Identification and use of Weeds Consumed as Vegetable in Sylhet City

Antara Pervin[1], Md. Ruhul Amin[2], Md Ashraful Islam[3] and Manas Mohan Adhikary[4]

[1]MS Student, Department of Agricultural Extension Education, Sylhet Agricultural University, Sylhet, Bangladesh
[2&3]Department of Agricultural Extension Education, Sylhet Agricultural University, Sylhet, Bangladesh
[4]Professor(Retd) Agricultural Extension, Bidhan Chandra Krishi Viswavidyalaya, West Bengal, India
E-Mail: dradhikary@gmail.com

Abstract—*Bangladesh is a densely populated country. It has a population of about 150 million with 147,570 square kilometers area. This huge population has a tremendous amount of nutrients requirement. Vegetables are important sources of nutrients. The purpose of this study was to determine the extent of use of weeds consumed as vegetables by consumers of Sylhet city. The study was conducted in six vegetable markets of Sylhet city namely Baluchar bazaar, Mejortilla bazaar, Tillaghor bazaar, Amborkhana boro bazaar, Tuker bazaar and Bondar bazaar. Data were collected by the researcher himself from randomly selected 60 vegetable consumers mainly through face to face interview by using an interview schedule. Ten (10) weed plants were identified as vegetables and consumed by the city dwellers to different extent. About two-third of the respondents had medium extent of use of weeds consumed as vegetables in Sylhet city. Among the identified 10 weed plants kalmishak (Ipomea aquatic), kachu (Colocassia sp.), helencha (Enhydra fluctuans) and so on were highly consumed. On the other hand, Nuneshak (Portulaca oleracea), Telakucha (Coccinia grandis) and Shapla (Nymphaea nouchali) etc. were less used as vegetables. In case of nine traditional vegetables bean, patshak, Lalshak etc. were highly consumed while cabbage, bottle gourd etc. were less consumed by consumers of Sylhet city. Majority of the respondents (48.3 percent) had medium extent of use of weeds consumed as vegetables followed by medium (18.3 percent) and high (33.3 percent) extent of use. Among the selected characteristics only age, exposure to communication media and vegetable consumption behavior showed a positive relationship with their extent of use of weeds consumed as vegetables.*

Keywords: *Weeds, vegetables, nutrients, metabolism, consumption*

Introduction:

In Bangladesh production of traditional vegetables is not satisfactory to meet the demand of total population. On the other hand, underutilized weed species have good yield potential. They can play vital role in meeting nutritional requirement. These plants are produced naturally and harvested by the urban and pre-urban poor [especially women] and sold at a support of their income and nutrition (Shah et al., 2007). Moreover, underutilized weed plants are relatively cheaper sources for meeting the nutritional requirement. The vegetables being currently cultivated in Bangladesh are broadly categorized into 3 groups viz. major indigenous traditional vegetables, exotic vegetables and minor or underutilized indigenous vegetables. About 98 kinds of vegetables are being cultivated in the country at present belonging to these three categories. Among these, 20 kinds are major indigenous traditional vegetable e.g. Pumpkin, Brinjal, Pointed gourd, Teasel gourd etc., 25 kinds are minor indigenous vegetables e.g. Winged bean, Sword bean, Luffa etc. and others are probably exotic. Most of these minor or underutilized indigenous vegetables are underutilized wild plants (Saifullah et al., 2010). But in Bangladesh, no such work have been done till now although Shah et al. (2007) tried to know the status of this venture through a market survey which had some sorts of commercial and socio-economic focus. Hence, it is almost a new concept in Bangladesh and no particular work in this area has yet been done. The present study was based on identification and use of weeds consumed as vegetables in Sylhet city. Historically, productivity and production of traditional vegetables in Bangladesh are relatively low to meet the domestic demand. The per capita requirement of vegetables is about 200 g/day where as present per capita availability is only 40 g/day (BBS, 2011). Main reasons of this low production are lack of improved varieties, diseases and pest infestation, environmental stress etc. Although the total production has been increased in last few years at increasing rate due to increase of production area but this is not sufficient because the increasing rate is very little. Moreover, production area increasing approach should not be a solution because our land area is limited (Saifullah et al., 2010). In such a situation we should care about the cultivation of underutilized wild plants in commercial scale. According to FAO's Production Yearbook wild plants are still maintained in some Latin American and eastern Asian countries. More than 20 wild plants are used as food in Mexico (Linares and Aguirre, 1992). In Korean local

markets 112 wild or weed plants are sold and their prices are higher than cultivated vegetables probably due to very poor supply. Moreover, some of these wild plants are exported to U.S.A. for preparing Korean and Chinese typical dishes (Pomberton and Lee, 1996). Morocco also exports several weeds or wild plants to U.S.A., Spain, Italy and Greece (Tanji and Nassif, 1995). Underutilized weed plants may be defined as the plants that are grown with cultivated crops as volunteers or weeds .They are usually not utilized in larger scale. Bathua, Thankuni, Helencha, Shaknotey, Takpalang, Shapla, Dhekishak etc are the example of weed vegetables of Bangladesh (Saifullah et al., 2010). These species have usually more yield potential than traditional vegetables. They require lesser amount of management in comparison with traditional vegetables. Moreover, they are less prone to several diseases and pests (Saifullah et al., 2010). Besides, several varieties of field grown traditional vegetables are expensive which is mentioned earlier and therefore poor people have to look to the wild plants for diets. The field grown vegetables also lack several vitamins. The use of underutilized weed plants can help in combating this problem. Considering these points the present study was conducted with the objectives such as to identify the weeds consumed as vegetable in Sylhet city; to determine the extent of use and benefits of consumable weeds; to determine and describe the socio-economic features of the consumer and to explore the relationship between selected characteristics of the respondents and extent of use of weeds consumed as vegetable.

Materials and Methods:

Data were collected from 60 sampled vegetables buyers (consumers) of the 6 selected markets through face to face interview using the interview schedule. The researcher firstly gave his institutional identity to the vegetables consumers and informed them about the purpose of the study in brief. Then the researcher requested the vegetables consumers to provide information as mentioned in interview schedule. Information was collected very carefully and cautiously. The questions were explained whenever any respondent felt difficulty in understanding properly. The researcher made sufficient efforts to establish rapport with the respondents in order to get valid and pertinent information from the respondents. After completion of interview each interview schedule was checked and verified for proper recording of data. Good cooperation was received from almost all of the respondents during interview. In survey research specification and measurement of variables is an important task. A well organized survey research usually contains at least two elements, an independent variable and a dependent variable. The researcher selected the dependent variable and independent variables for this study through an extensive reading of related theses and discussion with experts. However the nine (9) selected characteristics of vegetables consumers (buyers) were treated as the independent variables of the study. These selected characteristics were age, family size, education, annual income, cosmopoliteness, organizational participation, exposure to communication media, training and vegetables consumption behavior. On the other hand, extent of use of weeds consumed as vegetable was considered as dependent variable of the study. A score of "1" was given for one percentage of use of weed plants as vegetables for measuring the use of weeds consumed as vegetables of the respondent. Based on the use of weeds consumed as vegetables score the respondents were classified into following three categories. Vegetables consumption behavior included the four categories of vegetables consumption *viz.* consumption of traditional vegetables in summer, consumption of wild plants as vegetable in summer, consumption of traditional vegetables in winter and consumption of wild plants as vegetable in winter. The following scale was used for computing the vegetables consumption score.

Table 1 Assigned score against extent of consumption of vegetables by respondents

Category of vegetables consumption	Assigned score
Consumption of traditional vegetables in summer	0= Not at once in a month 1= 3 days in a month 2= 3 days in a week 3= Everyday
Consumption of weeds as vegetable in summer	0= Not at once in a month 1= 2 days in a month 2= 3 days in a month 3= Once in every 3 days
Consumption of traditional vegetables in winter	0= Not at once in a month 1= 3 days in a week 2= 3 days in a week 3= Every day
Consumption of weeds as vegetables in winter	0= Not at once in a month 1= 2 days in a month 2= 3 days in a month 3= Once in every 3 days

Use of weeds consumed as vegetables constituted the dependent variable of the study. The vegetable consumers were asked to mention their average amount of weeds plants consumed as vegetables (in kg) in a month and then it was converted into annual consumption. Again, they were asked to mention their average amount of traditional vegetables (in kg) in a week and then it was converted into annual consumption. Then the total amount of vegetable consumption was measured by adding the amount of consumption of weeds consumed as vegetables (kg) in a year and amount of consumption of traditional vegetables (in kg) in a year. After collection data were analyzed and tabulated for interpretation. Statistical treatment such as number, percent, range, mean and standard deviation were used to describe the data. The computer package program "Microsoft Office Excel 2007" and "SPSS Statistics 20" were used to analyze the data and "Arch View Software (AVS 11)" was used to digitize the map of the study area. Correlation co- efficient 'r' was used to explore the relationship between the selected characteristics of the respondents and their extent of use of weeds consumed as vegetable.

Results and Discussion:

Some selected weed plants are consumed as vegetable in sylhet city. These consumable weeds contain vitamins and minerals which is good for health. Consumer of the study area are used these consumable weeds for it is health benefits. Shak notey helps to lower the body cholesterol level, full of antioxidant and so on. Dheki shak is used to treatment for cancer etc. Kalmi shak act as anti- oxydent and anti- diabetes. Shapla helps to body metabolism and so on. Bathua helps to increase hemoglobin level and act as the blood purifier. Telakucha is used to treat leprosy, fever, asthma etc. Thankuni is used to treat blood purifier, wonds and so on. Helencha is used to treat eczema, skin allergies etc. Nune shak is rich in Omega-3 fatty acids and prevent headaches etc. Kachu helps to increase hemoglobin level, calcium etc. [Saifullah *et al.* (2010)].

Table No. 2 Health Benefits of Weeds Consumable weeds

SL. No.	Consumable Weeds	Benefits
01	Shak notey	• It Provide essential lysine, • To help hair loss and graying, • Lower the cholesterol and risk of cardiovascular disease, • Full of antioxidants and minerals, Improve eyesight, • Easy to digest.
02	Dheki shak	• Treats cancer, • Enhance immunity, • Anti Inflammatory Activity, • Maintain eye health, • Prevent form bone disorder.
03	Kalmi shak	• Prevent from constipation, • Act as anti- poison, anti diabetes, • Increase immunity, • Maintain healthy vision and good liver health.
04	Shapla	• Maintain strength in the body, • Increase immune system, • Helps in metabolism, • Helps in maintain the bone.
05	Bathua	• Helps in curing constipation, • Enhance immune system function growth none formation, • Reproduction, wound healing. • It also helps in purifier the blood. • Improve hemoglobin level.
06	Thankuni	• The plant has been used to treat skin inflammation, diabetes, cough, cataracts and other eye conditions, and to improve memory. • In Europe, The aerial parts of the plant was used to purify the blood and treat wounds, ulcers, skin inflammation, hypertension etc.
07	Telakucha	• It is used to treat leprosy, fever, asthma, bronchitis and jaundice, • The fruit possesses mast cell stabilizing, anti-anaphylactic, • The roots are used to treat osteoarthritis and join pain.
08	Helencha	• It helps in eczema, skin allergies, prickly heat reduction, • It purifies blood and removes pimples and boils, • It removes blemishes and makes skin glow from inside, • Treats acidity & liver problems.
09	Nuneshak	• It is a natural remedy for insomnia, • It is Rich in Omega-3 Fatty Acids, • It may prevent headaches and migraines, • It can promote strong bones, • It can help with skin conditions.
10	Kachu	• It is a good source of calcium, • It is rich in iron which help to increase hemoglobin.

The relative position (rank order) of weeds consumed as vegetables was determined based on Weed Plant Vegetables Consumption Index (WPVCI). Distribution of the respondents according to their consumption of identified WPVs based on wild plant vegetables consumption index and rank order are shown in the Table 3. Weed plant vegetables consumption index scores ranged from 13-99 against the possible range of 0-160. Among the 10 identified weed plants vegetables kalmi shak (Water spinach) was highly consumed followed by kachu (Aroids). On the other hand, nuneshak (Garden purslane) was less consumed by the consumers followed by shak notey, telakucha.

Table 3 Relative position of WPVs based on weed plant vegetables consumption index

WPVs	Respondent =60					
	Never	Rarely	Sometimes	Regulary	Consumption index	Rank
Kalmi shak	11	12	24	13	99	1st
Kachu	12	13	21	14	97	2nd
Helencha	12	18	14	16	94	3rd
Thankuni	19	14	15	12	80	4th
Shapla	24	13	16	7	66	5th
Dheki shak	31	8	17	4	54	6th
Bathua shak	35	14	8	7	51	7th
Telakucha	31	12	10	3	41	8th
Shak notey	41	7	8	4	35	9th
Nune shak	41	10	6	3	31	10th

The relative position/rank order of TrVs was determined in similar way i.e. based on TVCI. Distribution of the respondents according to their consumption of 9 identified TrVs based on traditional vegetables consumption index and rank order are shown in the Table 4. Traditional vegetables consumption index (TVCI) ranged from 43-149 against the possible range of 0-160. Among the 9 identified traditional vegetables bean was highly consumed vegetable followed by cauliflower, bottle gourd and

so on while the less consumed vegetable was giant taro was followed by spinach, papaya.

Table 4 Relative position of TrVs of based on traditional vegetables consumption index (TVCI)

Traditional vegetables (TVs)	Respondents=60					
	Never	Rarely	Sometimes	Frequenly	Consumption index	Rank
Bean	3	5	9	43	149	1st
Red amaranth	6	5	7	42	148	2nd
Pat shak	5	6	15	34	138	3rd
Brinjal	7	8	8	37	135	4th
Lady"s finger	10	6	8	36	130	5th
Spinach	10	11	13	30	127	6th
Papaya	11	10	10	29	117	7th
Bottle gourd	14	8	10	28	112	8th
Cabbage	16	10	9	26	106	9th

Relationships between selected characteristics of the respondents and their extent of use of weeds consumed as vegetable

The purpose of this section is to determine the relationships of the selected characteristics of the consumers with their extent of use of wild plants as vegetables. The selected characteristics of the consumers were: age, family size, education, annual income, cosmopoliteness, organizational participation, exposure to communication media, training and vegetables consumption behavior. Each of the selected characteristics constituted an independent variable while consumers" extent of use of weed plants as vegetables was only the dependent variable in this study. Relationships of nine selected characteristics of the consumers with their extent of use of wild plants as vegetables have been shown in Table 5.

Table 5 Correlation co-efficient showing relationship between independent and dependent variables

Sl. No.	Dependent variables	Independent variables	Observed "r" value	Tabulated value	
				0.05 level	0.01 level
1	Extent of use of weeds consumed as vegetable by the consumer	Age	0.336 **	0.197	0.257
2		Family size	-0.238 NS		
3		Education	0.030 NS		
4		Annual income	0.103 NS		
5		Cosmopolitanism	0.248 NS		
6		Organizational participation	0.034NS		
7		Exosure to communication media	0.428 **		
8		Training	-0.183 NS		
9		Vegetables consumption behavior	0.428**		

** p≤ 0.01, NS: Non-significant

In summary, the model suggest that the respective authority should consider growers age, family size, education, annual income, cosmopoliteness, organizational participation, exposure to communication media, training, vegetables consumption behavior for their extent of use of weeds consumed as vegetables. Data revealed that majority (45 percent) of the respondents were young and middle aged also (45 percent) and old (10 percent). The overwhelming majority (90 percent) of the respondents were young to middle aged. This result indicates that young and middle aged people know about those weeds health benefits. Data indicate that highest proportion (40 percent) of the respondents had secondary level of education followed by higher secondary level (11.7 percent) above higher secondary level (15 percent), primary level (16.7 percent) and illiterate person (16.7 percent) among the 60 respondents. Most of the people had secondary level of education but only 11.7 percent people had higher secondary level of education. Data indicate that about two third (60 percent) of the respondents had small sized family compared to medium sized (26.7 percent) and large sized (13.3 percent) family. Data revealed that highest proportion (71.7 percent) of the respondents belonged to high income group followed by medium income group (6.7 percent) and low income group (21.7 percent). Data presented in Table 5 indicate that about three-fourth (75 percent) of the respondents had medium cosmopoliteness as compared to high cosmopoliteness (25 percent). None of the respondents showed low cosmopoliteness. Results showed that about two third (70 percent) of the respondents had low organizational participation followed by medium participation (30 percent). However, none of the respondents had high organizational participation. Result indicate that most (66.7 percent) of the respondents had medium exposure to communication media. However, only 16.7% respondents had low exposure to communication media and high exposure to communication media respectively. High level of exposure to communication media also related with high consumption of weed plants vegetables. Result indicates that highest proportion (68.3 percent) of the respondents had low training followed by no training (31.7 percent). None of the respondents had high training and medium training. It means they have less idea about weed plant vegetables. Data indicate that highest proportion (36.7 percent) of the respondents belonged to high and medium consumption category followed by low consumption (26.7 percent). The overwhelming majority (73.4 percent) of the respondents belonged to low to medium consumption category. The findings also indicate that the respondents are little conscious about health and nutrition. Probably this might enhance them belong to low and medium vegetable consumption category. Majority people (73.4 percent) of the study area were conscious about vegetables consumption.

Relationships between selected characteristics of the respondents and their extent of use of weeds consumed as vegetable

Age and extent of use of weeds consumed as vegetable

The observed value of r (0.336) ** shows a positive and significant relationship between age of the respondents and their extent of use of weeds consumed as vegetables. The statistical analysis therefore, accepts the null hypothesis. This finding indicates that age is related with vegetables consumption. Young and middle aged people conscious about weed plants vegetables.

Family size and extent of use of weeds consumed as vegetable

The observed value of r (-0.238) shows a non-significant relationship between family size of the respondents and their extent of use of weeds consumed as vegetables. The statistical analysis therefore, accepts the null hypothesis.

Education and extent of use of weeds consumed as vegetable

The observed value of r (0.030) shows a non-significant relationship between personal education level of the respondents and their extent of use of weeds consumed as vegetables. The statistical analysis therefore, accepts the null hypothesis.

Annual income and extent of use of weeds consumed as vegetable

The observed value of r (0.103) shows a non-significant relationship between annual income of the respondents and their extent of use of weeds consumed as vegetables. The statistical analysis therefore, accepts the null hypothesis.

Cosmopoliteness and extent of use of weeds consumed as vegetable

The observed value of r (0.248) shows a non-significant relationship between cosmopoliteness of the respondents and their extent of use of weeds consumed as vegetables.

Organizational participation and extent of use of weeds consumed as vegetable

The observed value of r (0.034) shows a non-significant relationship between organizational participation of the respondents and their extent of use of weeds consumed as vegetables. The statistical analysis therefore, accepts the null hypothesis.

Exposure to communication media and extent of use of weeds consumed as vegetable

The observed value of r (0.428) ** shows a significant relationship between exposure to communication media of the respondents and their extent of use of weeds consumed as vegetables. The statistical analysis therefore, rejects the null hypothesis. The findings also indicate that the higher is communication of the respondents the higher is the extent of use of weeds consumed as vegetables.

Training and extent of use of weeds consumed as vegetable

The observed value of r (-0.183) shows a non-significant relationship between training of the respondents and their

extent of use of weeds consumed as vegetables. The statistical analysis therefore, accepts the null hypothesis.

Vegetables consumption behavior and extent of use of weeds consumed as vegetable

The observed value of r (0.428)** shows a positive and significant relationship between vegetables consumption behavior of the respondents and their extent of use of wild plants as vegetables. The statistical analysis therefore, rejects the null hypothesis. It concludes that if the respondents increase their amount of vegetables consumption then a considerable portion of the vegetables consumption may be occupied by weeds.

Conclusion

A number of 10 weeds was identified as vegetables and consumed by the city dwellers to different extent. About two-third of the respondents had low extent of use of weeds consumed as vegetables in Sylhet city. Among the identified 10 weed plants kalmishak, kachu, thankuni and so ones were highly consumed. On the other hand, nuneshak, thankuni, shapla etc. were less used as vegetables. In case of 9 traditional vegetables bean, patshak, etc were highly consumed while cabbage, bottle gourd etc. were less consumed by consumers of Sylhet city. Most of the respondents (90 percent) were young to middle aged .The highest percentage (40 percent) of respondents had secondary level of education. Most of the respondents (52 percent) belonged to small to medium sized family. Most (78 percent) respondents belonged to high income (71.7 percent) to low income (21.7 percent) group. Majority of the respondents had low comopoliteness (75 percent) and most of the respondents (66.7 percent) had medium exposure to communication media. Most of the respondents (70 percent) had no organizational participation. The overwhelming majority (68.3 percent) of the respondents belonged to low training categories. Vegetables consumption behavior of about two third (73.4 percent) of the respondents was medium to high i.e. they regularly consumed vegetables. Majority of the respondents (48.3 percent) had medium extent of use of weeds consumed as vegetables. Among the 6 selected characteristics of vegetable consumer seven characteristics viz. family size, education, annual income, cosmopoliteness, organizational participation and training had no significant relationship with extent of use of weeds consumed as vegetables. The correlation between the age of the consumers and their extent of use of weeds consumed as vegetables as well as correlation between exposure to communication media extent of use of weeds consumed as vegetables as well as correlation between vegetables consumption behavior of the consumers and extent of use of weeds consumed as vegetables of the vegetables consumers was positive and significant.

Reference:

[1]. BBS 2011: Statistical Yearbook of Bangladesh. Bangladesh Bureau of Statistics. Statistics Division, Ministry of Planning, Government of the People"s Republic of Bangladesh.

[2]. BRRI 2012: Dhan Chaser Somossa (Problems of Rice Cultivation). Bangladesh Rice Research Institute. 4th Revised edition. MRI Printing Press, Dhaka, Bangladesh. p. 57.

[3]. Khader V 2004: Preservation of Fruits and Vegetables. 2nd revised edition. Kalayani Pritings, New Delhi, India. p. 1.

[4]. Linares E, Aguirre J 1992: Los quelites, un tesoro culinario. Universidad Autonoma de Mexico and Instituto Nacional de la Nutricion"Salvador Zubiran", Mexico. p. 141. [Cited from Khattak, I.A., Khan, I.A. and Nazif, W. 2006. Weeds as Human Food-A Conquest for Cheaper Mineral Sources. *Journal of Agricultural and Biological Science* **1** 12-16.

[5]. Pomberton R, Lee NS 1996: Wild Food Plants in South Korea : Market Presence, New Crops Sand Exports to the United States. Economical Botany, 50:57-70. [Cited from Khattak, I.A., Khan, I.A. and Nazif, W. 2006. Weeds as Human Food-A Conquest for Cheaper Mineral Sources. *Journal of Agricultural and Biological Science* **1** 12-16.

[6]. Rahaman SMB, Kumar S, Sayeed MAB 2008: Ecological Diversity and Distribution of Aquatic and Semi-aquatic Weeds in Khulna, Bangladesh. *South Asian Journal of Agriculture* **3** 163-168.

[7]. Saifullah M, Goffar MA, Bhuyan MAJ 2010: Utilization of Indigenous Vegetables for Sustainable Vegetable Production in Bangladesh. *International Symposium on Sustainable Vegetable Production in Southeast Asia. ISHS Acta Horticulturae* 958.

[8]. Shah MS, Sayeed MAB, Talukder BA, Ghosh AK 2007: Aqua Products in Khulna Metropolitan Urban and Peri-Urban Areas of Bangladesh. *South Asian Journal of Agriculture* **2** 107-112

[9]. Tanji A, Nassif F 1995: Edible Weeds in Morocco. Weed Technology, 9: 617-620. [Cited from Khattak, I.A., Khan, I.A. and Nazif, W. 2006. Weeds as Human Food-A Conquest for Cheaper Mineral Sources. *Journal of Agricultural and Biological Science* **1** 12-16.