUSION AND RECOMMENDATIONS

The way of living of each family and its quality had some bearing on the sustainability of indigenous cultural practices of using various plant species with healing properties against common diseases and illness. This was greatly rooted on their ancestors' best practices who were using ethnomedicinal plants since time immemorial even situated in far distances away from the nearest medical and social services of the government. Their survival through time as manifested by mutual respect for each other was a good indicator that they possessed strong quality of life that could be passed on to the next generations to come. The foreseen threats to their culture by the elders, particularly on modern ways of living and medications triggered them to reeducate their young individuals on their usual culture and traditions. Good example is their efforts to conserve plant species that had medicinal values and lobby this to the mining authorities to leave portions of mining lands where rich plant species with medicinal values are found.

In this regard, all possible stakeholders should extend help to the Mandaya communities to address relevant societal health problems to avoid putting much pressure on the inhabiting plant species with medicinal properties. For instance, nurseries for certain herbal plants be established in their communal gardens. The tribal leaders should be supported through any relevant means in their efforts to preserve their usual cultures and traditions to younger individuals, particularly on improving their knowledge on certain ethnomedicinal plant species. Support should be extended to their plans on setting aside portions of mining areas solely for the conservation of medicinal plants. Government, mining authorities, academe and other stakeholders should formulate policies that are beneficial to all parties, especially on the sustainability, conservation and management of plants with ethnomedicinal properties.

ACKNOWLEDGMENTS

Heartfelt gratitude and appreciation are attributed to some institutions and individuals of DENR 11, MSU Naawan, Mil-Oro mining personnel, leaders and members of the Mandaya community, city government of Mati, and all other stakeholders involved in this study. Special thanks to Michael James O. Baclayon and Dr. Arvin Carlom for the all-out support provided in this study.

REFERENCES

1. Abe, R and K., Ohtani. 2013.An ethnobotanical study of medicinal plants and traditional therapies on Batan Island, the Philippines. Journal of Ethnopharmacology. 145(2):554-65.
2. Adam, L. 2007. Information and Communication Technologies, Knowledge Management and Indigenous Knowledge: Implications to Livelihood of Communities in Ethiopia. In: Proceedings of the Role of ICT in Preserving and Disseminating Indigenous Knowledge Workshop at Addis Ababa. 23p.

3. Adnan, M., I., Ullah, A., Tariq, W., Murad, A., Azizullah, A., Khan and N, Ali. 2014. Ethnomedicine use in the war affected region of northwest Pakistan. Journal of Ethnobiology and Ethnomedicine. 10:1-16.
4. Alpuerto AFT, A, Bangaysiso, V, Galang, L, Maquiling and Taylor. 2010. Level of awareness and extent of utilization of the ten medicinal plants approved by the department of health. Nursing Research Journal. 2:73-92.
5. Ammakiw, C. L. and M.P., Odiem. 2014. availability, preparation and uses of herbal plants in Kalinga, Philippines. European Scientific Journal, 9(10):34-42.
6. Asiimwe, S., A., Namutebi, B., Karisson, M., Mugisha and H. Origa. 2014. Documentation and consensus of indigenous knowledge on medicinal plants used by the local communities of western Uganda. Journal of Natural Products and Plant Resources 4(1):34-42.
7. Assefa, B., Glatzel, G. and C. Buchmann. 2010. Ethnomedicinal uses of *Hagenia abyssinica* (Bruce) J.F. Gmel. among rural communities of Ethiopia. Journal of Ethnobiology and Ethnomedicine. 6:1-20.
8. Atibioke, O.A., I. Ogunlade, A.A. Abiodun, B.A. Ogundele, M.A. Omodara and A.R. Ade. 2012. Effects of farmers' demographic factors on the adoption of grain storage technologies. Journal of Ethnobiology and Ethnomedicine. 12:1-6.
9. Barbalho, S.M., F.M.V., Farinazzi-Machado, R., de Alvares Goulart, A.C.S., Brunnati, A.M., Otoboni and C.C.Y., Nicolau. 2012. *Psidium guajava* (Guava): A Plant of Multipurpose Medicinal Applications. Med Aromat Plants 1:104. doi: 10.4172/2167-0412.1000104
10. Beltrán, J. (Ed.) 2000. Indigenous and Traditional Peoples and Protected Areas: Principles, Guidelines and Case Studies. IUCN, Gland, Switzerland and Cambridge, UK and WWF International, Gland, Switzerland. 133pp.
11. Bussman, R. and D., Sharon. 2006. Traditional medicinal plant use in Northern Peru: tracking two thousand years of healing culture. Journal of Ethnobiology and Ethnomedicine. 2: 1-18.
12. Butt, T.M., Z.Y. Hassan, K. Mehmood and S. Muhammad. 2010. Role of rural women in agricultural development and their constraints. J. Agri. Soc. Sci. 6: 53–56.
13. Canales, M., Hernandez, T., Caballero, J., Vivar, R., Avila, G., Duran, A., Lira, R., 2005. Informant consensus factor and antibacterial activity of the medicinal plants used by the people of San Rafael Coxcatlan, Puebla, Mexico. Journal of Ethnopharmacology 97:429-439.
14. Caniago I and F. Siebert. 1998. Medicinal plant ecology, knowledge and conservation in Kalimantan, Indonesia. Economic Botany. 52: 229-250.
15. Cohen, A. 1999. The mental health of indigenous peoples: an international overview. Cultural Survival Quarterly. 23: 18-20.
16. Constitution of the Republic of the Philippines, 1973.
17. Constitution of the Republic of the Philippines, 1987.
18. Coopoosamy, R. and Naidoo. 2012. An ethnobotanical study of medicinal plants used by traditional healers in Durban, South Africa. African Journal of Pharmacy and Pharmacology 6(11): 818-823.
19. Daku, L. 2002. Assessing farm-level and aggregate economic impacts of olive integrated pest management programs in Albania. Ph. D. Dissertation, Virginia Polytechnic Institute and State University, David, Lynne. Riener Publishers. 46p.
20. Fliegel, F.C. and P.F. Korsching. 2001. Diffusion research in rural sociology: The record and prospects for the future. Social Ecology Press, WI. p34.
21. Focho, A., Nkeng, E. A. P., Fonge, B. A., Fongod, A. N., Muh, C. N., Ndam, T. W. and A. Afegenui. 2011. Diversity of plants used to treat respiratory diseases in Tubah, northwest region, Cameroon. African J. of Pharm. Pharmacol. 11:573-580.
22. Foster, G.K. 2012. Foreign Investment and Indigenous Peoples: Options for Promoting Equilibrium between Economic Development and Indigenous Rights. Michigan Journal of International Law 33(4). Retrieved from http://repository.law.umich.edu/mjil/vol33/iss4/1
23. Gómez-Limón, J.A., E. Vera-Toscano and F.E. Garrido-Fernández. 2012. Farmers' contribution to agricultural social capital: Evidence from Southern Spain. Working Paper Series. Spanish Ministry of Economy and Competitiveness and FEDER AGRIGOBERSOS and CAPSOC. p112.
24. Greenpeace Philippines, 2012. A week after typhoon Pablo. http://www.greenpeace.org/seasia/ph/multimedia/photos/2012/December/A-week-after-typhoon-Pablo7/. Retrieved on December 5, 2016. p12
25. Gutierrez, R., Baculi, Pastor, R., Puma-ar, N. and T., Balangcod. 2013. Antibacterial potential of some medicinal plants of the Cordillera Region, Philippines. Indian Journal of Traditional Knowledge. 12(4):630-637.

26. Hall, T. D. and J. V., Fenelon. 2015. Indigenous peoples and globalization: Resistance and revitalization. Routledge. 23p.
27. Idowu OA, OT Soniran, O Ajana and DO Aworinde. 2010. Ethnobotanical survey of antimalarial plants used in Ogun State, Southwest Nigeria. A Journ Pharmacy and Pharm. 4: 055-060.
28. Khatun A, H., Or-Rashid and M. Rahmatullah. 2011. Scientific Validation of Eight Medicinal Plants Used in Traditional Medicinal Systems of Malaysia: A Review. American-Eurasian Journal of Sustainable Agriculture. 5: 67-75.
29. Langenberger GK, Martin and V, Prigge. 2005. Ethnobotanical Survey among Farmers in Leyte, Philippines, and Comparison with Indigenous Filipino Plant Lore. Conference on International Agricultural Research for Development, Stuttgart-Hohenheim.112p.
30. Lavoie, C. 2013. Biological Collections in an Ever-Changing World: Herbaria as Tools for Biogeographical and Environmental Studies. Persp. Plant Ecol. Evol. Systematics, 15(1): 68 – 76
31. Leeftink, F. Coping after typhoon Pepeng: A case study of indigenous practices and external aid in the Cordillera, Philippines. Wageningen University. p10.
32. Liu, W. and C. Gong. 2011. Expert Advice Treatment of Dermatosis in Traditional Chinese Medicine (TCM): The American Academy of Acupuncture and Oriental Medicine. Retrieved from http://www.tcmpage.com/hpdermatosis.html
33. Mafimisebi, T. and A., Oguntade. 2010. Preparation and use of plant medicines for farmers' health in Southwest Nigeria: socio-cultural, magico-religious and economic aspects. Journal of Ethnobiology and Ethnomedicine. 6(1):1-9, http://dx.doi.org/10.1186/1746-4269-6-1.
34. McGraw-Hill Companies, 1998. Victims of Progress. pp. 137-151. Copyright © 1998 by The Mayfield Publishing Company.
35. Mesfin, K., Tekle, G. and T. Tesfay. 2013. Ethnobotanical study of traditional medicinal plants used by indigenous people of Gemad District, Northern Ethiopia. Journal of Medicinal Plants Studies 1(4): 32-37.
36. Motlhanka, D. M. T. and G.P., Nthoiwa. 2013. Ethnobotanical Survey of Medicinal Plants of Tswapong North, in eastern Bostwana: A case Study of Plants from Mosweu and Seolwane Villages, European Journal of Medicinal Plants. 3(10):12-20.
37. Munro, B., Q., Vuong, A.,Chalmers, C., Goldsmith, M., Bowyer and C., Scarlett. 2015. Phytochemical, antioxidant and anti-cancer properties of Euphorbia tirucalli methanolic and aqueous extracts. Antioxidants. 4:647-661, http://dx.doi.org/10.3390/antiox4040647.
38. Mwine, J. and P. Damme. 2011. Why do Euphorbiaceae tick as medicinal plants? a review of Euphorbiaceae family and its medicinal features. Journal of Medicinal Plants Research 5(5):652-662.
39. National Commission on Indigenous Commission.2014. Annual Report. Republic of the Philippines
40. National Statistics Office (NSO), 2011. Republic of the Philippines
41. Odhiambo, J., C., Lukhoba and Dossaji, S. 2011. Evaluation of herbs as potential drugs/medicines. African Journal of Complementary and Alternative Medicine. 8:144-151.
42. Okullo, J., F., Omujal, C., Bigirimana, P., Isubikalu. M., Malinga, E., Bizuru, A., Namutebi, B.,Obaa and J.,Agea. 2014. Ethno-medicinal uses of selected indigenous fruit trees from the Lake Victoria Basin Districts in Uganda. Journal of Medicinal Plant Studies. 2(1):78-88.
43. Olajuyigbe, O. and A., Afolayan. 2012. Ethnobotanical survey of medicinal plants used in the treatment of gastrointestinal disorders in the Eastern Cape Province, South Africa. Journal of Medicinal Plants Research. 6(18):3415-3424, http://dx.doi.org/10.5897/JMPR11.1707.
44. Parvez, N. and S., Yadav. 2010. Ethnopharmacology of single herbal preparations of medicinal plants in Asendabo district, Jimma, Ethiopia. Indian Journal of Traditional Knowledge 9(4):724-729.
45. Pratchayasakul, W., A., Pongchaidecha, N., Chattipakorn and S., Chattipakorn, 2008. Ethnobotany & ethnopharmacology of Tabernaemontana divaricate. Indian Journal of Medical Research. 127:317-335.
46. Prigge, V., Langenberger, G. and K. Martin. 2005. Ethnobotanical Survey among Farmers in Leyte, Philippines, and Comparison with Indigenous Filipino Plant Lore. In: Deutscher Tropentag, Stuttgart-Hohenheim, Germany. 45p.
47. Rajeh, M., Z. Zuraini, S., Sasidharan, L., Latha and S,Amutha. 2010. Assessment of Euphorbia hirta L. leaf, flower, stem and root extracts for their antibacterial and antifungal activity and brine shrimp lethality. Molecules. 15:6008-6018, http://dx.doi.org/10.3390/molecules15096008.
48. Rekhari, S. 2009. Indigenous communities and new media: questions on the global Digital Age. Journal of Information, Communication and Ethics in Society. 7(2/3):175-181.
49. Silvoarable Agroforestry for Europe (SAFE). 2005. Quality of Life and Management of Living Resources. European Research Final Report. 108-244pp.

50. Smith, C. and G, Ward. 2000. Indigenous cultures in an interconnected world. UBC Press, 213pp.
51. Suart, G.U. 2014. Philippine Alternative Medicine: Pasma. Retrieved from http://www.stuartx change.org/Pasma.html.
52. Subba, C. 2014. A study on the Socio – Economic Status of Indigenous Peoples in Nepal. Lawyers' Association for Human Rights of Nepalese Indigenous Peoples (LAHURNIP). Ghattekulo – Anamnagar, Kathmandu, Nepal. 21p.
53. Teklehaymanot, T. and Giday, M. 2012. Ethnobotanical study of medicinal plants used by people in Zegie Peninsula, Northwestern, Ethiopia. Journal of Ethnobiology and Ethnomedicine. 2:1-7.
54. Ticktin, T. 2004. The ecological implications of harvesting non-timber forest products. Journal of Applied Ecology. 41:11–21.
55. Ugulu, I., 2012. Fidelity level and knowledge of medicinal plants used to make therapeutic Turkish baths. Ethno Med. 6(1):1-9.
56. United Nation Development Program (UNDP) in the Philippines. 2013. Philippine Human Development Report on geography and human development. 213pp. http://www.ph.undp.org/content/philippines/en/home/countryinfo/.
57. United Nations Population Fund (UNPF). 2011. People and possibilities in a world of 7 billion. UNFPA. 132pp.
58. Uprety, Y., Asselin, H., Dhakal, A. and N., Julien. 2012. Traditional use of medicinal plants in the boreal forest of Canada: review and perspectives. Journal of ethnobiology and ethnomedicine. 8(7):1-12.
59. Varnika, S., S., Ashish and A., Imran. 2012. A review on ethnomedical and traditional uses of *Mimosa pudica* (chui-mui). International Research of Journal of Pharmacy. 3(2):41-44.
60. Virtanen, P. K. 2015. Indigenous social media practices in Southwestern Amazonia. AlterNative: An International Journal of Indigenous Peoples. 11:4-35.