

Regular Article

pISSN: 2288–9744, eISSN: 2288–9752
Journal of Forest and Environmental Science
Vol. 36, No. 4, pp. 311–317, December, 2020
<https://doi.org/10.7747/JFES.2020.36.4.311>

Factors Influencing the Consumption of Wild and Cultivated Mushroom Species in Southwestern Nigeria

Ayanyemi Elizabeth Adegbenjo*, Margaret Olunfunsho Adedokun and Samuel Adeniran Oluwalana
Department of Forestry and Wildlife Management, Federal University of Agriculture, Abeokuta, 2240 Abeokuta, Ogun State, Nigeria

Abstract

Mushroom has economic, food and medicinal value to a large proportion of human populace. This study assessed the consumption pattern of mushroom species in Southwestern Nigeria. Non-probability sampling method was used to select 20 Local Government Areas (LGAs) from 3 states and four communities were selected purposively from each LGAs. Snow-ball sampling approach was used in selecting 5 respondents from each community, making a total of 400 respondents. Descriptive statistics was used to describe the socio-economic characteristics of the respondents, to compare the differences between the local (wild) and Exotic (cultivated) mushroom Species and to determine the rate at which mushroom substitute is consumed among the mushroom consumers. Logit regression was used to identify the factors influencing mushroom consumption in the study area. Thirty percent of the respondents were aged 41 to 50 years, with mean age of 49.76 years. About 82% had tertiary education, 17.3% earned above N200,000 monthly and 8.8% spent above N6000 monthly on mushroom. Logit regression showed that age (-3.21), household size (-2.17) and medicinal benefits (-2.17) had significant ($p < 0.01$) negative effects on mushroom consumption. Conclusively, mushroom has wide acceptance among the general populace, good for food and medicine; hence, awareness should be created through agricultural policy on the need for mushroom cultivation and consumption in Nigeria.

Key Words: food, mushroom cultivation, mushroom cultivation, mushroom substitutes, logit regression

Introduction

Mushrooms belong to the kingdom of Fungi, a group very distinct from plants, animals and bacteria. Fungi lack the most important feature of plants which is the ability to use energy from the sun directly through chlorophyll. Thus, fungi depend on other organisms for food, absorbing nutrients from the organic material in which they live (Akpaja et al. 2003). Mushrooms have long been valued as tasty, nutritious food by different societies throughout the world. In the developing world, including Africa, mush-

rooms are used as food and medicine in many societies (NAPRECA 2006).

Edible mushrooms are consumed by humans for their nutritional and occasionally supposed medicinal value as comestibles. Mushrooms consumed by those practicing folk medicine are known as medicinal mushrooms. While hallucinogenic mushrooms (e.g. Psilocybin mushrooms) are occasionally consumed for recreational or religious purposes, they can produce severe nausea and disorientation, and are therefore not commonly considered edible mushrooms (Boa 2004).

Received: December 31, 2019. Revised: November 2, 2020. Accepted: November 6, 2020.

Corresponding author: Ayanyemi Elizabeth Adegbenjo

Department of Forestry and Wildlife Management, Federal University of Agriculture, Abeokuta, 2240 Abeokuta, Ogun State, Nigeria
Tel: +2348132683884, E-mail: adegbenjoae@funaab.edu.ng

According to Boa (2004), the act of consuming mushrooms known as Mycophagy can be dated back to ancient times. Edible mushroom species have been found in association with 13,000 year old ruins in Chile, but the first reliable evidence of mushroom consumption dates to several hundred years BC in China. The Chinese value mushrooms for medicinal properties as well as for food. Ancient Romans and Greeks, particularly the upper classes, used mushrooms for culinary purposes (Boa 2004).

USITC (2010) reported that in 2007, global mushroom consumption amounted to 3.3 million mt and China, the EU, and the United States were the leading global consumers of mushrooms. Other major consumers included Canada, Japan, Russia, Australia, and India. Virtually all consumption in China, the EU, and India was supplied from domestic production. On the other hand, virtually all Russian consumption was supplied by imports. Finally, consumption in the United States, Canada, Japan, and Australia was supplied mostly by domestic production but also by significant amounts of imports (USITC 2010).

Inadequate regional food supplies, diminishing quality of health, and increasing environmental deterioration are three key underlying problems affecting the future well-being of humankind in Africa and especially Nigeria. The magnitude of these problems is set to increase as the population continues to grow (Sanchez et al. 2002). Despite the numerous, nutritional, health benefits and medicinal values of mushrooms, the importance of mushrooms in food security, especially in developing nations is not appreciated (Sanchez et al. 2002).

Because of these contributions, especially to household nutrition, economy and food security, medicinal values, employment opportunities, environmental conservation, and income, generation, this study was carried out to evaluate mushroom consumption in some areas of the southwest of Nigeria.

Materials and Methods

Study area

Three states were selected for the study. They are Ogun (Forest savannah), Lagos (Mangrove) and Oyo (Forest Mosaic) States Nigeria. These states were selected based on reconnaissance survey earlier carried out because both local

and exotic mushrooms are common in these states. Ogun state lies within 7°N and 6°N and longitude 2.5°E and 5°E. The rainy season is usually between March and October, while the dry season occurs from November – February. Lagos metropolitan area is approximately between longitudes 2°42 E to 3°42 E and latitudes 6°22N to 6°42 N, the rainy season is usually between April and October, while dry season occurs from November to March while Oyo State is approximately located between latitude 7°N and 9°N and longitude 2.5°E-5°E. The raining season is usually between March and October while the dry season occurs from November to February (Latlong.net 2017).

Data collection and analysis

The instrument of data collection was structured questionnaire. Non probability sampling method was used for this study. Based on reconnaissance survey, 3 States were selected from Southwest Nigeria; they are Lagos, Oyo and Ogun States. From each State, sampling intensity of Local Government Areas (LGAs) was done thus, 5 LGAs in Lagos State, 9 LGAs in Oyo State and 6 LGAs in Ogun State as shown in Table 1 (10% of LGAs present in each states were selected). Four communities were selected purposively because both local and exotic mushrooms were commonly available in the communities and a snow ball sampling approach was used to select 5 respondents (majorly, the household heads) from each communities making a total number of 400 respondents.

The questionnaire was divided into two parts. Part A ad-

Table 1. Sampling plan showing the States and the LGAs visited

	OYO	OGUN	LAGOS
Ibadan South	(20)	Ado-odo (20)	Alimosho (20)
Egbeda	(20)	Ifo (20)	Eti-osa (20)
Kajola	(20)	Odeda (20)	Lagos-Island (20)
Afijio	(20)	Obafemi- owode (20)	Ikorodu (20) Lagos- (20)
Ibadan North	(20)	Remo (20)	Mainland
Lagelu	(20)	Ijebu- (20)	
Iwajowa	(20)	Northeast	
Irepo	(20)		
Ogo-Oluwa/ Surulere	(20)		
Total	180	120	100

dressed the socio-economic characteristics of respondents while part B addressed the factors that influence mushroom consumption in the study area. Variables analyzed were sex,

age, educational status, major occupation, household income, food expenditure and mushroom expenditure. Descriptive statistical tools such as frequencies and percen-

Table 2. Socio-economic characteristics of the respondents

Variables	Frequency (Oyo)	Frequency (Ogun)	Frequency (Lagos)	Frequency (Pooled)
Age				
30 years & below	12 (6.7)	10 (8.3)	6 (6.0)	28 (7.0)
31-40	32 (17.7)	22 (18.3)	16 (16.0)	70 (17.5)
41-50	65 (36.1)	32 (26.8)	23 (23.0)	120 (30.0)
51-60	38 (21.1)	31 (25.8)	28 (28.0)	97 (24.3)
61-70	23 (12.8)	15 (12.5)	12 (12.0)	50 (12.5)
71 years & above	10 (5.6)	10 (8.3)	15 (15.0)	35 (8.8)
Total	180 (100)	120 (100)	100 (100)	400 (100)
Mean age (yrs)	51.02	49.28	48.98	49.76
Gender				
Male	112 (62.2)	66 (55.0)	56 (56.0)	234 (58.5)
Female	68 (37.8)	54 (45.0)	44 (44.0)	166 (41.5)
Total	180 (100)	120 (100)	100 (100)	400 (100)
Marital status				
Single	43 (23.9)	34 (28.3)	43 (43.0)	120 (30.0)
Married	127 (70.6)	76 (63.3)	51 (51.0)	254 (63.5)
Divorced	4 (2.2)	7 (5.9)	0 (0.0)	11 (2.8)
Widowed	6 (3.3)	3 (2.5)	6 (6.0)	15 (3.8)
Total	180 (100)	120 (100)	100 (100)	400 (100)
Religion				
Christianity	140 (77.8)	102 (85.0)	76 (76.0)	318 (79.5)
Islam	28 (15.6)	12 (10.0)	12 (12.0)	52 (13.0)
Traditional	12 (6.6)	6 (5.0)	12 (12.0)	30 (7.5)
Total	180 (100)	120 (100)	100 (100)	400 (100)
Household size				
1-4 members	110 (61.1)	48 (40.0)	65 (65.0)	223 (55.8)
5-8 members	70 (38.9)	72 (60.0)	35 (35.0)	177 (44.3)
Total	180 (100)	120 (100)	100 (100)	400 (100)
Mean HH size	3.87	3.28	3.79	4.10
Education				
No formal	9 (5.0)	2 (1.7)	0 (0.0)	11 (2.8)
Secondary	25 (13.9)	20 (16.7)	17 (17.0)	62 (15.5)
Tertiary	146 (81.1)	98 (81.6)	83 (83.0)	327 (81.8)
Total	180 (100)	120 (100)	100 (100)	400 (100)
Mean education (yrs)	12.66	13.93	12.37	14.94
Occupation				
Business	22 (12.2)	13 (10.8)	32 (32.0)	67 (16.8)
Civil servant	108 (60.0)	77 (64.2)	31 (31.0)	216 (54.0)
Public servant	7 (3.9)	3 (2.5)	6 (6.0)	16 (4.0)
Researcher	16 (8.9)	10 (8.3)	16 (16.0)	42 (10.5)
Student	15 (8.3)	9 (7.5)	8 (8.0)	32 (8.0)
Total	180 (100)	120 (100)	100 (100)	400 (100)

Values in parentheses are in percentages.

tages were used to analyzed variables of interest. Logit regression was also used to determine the factors influencing mushroom consumption in the study area as expressed below;

$$Y = \frac{1}{1 + \exp^{-(\beta_0 + \beta_i X_i)}} \dots\dots\dots (1)$$

Where:

Y = consumers' response to preference question which is dichotomous

$$Z = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots\dots\dots + \beta_{11} X_{11}$$

β_0 = coefficient of explanatory variables

$X_1, X_2, \dots\dots\dots X_{11}$ are the explanatory variables

Results and Discussion

Socio-economic characteristics of respondents

The socio-economic characteristic of the respondents (Table 2) shows that the age group of 41-50 years had the highest respondents of 30%. The sex distribution data indicates that majority (58.5%) of the respondents were male

Table 3. Distribution of households by monthly income, food expenditure and mushroom expenditure

	Oyo	Ogun	Lagos	Frequency (Pooled)
Monthly income group				
20,000 Naira or less	16 (7.8)	10 (8.3)	7 (7.0)	33 (8.3)
20,001-40,000	11 (6.1)	3 (2.5)	6 (6.0)	21 (5.3)
40,001-60,000	9 (5.0)	6 (5.0)	7 (7.0)	23 (5.8)
60,001-80,000	15 (8.3)	14 (11.7)	5 (5.0)	35 (8.8)
80,001-100,000	18 (10.0)	14 (11.7)	13 (13.0)	46 (11.5)
100,001-120,000	18 (10.0)	5 (4.2)	4 (4.0)	18 (4.5)
120,001-140,000	21 (11.7)	19 (15.8)	13 (13.0)	54 (13.5)
140,001-160,000	21 (11.7)	14 (11.7)	8 (8.0)	44 (11.0)
160,001-180,000	14 (7.8)	7 (5.8)	9 (9.0)	31 (7.8)
180,001-200,000	9 (5.0)	7 (5.8)	9 (9.0)	26 (6.5)
200,001 Naira or more	28 (15.6)	21 (17.5)	19 (19.0)	69 (17.3)
Total	180 (100)	120 (100)	100 (100)	400.0
Mean	135,324.1	139,721.8	146,369	139,404.64
Spent on food items+ mushrooms				
10,000 Naira or below	21 (11.7)	19 (15.8)	17 (17.0)	57 (14.3)
10,001-20,000	55 (30.6)	43 (35.8)	28 (28.0)	126 (31.5)
20,001 -30,000	47 (26.1)	32 (26.7)	31 (31.0)	110 (27.5)
30,001 -40,000	38 (21.1)	18 (15.0)	6 (6.0)	62 (15.5)
40,001-50,000	10 (5.6)	7 (5.8)	10 (10.0)	27 (6.8)
50,001 Naira or more	9 (5.0)	1 (0.8)	8 (8.0)	18 (4.5)
Total	180 (100)	120 (100)	100 (100)	400.0
Mean	21,342.56	24,031.5	24,311.6	24,151.55
Spent on mushroom and mushroom products				
1,000 Naira or less	45 (25.0)	33 (27.5)	19 (19.0)	97 (24.3)
1,001-2,000	42 (23.3)	23 (19.2)	17 (17.0)	82 (20.5)
2,001-3,000	21 (11.7)	20 (16.7)	14 (14.0)	55 (13.8)
3,001-4,000	29 (16.1)	18 (15.0)	19 (19.0)	66 (16.5)
4,001-5,000	21 (11.7)	10 (8.3)	9 (9.0)	40 (10.0)
5,001-6,000	10 (5.6)	5 (4.2)	10 (10.0)	25 (6.3)
6,001 Naira or more	12 (6.7)	11 (9.2)	12 (12.0)	35 (8.8)
Total	180 (100)	120 (100)	100 (100)	400
Mean	3,087.22	2,989.73	3,100.68	3,169.40

Values in parentheses are in percentages.

and (41.5%) female. It can be inferred from the distribution that food demand decisions were dominated by male-headed households in the study area. Also, majority (63.5%) were married and educated (81.8%). This is because education is an important factor in food decision making among households as it helps to understand the health information knowledge about the attribute of food. There are both positive (taste and essential nutrient) and negative (health risk) attribute of food (CPRC 2008). Similarly, education affects the income level of households. This is in line with the report of Jajua and Kamal (2011) that reported on education as a tool to reduce poverty through direct (income) and indirect (externalities) channels. The structure of major occupation of respondents revealed that most respondents were involved in one occupation or the other and these enhanced the income of the respondents.

Households monthly income, food expenditure and mushroom expenditure

The result of the household income level in Table 3 revealed that the yearly mean expenditure of the respondents is 139404.64. This indicated that majority of respondents are well to do because they dwell majorly in urban areas. According to the Nigerian Living Standards Survey (NLSS) report released by the NBS covering the year 2019, reported that 52.1% of rural dwellers in Nigeria are poor, while only 18.04% of urban dwellers are classified as poor. According to NBS, on average, 4 out of 10 individuals in Nigeria has real per capita expenditures below N137,430 per year, which translates to N376.5 per day (nairametric.com, 05/10/2020, 05:30 am). It is further revealed in Table 3 that 24.3% spent less than ₦1,000 on mushrooms per month

Table 4. Comparison of local (wild) and exotic (cultivated) mushroom species based on their characteristics

	Mushroom type	Frequency (Oyo)	Frequency (Ogun)	Frequency (Lagos)	Frequency (Pooled)
Taste Better	Exotic	62 (34.3)	45 (37.5)	31 (31.0)	138 (34.5)
	Local	118 (65.6)	55 (45.8)	69 (69.0)	262 (65.5)
	Total	180 (100.0)	120 (100.0)	100 (100.0)	400 (100.0)
Flavour	Exotic	79 (43.9)	67 (55.8)	40 (40.0)	186 (46.5)
	Local	101 (56.1)	53 (44.2)	60 (60.0)	214 (53.5)
	Total	180 (100.0)	120 (100.0)	100 (100.0)	400 (100.0)
Texture	Exotic	91 (50.6)	63 (52.5)	44 (44.0)	198 (49.5)
	Local	89 (49.4)	57 (47.5)	56 (56.0)	202 (50.5)
	Total	180 (100.0)	120 (100.0)	100 (100.0)	400 (100.0)
Appearance	Exotic	139 (77.2)	89 (74.2)	70 (70.0)	298 (74.5)
	Local	41 (22.8)	31 (25.8)	30 (30.0)	102 (25.5)
	Total	180 (100.0)	120 (100.0)	100 (100.0)	400 (100.0)
Shelf life	No response	3 (1.7)	0 (0)	0 (0)	3 (0.8)
	Exotic	117 (65.0)	90 (75.0)	55 (55.0)	262 (65.5)
	Local	60 (33.3)	30 (25.0)	45 (45.0)	135 (33.8)
	Total	180 (100.0)	120 (100.0)	100 (100.0)	400 (100.0)
Poisonous threat	Exotic	27 (15.0)	22 (18.3)	15 (15.0)	64 (16.0)
	Local	153 (85.0)	98 (81.7)	85 (85.0)	336 (84.0)
	Total	180 (100.0)	120 (100.0)	100 (100.0)	400 (100.0)
Availability	No response	2 (2.5)	0 (0)	1 (1.0)	3 (0.8)
	Exotic	121 (67.3)	81 (67.5)	72 (72.0)	274 (68.5)
	Local	59 (32.7)	39 (32.5)	28 (28.0)	123 (30.8)
	Total	180 (100.0)	120 (100.0)	100 (100.0)	400 (100.0)
Affordability	Exotic	29 (16.1)	24 (20.0)	16 (16.0)	69 (17.3)
	Local	151 (83.9)	96 (80.0)	84 (84.0)	331 (82.8)
	Total	180 (100.0)	120 (100.0)	100 (100.0)	400 (100.0)

Values in parentheses are in percentages.

and 20.5% spent between ₦1,001 to ₦2000 while the minimum mushrooms expenditure was ₦200 and the maximum expenditure was ₦14,000.

Comparison of local (wild) and exotic (cultivated) mushroom species based on their characteristics

Table 4 revealed that majority of the respondent in Oyo, Ogun and Lagos states preferred local mushroom to exotic mushroom when it comes to taste, affordability and flavour although in Ogun state, more respondents (55.8%) preferred exotic mushroom to local mushroom in terms of flavour. Exotic mushrooms are much more preferred to other mushrooms when it comes to appearance, shelf life, being poisonous and availability. From the pooled result, 65.5% of the respondents reported that local mushrooms taste better while 74.5% said that exotic mushroom appears better. This agrees with the findings of (Sawyer 2000) who stated that though national schemes introduced technologies for the cultivation of exotic mushroom species which, even though suitable to the local conditions, did not suit the taste preferences of the local people.

Factors influencing mushroom consumption in Southwestern Nigeria

The result of the factors influencing mushroom consumption in the study areas is shown in Table 5. From the result, LRChi² (11) value is 327.78 which was statistically significant at 10%, Pseudo R² = 0.05942 and the Log likelihood = -111.92. The calculated Chi-square value associated with the Likelihood Ratio (LR) test was significant at p < 0.01 which indicated the goodness of fit.

The sign of the coefficient showed the direction of the variables in relation with the dependent variable, while the marginal effects describe the magnitude of the change in a unit of the independent variable on the dependent variable. The variable age and medicinal benefit were negative and significant at p < 0.01. This implies that an increase in age reduces the probability of the respondents to consume mushroom in the study area. The household size, income, seasonality, price of related goods, mushroom price and nutritional benefit of mushroom are significant and positive at p < 0.01 level of significance. This means that majority of households were conscious of their food intake, this may be attributed to the fact that they wanted their household to benefit in nutritious food intake and to avoid the risk in-

Table 5. Factors Influencing Mushroom Consumption in Southwestern Nigeria

Variable	Co-efficient	T-ratio	Marginal effect	Standard error
Age	-3.2088***	-5.89	-0.7872	0.5448
Household size	2.1749***	4.02	0.5336	0.5407
Income	3.5767***	5.17	0.8775	0.6919
Mushroom price	3.8392***	7.91	0.9419	0.4856
Price r/goods	5.7257***	4.09	1.4047	1.3992
Season	3.9481***	8.04	0.9686	0.4908
Nutritional benefit	2.1279***	3.41	0.5221	0.6242
Medicinal benefit	-2.1717***	-3.61	-0.5328	0.6015
Gender	0.0244	0.06	0.0059	0.3863
Marital status	-0.0786	-0.29	0.0193	0.2703
Education	0.1612	0.70	0.0395	0.2301
Constant	-17.9460***	-5.53		3.2447

Numbers of Obs= 400
 LR Chi² (11)= 327.78
 Prob > Chi² = 0.0000
 PseudoR² = 0.05942*
 Log Likelihood= -111.9216***

***p < 0.01, **p < 0.05, *p < 0.1.

volved when faced with the challenges of hidden hunger. This is related to the report of Burchi et al. (2011) who concluded that a new focus must be undertaken that addresses the long term determinants of nutrition insecurity and hidden hunger and community and households has major role to play by combating this challenge with nutritious foods. The marginal effect shows that the variables age and medicinal factor was negative and highly significant. This disagrees with the findings of Adejo and Ademu 2018 who stated that age has positive marginal effect on the mushroom consumption. This implies that the rate of mushroom consumption decreases as these variables increases. The marital status had a negative correlation with the likelihood of mushroom consumption although, it was not statistically significant. On the other hand, gender and education of the respondents had a positive correlation with the likelihood of the respondents to mushroom consumption although not statistically significant.

Conclusion

It can be concluded from this study that mushroom has wide acceptance in the study areas. Education however, is an important factor in food decision making among the respondents as it helps them to understand their health needs and the attribute of food they consumed. Household size can affect the type and quality of food consumed in a family, majority of the household size of the respondents are small and this has a positive effect on food intake of the respondents because they want their household to benefit in nutritious food intake and to avoid the risk involved when faced with the challenges of hidden hunger. And as the respondents increase in age, they become more conscious of what they consume basically because of their health issues.

Furthermore, most of the respondents in the study areas had better income when their income is considered. The amount of food and mushroom expenditure shows that the respondents were not poor and were conscious of their health status. Also, local mushroom is more preferable in terms of taste, flavour and price while exotic mushroom is highly preferable when comes to appearance, shelf life and low rate of poisonous threat.

Finally, mushroom is a very good source of protein in daily diet and respondents were ready to go for it if it is

readily available in the market.

Acknowledgements

I acknowledged my supervisor in person of Prof. Sam A. Oluwalana for is constructive criticism. This research is complied with the current laws of Nigeria where this research was performed.

References

- Adejo PE, Ademu H. 2018. Attitude of Rural Farming Household towards the Consumption of Edible Mushrooms in Dekina Local Government Area, Kogi State, Nigeria. *Nutri Food Sci Int J* 5: 555661.
- Akpaja EO, Isikhuemhen OS, Okhuoya JA. 2003. Ethnomycology and Usage of Edible and Medicinal Mushrooms among the Igbo People of Nigeria. *Int J Med Mushrooms* 5: 313-319.
- Berg SVD. 2008. Poverty and Education. IIEP- International Institute for Educational Planning, Paris, 125 pp.
- Boa ER. 2004. Wild Edible Fungi: A Global Overview of Their Use and Importance to People. Food and Agriculture Organization of the United Nations, Rome, 157 pp.
- Burchi F, Fanzo J, Frison E. 2011. The role of food and nutrition system approaches in tackling hidden hunger. *Int J Environ Res Public Health* 8: 358-373.
- Chronic Poverty Research Centre. 2008. Chronic Poverty Report 2008-09: Escaping Poverty Traps. CPRC, Manchester, pp 127-133.
- Janjua PZ, Kamal UA. 2011. The Role of Education and Income in Poverty Alleviation: A Cross-Country Analysis. *Lahore J Econ* 16: 143-172.
- LatLong.net. Cities in Nigeria. <https://www.latlong.net/category/cities-160-15.html>. Accessed 5 Oct 2020.
- Nairametrics. 2020. Over 82 Million Nigerians are Poor, Northern States Dominate List. <https://nairametrics.com/2020/05/04/breaking-over-82-million-nigerians-are-poor-northern-states-dominate-list/>. Accessed 5 Oct 2020.
- NAPRECA. 2006. The First All-Africa Scientific Conference on Edible and Medicinal Mushrooms; 2006 Oct 25-29; Nile Resort Hotel, Jinja, Uganda: NAPRECA.
- Sánchez A, Ysunza F, Beltrán-García MJ, Esqueda M. 2002. Biodegradation of viticulture wastes by *Pleurotus*: a source of microbial and human food and its potential use in animal feeding. *J Agric Food Chem* 50: 2537-2542.
- USITC (United State International Trade Commission), Certain Preserved Mushrooms, 2010, II-2. Industry official, telephone interview with Commission staff, November 13, 2009.
- World Health Organization. 2011. Global Status Report on Noncommunicable Diseases 2010. World Health Organization, Geneva, 162 pp.